Draft Environmental Impact Statement

2013

VOLUME I

East Monroe Comprehensive Plan Amendment and Subsequent Rezone

Submitted August 2013

PACE
An Engineering Services Company

Draft Environmental Impact Statement
East Monroe Comprehensive Plan Amendment
and Subsequent Rezone

Prepared by:

11255 Kirkland Way | Suite 300
Kirkland, Washington 98033-6715
p 425.827.2014 | *f* 425.827.5043

www.paceengrs.com

With Assistance From:

Fact Sheet

NAME OF PROPOSAL

East Monroe Comprehensive Plan Amendment and Subsequent Rezone

PROPOSAL LOCATION

The Proposed Action of a Comprehensive Plan amendment and subsequent rezone is for five parcels of land within the eastern portion of the City of Monroe in Snohomish County, Washington. The 42.81 acre site is located along the north side of State Route 2 near the eastern city limits and within Sections 5 and 6, Township 27N, Range 07E, W.M. The five parcels coincide with Snohomish County Assessor's Office parcel numbers: 270706-001-025-00 (Parcel A), 270705-002-061-00 (Parcel B), 270705-002-062-00 (Parcel C), 270705-002-063-00 (Parcel D), and 270705-002-064-00 (Parcel E). The proposal has been modified from the previous six-parcel rezone application (received by the City on July 23, 2010) and environmental analyses in 2012 by eliminating the adjacent parcel east of the current proposal (Lot F).

PROPOSED ACTION

The Proposed Action is an Amendment to the City of Monroe Comprehensive Plan and subsequent Rezone of the subject property from the current designation Limited Open Space (LOS) to General Commercial (GC). The property is entirely within the established Urban Growth Area and located along SR-2, a highway of statewide significance that is critical to the statewide transportation network. SR-2 is one of only three roadways providing year-round access between Eastern and Western Washington. As such, rezone to a classification that allows for commercial and sundry uses, will help maintain and enhance critical areas and supports a balance between socioeconomic growth, development and protection of the environment. These objectives are consistent with the goals and objectives of Growth Management Act Planning. Three alternatives have been considered for this DEIS.

- **Alternative 1: No Action – Retain Limited Open Space Zoning**
  The No Action Alternative presents a potential development scenario that considers collective development of five parcels under the current LOS land use and zoning designation.

- **Alternative 2: Rezone to General Commercial (Proposed Action)**
  Alternative 2 contemplates collective development of the five parcels as allowed under GC land use and zoning designation as allowed under the Monroe Municipal Code. Alternative 2 is the Proposed Action of this DEIS.

- **Alternative 3: Rezone to Mixed Use Commercial**
  Alternative 3 contemplates development of the property under a Comprehensive Plan designation of Mixed Use (MU) and zoning designation of Mixed Use Commercial (MUC) under allowable uses put forth in Monroe Municipal Code.

ACTION SPONSOR

Heritage Baptist Fellowship
P.O. Box 1090
Monroe, WA 98272

LEAD AGENCY

City of Monroe
806 W. Main Street
Monroe, WA 98272
360.794.7400

CITY OF MONROE RESPONSIBLE OFFICIAL

Melissa Sartorius, AICP, Senior Planner

DEIS CONTACT PERSON

Susan E. Boyd, Vice President
PACE Engineers, Inc.
11255 Kirkland Way, Suite 300
Kirkland, Washington 98033-6715
425.827.2014
susanb@paceengrs.com

CITY OF MONROE APPROVALS REQUIRED

- Adoption of ordinance amending comprehensive plan land use designation.
- Adoption of ordinance rezoning property.
- Any future development and capital improvement projects will be subject to additional environmental review and required to obtain all necessary permits.

AUTHORS AND CONTRIBUTORS

PACE Engineers, Inc. 11255 Kirkland Way Suite 300 Kirkland, WA 98033 Phone 425.827.2014	Susan E. Boyd, Principal Christina W. Long, P.E., Project Engineer Megan K. Hawkins, Planner
Wetlands Resources, Inc.	Scott Brainard, PWS 425.337.3174
Gibson Traffic Consultants, Inc.	Brad Lincoln, P.E. 425.339.8266
GeoEngineers	Debra Overbay, P.E. 425.861.6000

DATE OF ISSUANCE OF THIS DRAFT EIS

August 14, 2013

COMMENT PERIOD

Comments are due no later than September 13, 2013 at 5:00 pm

DATE OF ISSUANCE OF FINAL EIS

Expected on September 27, 2013

FINAL ACTION

Final action on the Comprehensive Plan Amendment is expected to take place on December 17, 2013.

SUBSEQUENT ENVIRONMENTAL REVIEW

Additional environmental review will be required at the time that specific proposals are made for development of the property and applications for permits are made. No dates are known or committed at this time.

LOCATION OF BACKGROUND MATERIAL

Materials such as City codes, planning documents, and historical information pertaining to the site incorporated by reference herein are available for review at the City of Monroe at 806 W Main Street in Monroe, WA.

COST OF DOCUMENT

This document can be purchased on CD for $5 from the City of Monroe.

Table of Contents

Table of Contents i
List of Tables iii
List of Figures iii
List of Appendices iii
Acronyms v
1. Summary 1
1.1 Overview of The Proposed Action 2
1.2 Objectives of Proposed Action 4
1.3 Proposal Location 4
1.4 Alternatives Considered 6
1.4.1 Alternative 1: No Action – Retain Limited Open Space Zoning 7
1.4.2 Alternative 2: Rezone to General Commercial (Proposed Action) 7
1.4.3 Alternative 3: Rezone to Mixed Use Commercial 7
1.5 Summary of Potential Environmental Impacts 8
1.6 Mitigation Measures 8
1.7 Significant Unavoidable Adverse Impacts 9
2. Proposed Action and Alternatives 15
2.1 Proposed Action 15
2.2 Alternatives 15
2.2.1 Alternative 1: No Action – Retain Limited Open Space Zoning 17
2.2.2 Alternative 2: Rezone to General Commercial (Proposed Action) 18
2.2.3 Alternative 3: Rezone to Mixed Use Commercial 19
2.3 Planning Requirements 20
2.3.1 Growth Management Act 20
2.3.2 City of Monroe Comprehensive Plan 20
2.3.3 City of Monroe Municipal Code 20
2.3.4 City of Monroe Critical Areas Ordinance 20
2.3.5 City of Monroe Shoreline Master Program 21
2.3.6 City of Monroe Water System Plan 21
2.3.7 City of Monroe Sanitary Sewer System Plan 21
2.4 Benefits and Disadvantages of Delaying the Proposed Action 21
3. Affected Environment, Impacts & Mitigation Measures 23
3.1 Earth 23
3.1.1 Affected Environment 23
Topography and Soils 23
Landslide and Erosion Hazard 23
3.1.2 Environmental Impacts 27
3.1.3 Mitigating Measures 31
3.1.4 Significant Unavoidable Adverse Impacts 33
3.2 Ground Water 33
3.2.1 Affected Environment 33
3.2.2 Environmental Impacts 33
3.2.3 Mitigating Measures 34
3.2.4 Significant Unavoidable Adverse Impacts 34
3.3 Surface Water 35
3.3.1 Affected Environment 35

3.3.2 Environmental Impacts 36
3.3.3 Mitigating Measures 38
3.3.4 Significant Unavoidable Adverse Impacts 40
3.4 Plants 40
3.4.1 Affected Environment 40
3.4.2 Environmental Impacts 41
3.4.3 Mitigating Measures 41
3.4.4 Significant Unavoidable Adverse Impacts 42
3.5 Animals 42
3.5.1 Affected Environment 42
3.5.2 Environmental Impacts 43
3.5.3 Mitigating Measures 44
3.5.4 Significant Unavoidable Adverse Impacts 44
3.6 Noise 44
3.6.1 Affected Environment 44
3.6.2 Environmental Impacts 45
3.6.3 Mitigating Measures 46
3.6.4 Significant Unavoidable Adverse Impacts 46
3.7 Land And Shoreline Use 46
3.7.1 Affected Environment 46
3.7.2 Environmental Impacts 48
3.7.1 Mitigating Measures 49
3.7.2 Significant Unavoidable Adverse Impacts 50
3.8 Aesthetics 50
3.8.1 Affected Environment 50
3.8.2 Environmental Impacts 51
3.8.3 Mitigating Measures 51
3.8.4 Significant Unavoidable Adverse Impacts 52
3.9 Light and Glare 52
3.9.1 Affected Environment 52
3.9.2 Environmental Impacts 52
3.9.3 Mitigating Measures 52
3.9.4 Significant Unavoidable Adverse Impacts 52
3.10 Transportation 53
3.10.1 Affected Environment 53
3.10.2 Environmental Impacts 53
3.10.3 Mitigating Measures 54
3.10.4 Significant Unavoidable Adverse Impacts 54
3.11 Public Services 54
3.11.1 Affected Environment 54
3.11.2 Environmental Impacts 55
3.11.3 Mitigating Measures 56
3.11.4 Significant Unavoidable Adverse Impacts 57
3.12 Utilities 57
3.12.1 Affected Environment 57
3.12.2 Environmental Impacts 58
3.12.3 Mitigating Measures 59
3.12.4 Significant Unavoidable Adverse Impacts 60
4. Summary of Cumulative Impacts 61

List of Tables

Table 1: Project Area Parcels 4
Table 2: Estimated Developable Area 6
Table 3: Impacts and Mitigations 11
Table 4: Alternatives Overview [1] 16
Table 5: Maximum Permissible Environmental Noise Levels 45
Table 6: City of Monroe Land Use Inventory (2012) 46
Table 7: Intersection Operations 53

List of Figures

Figure 1: Vicinity Map 5
Figure 2: Project Area and Parcels 5
Figure 3: Estimated Developable Area 7
Figure 4: Alternative 1 – Limited Open Space Conceptual Layout 17
Figure 5: Alternative 2 – General Commercial Conceptual Layout 18
Figure 6: Alternative 3 Mixed Use Commercial Conceptual Layout 19
Figure 7: Area Soils 24
Figure 8: Erosion Hazard Areas 24
Figure 9: Composite Critical Areas and Buffers 25
Figure 10: Cut and Fill Areas 28
Figure 11: Enhancement Area and Compensatory Flood Storage Cross-Section 29
Figure 12: Wetlands 36
Figure 13: City of Monroe Shoreline Environment Designations Map 48
Figure 14: South-Facing Property View from Bluff North of Study Area 51
Figure 15: Monroe School District Boundaries 55

List of Appendices

Appendix A: City of Monroe Comprehensive Plan Zoning Designation Map
Appendix B: Land Uses Table
Appendix C: GeoEngineers Geotechnical Soils Evaluation
Appendix D: Wetland Resources, Inc. Critical Areas Report
Appendix E: FEMA-FIRM Map 53061C1377G (Preliminary)
Appendix F: Gibson Traffic Analysis
Appendix G: Shoreline Use and Modification Matrix
Appendix H: 2003 Property Survey
Appendix I: City of Monroe Shoreline Environment Designations Map

Acronyms

ALS	Advanced Life Support
BMP	Best Management Practices
CPA	Comprehensive Plan Amendment
DOE	Department of Ecology
DOH	Department of Health
DPEIS	Draft Phased Environmental Impact Statement
EIS	Environmental Impact Statement
EPA	Environmental Protecting Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FPEIS	Final Phased Environmental Impact Statement
GC	General Commercial Zoning Designation
GIS	Geographic Information Systems
GLA	Gross Leasable Area
GMA	Growth Management Act
LID	Low Impact Development
LOS	Limited Open Space Zoning Designation
LoS	Level of Service
MMC	Monroe Municipal Code
MUC	Mixed Use Commercial Zoning Designation
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
NPDES	National Pollution Discharge Elimination System
OHWM	Ordinary High Water Mark
OFM	State Office of Financial Management
PGIS	Pollution-Generating Impervious Surfaces
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
TESC	Temporary Erosion and Sediment Control
UGA	Urban Growth Area
USFWS	United States Department of Fish and Wildlife
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington Department of Natural Resources
WHPA	Wellhead Protection Area
WSDOT	Washington State Department of Transportation

1. Summary

The subject property is located near the eastern boundary of the City of Monroe on the north side of State Route 2. Critical areas and environmental regulations have significantly impacted the site and resulted in approximately 75% of the total site being undevelopable or designated for protection as critical areas and buffers. Despite multiple land use action proposals, the applicant is still searching for the highest and best use for the property.

In its current state, the property is of low value both economically and ecologically (see Appendix D for more detail regarding ecological value and function). This 2013 Draft Environmental Impact Statement (DEIS) examines how best to achieve a balance between protection of the environment and maximizing the socio-economic value of the property as a gateway into the City of Monroe. Although numerous critical areas (steep slopes, streams, shorelines, wetlands and floodplains) have been identified on the site, the majority of these features are low functioning and provide little ecological value in their current state. Rezone and future development of the property for commercial use presents a unique opportunity for restoring ecological functions and enhancing critical areas to benefit the environment and community.

The proposed Comprehensive Plan amendment and subsequent rezone is a non-project action, however, consideration of potential future development under the proposed zoning designation is required for a complete evaluation under City of Monroe requirements and SEPA regulations. Although three potential development concepts have been considered, no specific development proposal is known or under application at this time. Future development concepts are speculative and this DEIS only anticipates what could be proposed. Any application for a project action will be required to demonstrate that work in critical areas complies with Monroe Municipal Code (MMC) requirements. It is incumbent on the applicant to demonstrate compliance with the standards in the MMC, and all other local, state, and federal regulations at the time of application for development.

The result of this DEIS is identification of a range of opportunities for the site that go beyond environmental protection to enhance the value and function of critical areas and augment and improve habitat. As demonstrated herein, this can be achieved while allowing for land use activities that are appropriate to the site location along a major state highway. This type of balance meets key objectives of the Growth Management Act and local planning by concentrating urban activities within an established Urban Growth Area. The DEIS also recognizes the site as one of great potential for responding to the limited amount of undeveloped commercial property in the area, addressing market demand for land, promoting economic development and setting the precedent for future development in Monroe.

Two key features of the site present challenges in terms of arriving at a sound development proposal. These features are the stream/ slough from the Skykomish River that bisects the property and the steep slopes north of the stream that lead to residential properties on the bluff above the site. In addition, one Class II and two Class III wetlands have been identified on the site. Under any land use or zoning designation, collective development of the five subject parcels provides opportunity for a comprehensive mitigation strategy for the multiple environmental constraints identified.

An amendment of the City of Monroe Comprehensive Plan to allow for rezone of the property provides a complete solution to environmental challenges and makes development of the site in accordance with current codes economically feasible. A successful development proposal will avoid impacts to steep slopes and erosion of the north bank of the stream by retaining the wooded steep slope north of the stream in its natural state while enhancing critical areas and providing on-site flood management south of the stream. The combined development and environmental enhancement strategy discussed herein demonstrates that economic development and protection

of critical resources are not mutually exclusive endeavors. With the proposed land use and zoning change, the City is provided an opportunity to create a gateway entrance to East Monroe that represents and encourages economic development while preserving and enhancing critical areas. This DEIS demonstrates how a site of limited economic and environmental value in its current state could become a model example of successful commercial development accomplished in tandem with environmental protection and flood management.

History

An application for amending the Comprehensive Plan and rezoning certain properties in East Monroe was received by the City on July 23, 2010. This application included the properties addressed herein (Parcels A through E, Figure 2), together with an adjacent parcel to the east (identified as Parcel F in 2012 FPEIS but excluded from this proposal). The original application resulted in a Draft Phased Environmental Impact Statement (DPEIS) issued by the City of Monroe on February 29, 2012. Numerous comments were received on the DPEIS and addressed in the April 23, 2012 Final Phased EIS (FPEIS). An open record hearing was held on the FPEIS on July 19, 2012 and the Monroe Hearing Examiner concluded that the FPEIS was inadequate as a matter of law. In summary, although the proposal is a non-project action, additional detail and analyses of potential impacts was determined necessary to aid the decision making process of amending the Comprehensive Plan and approving the rezone.

Review of the 2012 DPEIS, FPEIS, and supporting documentation confirmed that while significant documentation exists for most of the original proposal, the easternmost parcel had not been studied to the same level of detail as the other five parcels included in this DEIS. After consideration of the Hearing Examiner decision, a choice was made to revise (reduce) the proposal to exclude the easternmost parcel, (formerly known as Lot F), and expand on 2012 environmental documentation with a comprehensive analysis of potential impacts associated with development of Parcels A through E under the requested General Commercial (GC) zoning designation. Although additional environmental analyses will be required at the time of actual development in accordance with City of Monroe development regulations and procedures, the objective of this DEIS is to provide an in-depth evaluation and establish a baseline for determining the range of potential impacts and mitigation strategies associated with development of the property. In doing so, the applicant demonstrates conceptual development scenarios that are consistent with local, state and federal regulations.

A team of consultants was formed to perform the necessary analyses and expand on previous work in accordance with the requirements of the State Environmental Policy Act (SEPA) and the SEPA Rules put forth in WAC 197-11. This 2013 Draft Environmental Impact Statement (DEIS) has been prepared by PACE Engineers, Inc. and sub-consultants specializing in wetlands and surface water, traffic, and geotechnical evaluations. It is based on current analyses and best available science but benefits from information previously assembled and comments received on the 2012 DPEIS. This 2013 DEIS also considers Conclusions of Law put forth in the Hearing Examiners Decision dated August 8, 2012. The primary purpose of this 2013 DEIS, however, is to present a comprehensive analysis of potential environmental impacts, mitigation measures, and significant unavoidable impacts that would likely be associated with development of the property under the conceptual development scenarios put forth herein.

1.1 OVERVIEW OF THE PROPOSED ACTION

The Proposed Action affects a group of five parcels encumbered by critical areas, buffers, and steep slopes. Although challenging, the subject property presents opportunity for enhancement and development allowed under General Commercial land use and zoning designations put forth by the City of Monroe. Development of the site will exemplify the benefits of mitigation under current code requirements and widely accepted best available science and no net loss standards.

Of the three alternatives evaluated, the Proposed Action is identified as Alternative 2 - an amendment to the City of Monroe's Comprehensive Plan changing the land use designation and allowing for subsequent rezone of the property from Limited Open Space (LOS) to General Commercial (GC). This change results in an expanded range of allowable uses under the City of Monroe Municipal Code and provides for highest and best use of the property.

To provide a comprehensive analysis and demonstrate that the subject property is appropriate for commercial development, conceptual site plans have been developed with full consideration of site opportunities and constraints. The Proposed Action (Alternative 2) considers a mixture of commercial activity including a larger scale retail store and smaller supporting businesses. The conceptual site plan for Alternative 2 includes assumptions regarding onsite infrastructure requirements as well as buffers and mitigation areas consistent with the MMC. It is understood, however, that the conceptual plan does not represent or replace the complete development plans that will be required of any future development proposals. It is incumbent on the applicants for any future development proposals to demonstrate compliance with the Monroe Municipal Code and all other local, state, and federal regulations at the time of application for development.

As noted throughout this DEIS, the subject property hosts an array of environmental challenges that warrant consideration to evaluate methods of avoidance, protection, and/or enhancement. The site's character is derived from its location between a steep hillside to the north and SR-2 to the south. Just south of the highway are the Burlington Northern/ Santa Fe Railroad tracks and the Skykomish River. An oxbow stream from the River flows through culverts under SR-2 and BNSFRR tracks and bisects the site. Shoreline, stream, and wetland areas require significant buffers and the location of much of the site in floodplain requires provision of compensatory flood storage to off-set placement of fill. Native Growth Protection Area (NGPA) and Urban Conservancy (UC) shoreline designation exist across portions of the property, as detailed in Section 3 and the Appendices to this DEIS. However, in terms of hydrology, water quality, and wildlife habitat, existing streams and wetlands are currently of low to moderate functional value. The environmental analyses put forth herein indicates that with wetland preservation and enhancement, the site can support commercial development as well as create a thriving NGPA and habitat area that is aesthetically pleasing to the community and beneficial to the environment.

Work within the NGPA is subject to approval by the City of Monroe in accordance with the MMC. Work would be accomplished in accordance with the intent, purpose and management policies for the Urban Conservancy designation as expressed in the City of Monroe's 2008 Shoreline Master Program. Invasive and nuisance vegetation currently limits habitat value adjacent to the south side of the stream and will be replaced with well-thought planting of native species to enhance critical areas and habitat and screen the proposed development from neighboring properties. Grading and enhancement in setbacks and buffers will comply with local, state and federal requirements to provide a pristine environment that is protected from unwanted disturbance with fencing and signs. Proposed buildings and parking will be outside of required buffers as required by code, allowing enhanced wetland and buffer areas to grow and mature without human interference. As explained in this DEIS, commercial development on the site can be accomplished to support a balance between both socioeconomic growth and environmental protection. Socioeconomically, the proposed Comprehensive Plan amendment will encourage development, allow for more jobs in the community and generate City tax revenue. In regards to wildlife, more birds and fish will be inclined to migrate to this area for its functionality and safer and more habitable wetland environment.

1.2 OBJECTIVES OF PROPOSED ACTION

The following objectives presented for the Proposed Action are examples and in no way represent requirements by the City or any private party.

- Respond to demand for, and lack of, undeveloped commercial property along the SR-2 transportation corridor
- Support and encourage regional and local economic development
- Encourage a mixture of land uses, including varying sizes of retail, restaurants, and open space
- Protect sensitive areas to the north of the stream/slough, while providing opportunities for coordinated mitigation and enhancement of impacted areas
- Provide a gateway to the City for travelers entering Monroe from the east
- Promote businesses that offer goods and services to current and future City residents and the traveling public
- Provide for coordinated land use and transportation improvements
- Provide for continued access and mobility in the project area
- Provide a streamlined SEPA review process for future project-level development proposals, consistent with the findings of this DEIS

1.3 PROPOSAL LOCATION

Figure 1 shows the general location and vicinity of the project. Figure 2 provides more detail on the project area and parcel boundaries.

The proposal occurs on 42.81 acres of land near the eastern boundary of the City of Monroe in Snohomish County, Washington. The site is located along the north side of State Route 2 and within Sections 5 and 6, Township 27N, Range 07E, W.M. The proposal includes a land use designation change and rezone of five parcels of land that are under single ownership and within the designated Urban Growth Area. The proposal has been modified from a previous six-parcel rezone application by eliminating the adjacent parcel east of the current proposal (previously identified as Lot F).

Table 1 provides detailed information on the five parcels (Parcels A through E) that constitute the proposed action. For unknown reasons, the area of Parcel C is not recorded in the Snohomish County Assessor's database and was therefore estimated by using Snohomish County's parcel line database in GIS format.

Table 1: Project Area Parcels

DEIS Lot Designation	Assessor's Parcel Number*	Gross Size* (acres)
A	27070600102500	15.73
B	27070500206100	5.01
C	27070500206200	5.20
D	27070500206300	6.85
E	27070500206400	10.02
	TOTAL	42.81

Source*: Snohomish County Assessor's Office online property database.

Figure 1: Vicinity Map

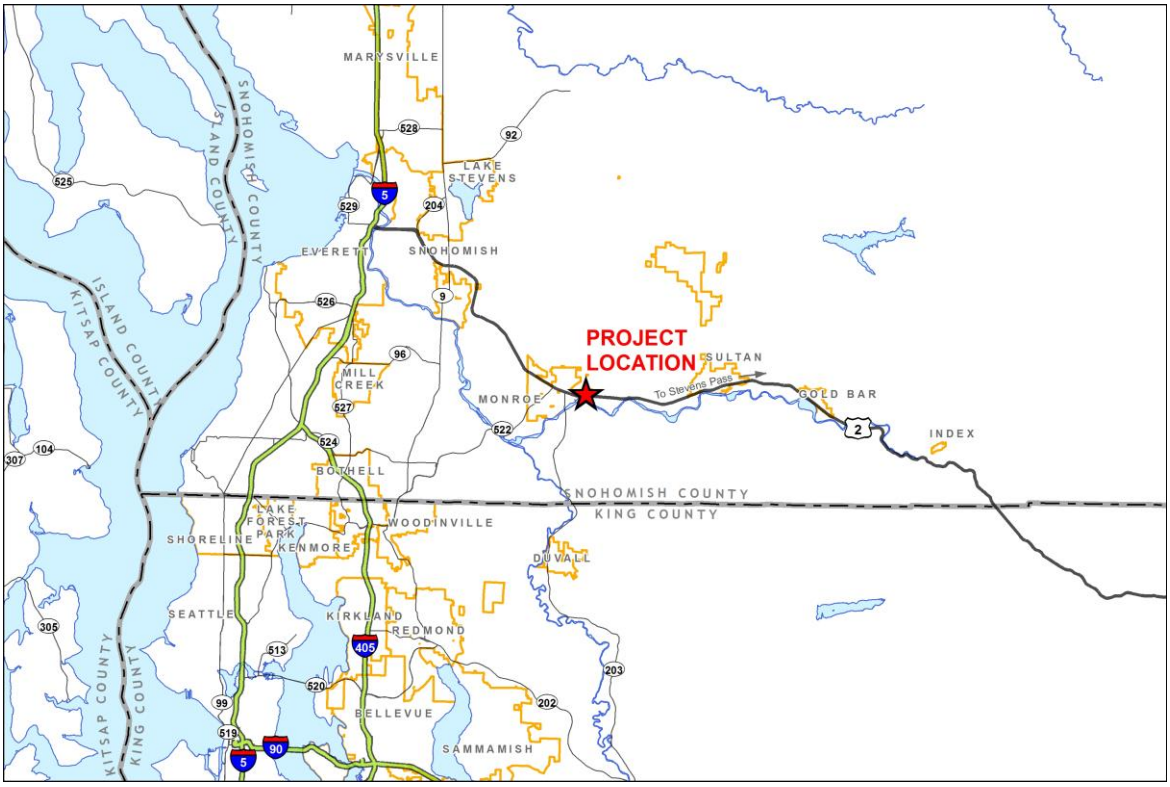
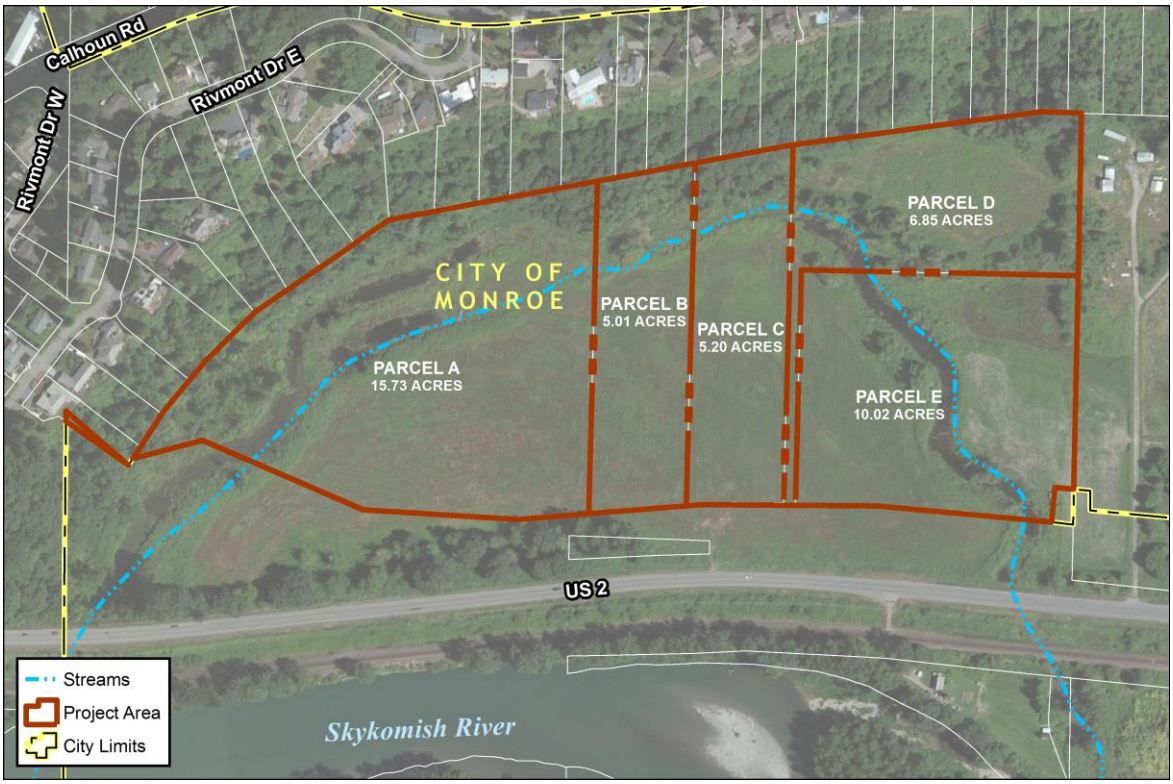


Figure 2: Project Area and Parcels



1.4 ALTERNATIVES CONSIDERED

No specific plan for development of the property has been identified or is known at this time. Review of previous environmental analyses, comments, responses and findings indicated that more detail was required for a complete evaluation of the proposal. Although this DEIS is for the non-project action of a Comprehensive Plan amendment and rezone, three land use and zoning alternatives are presented with conceptual development scenarios to demonstrate a range of potential impacts and avoidance mitigation and enhancement measures. Each alternative considers a different zoning classification and the associated types of permitted land use activities. Future development scenarios are speculative and this DEIS only anticipates what could be proposed. Any application for a project action will be required to demonstrate that work in critical areas complies with Monroe Municipal Code (MMC) requirements. It is incumbent upon the applicant to demonstrate compliance with the standards in the MMC, and all other local, state, and federal regulations at the time of application for development.

All of the alternatives are conceptual in nature and intended only to show possible development scenarios. The purpose of the alternative scenarios is to show development potential and identify the scope and range of likely mitigation strategies to avoid, reduce and/or mitigate impacts to the environment and community. Developable area and conceptual development alternatives are presented at a planning level and based on the Monroe Municipal Code, other regulatory requirements, recent site reconnaissance including wetland and shoreline mapping, and anticipated setback requirements.

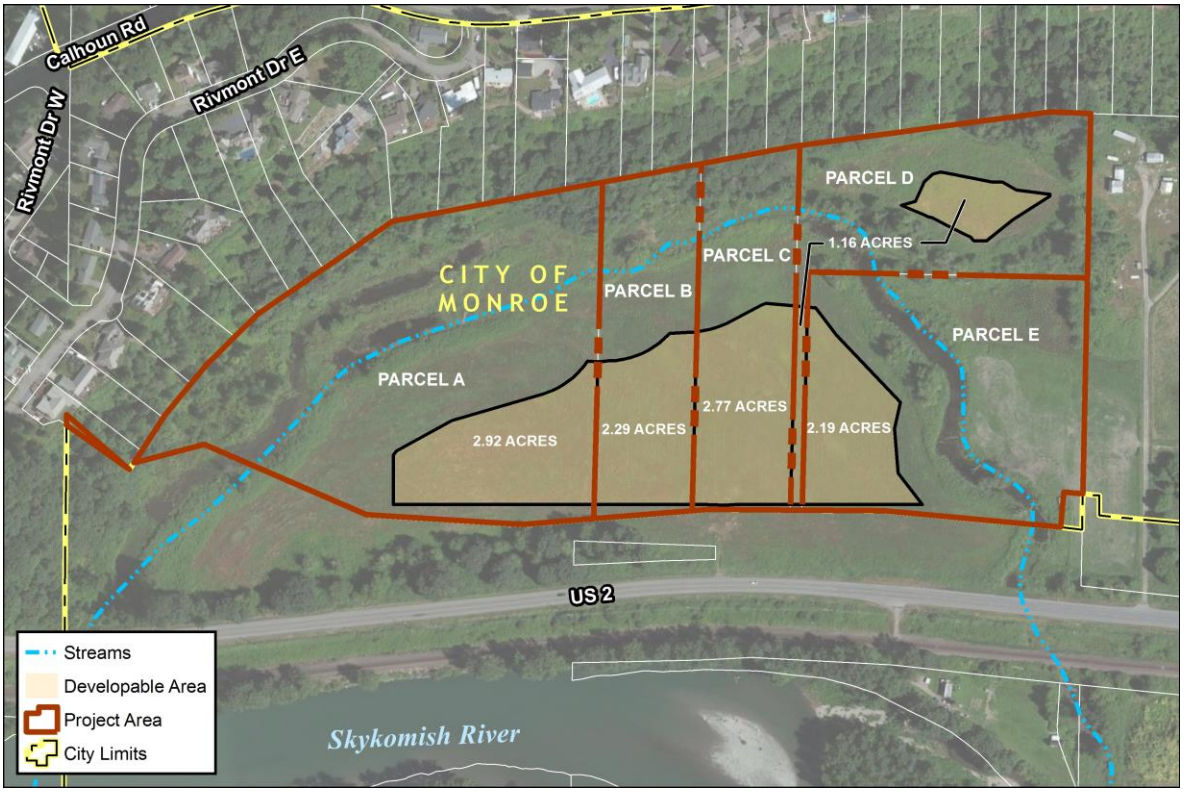
The actions proposed under each alternative represents a reasonable level of development under current code but not established maximum building size, use or density. Although buffer averaging and offsite mitigation could increase the developable area and building sizes, the alternatives presented herein are based on achieving onsite mitigation. Given the opportunities and constraints on the property, the developable area of Parcels A through E is estimated at 25% of the total site or approximately 11.33 acres.

Table 2: Estimated Developable Area

DEIS Lot Designation	Approximate Size (Acres)	
	Gross Size* (acres)	Developable Area (acres)**
A	15.73	2.92
B	5.01	2.29
C	5.20	2.77
D	6.85	1.16
E	10.02	2.19
TOTAL	42.81	11.33

Notes
* Snohomish County, 2012
** Developable area is estimated at a planning level based on LIDAR topographic data, site reconnaissance to identify and evaluate critical areas and various City of Monroe planning documents. Verification of shoreline areas, wetland boundaries, easements and topography is required as part of any actual development proposal.

Figure 3: Estimated Developable Area



1.4.1 ALTERNATIVE 1: NO ACTION – RETAIN LIMITED OPEN SPACE ZONING

This alternative is based on retaining the existing Limited Open Space (LOS) Comprehensive Plan designation and future development under zoning as is. For this proposal, "no action" does not indicate that no development will occur, but only that no changes to the zoning designation will be made and that the property will be developed as permitted by the City of Monroe Municipal Code. At a minimum level of development, one dwelling unit per five acres is currently allowed. However, to evaluate the full range of potential impacts associated with development under LOS, Alternative 1 includes a mixture of fitness club, day care facility and church activities. Alternative 1 is conceptually shown on Figure 4.

1.4.2 ALTERNATIVE 2: REZONE TO GENERAL COMMERCIAL (PROPOSED ACTION)

Alternative 2 represents the Proposed Action and is for an amendment to the City of Monroe Comprehensive Plan changing the land use designation to allow for subsequent rezone of the property. The current land use designation and corresponding zoning classification is Limited Open Space, (LOS) and the applicants desire a land use designation and zoning classification of General Commercial (GC). If approved by the Monroe City Council, the Proposed Action will allow for development that is considered more intensive. For the purpose of this EIS, Alternative 2 proposes a mixture of commercial development, including retail and restaurant development and is conceptually shown on Figure 5.

1.4.3 ALTERNATIVE 3: REZONE TO MIXED USE COMMERCIAL

Alternative 3 also considers an amendment to the City of Monroe Comprehensive Plan to change the land use designation from LOS to Mixed Use and a subsequent rezone from LOS to Mixed Use Commercial (MUC). The purpose of this alternative is to evaluate other zoning options and different permitted land uses than those considered in Alternatives 1 and 2. The mixed use designation allows for many of the same land uses as Alternative 2

and permits residential development in addition to other retail and commercial uses. For this analysis, Alternative 3 includes a mixture of commercial, office and residential development and is conceptually shown on Figure 6.

1.5 SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS

Environmental impacts were identified based on potential land use scenarios designed to illustrate characteristics of development under the three alternatives considered. Development of the property under any of the alternatives, including the "no action" concept included as Alternative 1, has the potential to create environmental and socio-economic impacts at the time of development. Table 3 contains a summary of the environmental impacts analyzed in Section 3 and detailed in the technical reports and supporting documentation contained in the Appendices put forth in Volume II of this DEIS.

1.6 MITIGATION MEASURES

Mitigation measures are recommended actions to reduce, avoid or offset the potential adverse consequences of development activities. A primary objective of mitigation is to minimize undesirable impacts. The mitigation measures discussed herein are proposed to avoid or alleviate potential impacts and demonstrate how mitigation can enhance and have positive impacts on the site and community. Element specific avoidance and mitigation measures and unavoidable impacts are summarized in Table 3. Detailed environmental analyses are presented in Section 3 and cumulative impacts are discussed in Section 4.

Compliance with all federal, state, and local regulations are requirements of any proposed development. Regardless of which alternative is chosen, the design must comply with an array of codes and regulations, including but not limited to:

- Federal Clean Water Act
- Federal Emergency Management Agency (FEMA) requirements
- National Marine Fisheries Service (NMFS) requirements
- Washington State Department of Ecology regulations
- Washington State Department of Health regulations
- Washington Department of Fish and Wildlife regulations
- Snohomish County Health District regulations
- WSDOT/APWA Standard Specifications
- City of Monroe Municipal Code (MMC)
- City of Monroe Public Works Design and Construction Standards
- City of Monroe Shoreline Master Program
- City of Monroe Comprehensive Plan 2005-2025
- City of Monroe 2009 Water System Plan and 2011 Amendments
- City of Monroe 2008 Sanitary Sewer System Plan and 2011 Amendments
- City of Monroe 2009 Stormwater System Plan and 2011 Amendments
- City of Monroe Phase 2 NPDES Permit requirements
- City of Monroe Critical Areas Ordinance.

1.7 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Table 3 contains a summary of the significant unavoidable adverse impacts that are detailed in Section 3 of this DEIS and could occur as a result of development actions allowed under the alternatives discussed herein.

If the mitigation measures outlined in this DEIS, the City's utility planning documents (water, sanitary sewer, and stormwater comprehensive plans), and mandated in federal, state, and local regulations are followed, permanent significant unavoidable adverse impacts are not anticipated. As noted, most of the unavoidable adverse impacts are indirect to the non-project action proposed herein and are temporary impacts associated with the construction activity.

Table 3: Impacts & Mitigation Measures

Environmental Impacts	Mitigation Measures	Significant Unavoidable Adverse Impacts
Earth		
Topography & Soils *All Alternatives:* 1. Clearing and grading within critical area setbacks and NGPA 2. Cut and fill required to accommodate development and habitat enhancement area south of stream / slough 3. Altered topography to promote site drainage of developed area and raise site above floodplain as needed 4. Preservation of current quantity of on-site flood storage 5. Indirect Impacts include clearing of vegetation including pasture, ground cover, invasive plants and noxious weeds Landslide & Erosion Hazard *All Alternatives:* 1. No activity will occur in steep slope area north of oxbow slough and area will remain in current natural state	Topography & Soils *All Alternatives:* 1. Cut and fill will be engineered to enhance site drainage and habitat and result in no net loss of on-site flood storage 2. Clearing, grading and re-vegetation for habitat management / enhancement and flood management accomplished as allowable uses (with approval) under MMC 3. Clearing to remove invasive species and planting native vegetation to enhance graded area 4. Excavated areas south of stream provides compensatory flood storage for flood volumes lost due to fill 5. The shoreline designation area will be protected and stabilized by following the 2012 DOE Manual Volume II: Construction Stormwater Pollution Prevention 6. Future development proposals will mandate that fill be placed in accordance with: a. Approved grading plans b. Approval by a geotechnical engineer for suitable soils and site preparation (pre-loading, if necessary) to ensure proper compaction and stability Unsuitable excavated materials will be hauled to a pre-approved disposal site and suitable fill material will be imported as necessary Landslide & Erosion Hazard *All Alternatives:* 1. Full compliance with the DOE Stormwater Management Manual for Western Washington and the Stormwater Pollution Prevention Plan to mitigate construction impacts as required under NPDES General Construction Permit administered by DOE 2. No grading or earthwork north of the slough; the development boundary will be offset approximately 200 to 400 ft from the toe of the slope and approximately 100 to 200 ft from the stream/slough 3. Planting graded areas will mitigate potential erosion and contribute to stabilization of south bank of slough	Topography & Soils *All Alternatives:* 1. Temporary impacts associated with earthwork include dust, increased traffic along haul routes and noise; all mitigated by typical construction mitigation measures and best managements practices 2. Changed topography is a permanent impact that will result from site development but will be accomplished in a manner that is aesthetically pleasing and achieves site screening, site drainage, buffer enhancement, habitat enhancement and provision of flood storage Landslide & Erosion Hazard *All Alternatives:* 1. Temporary erosion on the south side of the stream/slough due to construction activities is expected and will be mitigated by strict adherence to code and by following federal, state and local regulations and BMPS established in permits associated with future development proposals
Ground Water		
All Alternatives: 1. Groundwater impacts resulting from industrial/agricultural uses or future development, such as leaching of surface water runoff, animal waste, fertilizer, and pesticide residues 2. Increased stormwater runoff due to increased impervious surface and decreased groundwater recharge 3. Temporary construction impacts associated with subsurface construction including public and franchised utilities	*All Alternatives:* 1. Municipal water service will be provided, eliminating the need for wells 2. Municipal sewer service will be provided, eliminating the need for on-site sewage disposal 3. Management of stormwater runoff rates and water quality with the use of detention, flow controls and treatment facilities and in accordance with local, state, and federal regulations	*All Alternatives:* 1. Temporary construction impacts for installation of public water and sanitary sewage services and franchised facilities
Surface Water		
Stream/Slough *All Alternatives:* 1. Fish habitat will be modified and enhanced 2. Loss of water quality improvement functions and/or loss of hydrologic functions 3. Increased stormwater runoff entering the stream due to increased impervious surface 4. Increased pollutants and/or sediment entering the stream 5. Impacts to the functions and values of the on-site Type-1 stream 6. Potential abutments for bridge access to northeast portion of the site Wetlands *All Alternatives:* 1. Wetland hydrology as well as infiltration rate and function impacts 2. Habitat loss (primarily within the buffer areas, except field mice) 3. Loss of water quality improvement functions, and/or loss of hydrologic functions 4. Increase in impervious surface could increase stormwater runoff entering the wetlands 5. Development could divert water away from the wetlands, impacting wetland hydrology and infiltration rates 6. Potential abutments for bridge access to northeast portion of the site	Stream/Slough *All Alternatives:* 1. Mitigation and protection will occur in accordance with MMC and state and federal regulation. Potential measures include: building setback lines; signage and/or fencing; monitoring; and performance standards 2. Planting and grading along south side of slough will enhance stream and habitat 3. Follow DOE manual for flow control and water quality treatment to meet stormwater release rate and water quality standards 4. Stream protection measures during excavation 5. Adherence to the 2012 DOE Manual Volume II: Construction Stormwater Pollution Prevention Wetlands *All Alternatives*: 1. Compensation for impacts to wetland buffers is required 2. Maintain the hydrology of on-site wetlands 3. New NGPE tract permanently protecting critical areas 4. Wetland/buffer enhancement and potential wetland creation and mitigation banking	Stream/Slough *All Alternatives:* 1. Stream mitigation though the implementation of the Critical Areas Ordinance Shoreline Plan and floodplain regulations are anticipated to result in no permanent significant adverse impacts. Stream will be enhanced. Wetlands *All Alternatives*: 1. Wetland mitigation though the implementation of the Critical Areas Ordinance Shoreline Plan and floodplain regulations are anticipated to result in no permanent significant adverse impacts. Wetland areas will be enhanced.

Table 3: Impacts & Mitigation Measures

Environmental Impacts	Mitigation Measures	Significant Unavoidable Adverse Impacts
Flood Hazard Area *All Alternatives:* 1. Removal of floodplain storage in the flood zone	5. During construction, the 2012 DOE Manual Volume II: Construction Stormwater Pollution Prevention will be followed and a Stormwater Pollution Prevention Plan (SWPPP) will be prepared Flood Hazard Area *All* Alternatives*:* 1. Providing compensatory flood storage in the NGPA adjacent to the slough 2. Excavation of soils, grading and planting will enhance the NGPA/Shoreline setback area and potential habitat for fish and wildlife 3. Flow control will reduce flood water impact on downstream properties 4. Mitigation to be in accordance with NFIP/ESA	Flood Hazard Area *All* Alternatives*:* 1. Site grading to accommodate compensatory storage
Plants		
All Alternatives: 1. Grassland/pasture will be converted to impervious surface and landscaping/open-space 2. Removal of currently present invasive plant species such as Canarygrass and Himalayan Blackberry bushes	*All Alternatives:* 1. Retain native non-invasive species to the greatest extent possible 2. Remove invasive vegetation species and/or plant additional native species 3. New plantings will help minimize erosion, improve earth stabilization, provide screening of the development, and attract wildlife 4. Aesthetic improvements in the wetland/NGPA areas will be maintained and enhanced with more visually pleasing and functional plants 5. Water quality treatment will protect enhanced wetlands	*All Alternatives:* 1. Reduction in grassland/pasture coverage, which could limit water quality improvement and wildlife habitat and change site hydrology 2. Benefits of new plants will not be recognized until plants are established/matured
Animals		
All Alternatives: 1. Habitat loss and fragmentation 2. Habitat degradation will increase as a function of the proximity of urban development and intensity of land use 3. Deterred animal use in the grassland/pasture portion of the site 4. Increased habitat use (fish and bird species) in the enhanced portion of the site 5. Habitat functions provided by maintained grasses (proposed open spaces/landscaping) are limited for medium to large mammals. 6. Distance from habitat land to human development will be reduced	*All Alternatives:* 1. Designating the highest quality habitat on-site as NGPE and segregating this habitat from the proposed development activity through fencing and signage 2. Planting native vegetation in the NGPE to increase the habitat function of the wetland, stream and buffer corridor 3. Mitigation must be in accordance with NMFS	*All Alternatives:* 1. Temporary disturbance of all habitat 2. Reduction in smaller pasture mammals
Noise		
All Alternatives: 1. Generation of additional noise during construction activity and hours of operation 2. Increased traffic volumes under any of the alternatives may also contribute to increased traffic noise for residents in the vicinity of the study area 3. Increased noise volumes due to commercial activity	*All Alternatives:* 1. Compliance with the Monroe Municipal Code 18.10.270 subsection E, "Noise"	*All Alternatives:* 1. Increased noise levels during construction 2. Slight increases in background and traffic noise during operation
Land & Shoreline Use		
Land Use *Alternative 1:* Minimal anticipated environmental impacts (increased commercial activity) *Alternative 2:* Change the land use designation from LOS to GC (increased commercial activity) *Alternative 3:* Change the land use designation from LOS to MU (increased commercial activity) Shoreline Use *All Alternatives:* Excavation, grading, and restoration and enhancement to provide compensatory flood storage, improve drainage and enhance habitat[1]	Land Use *All Alternatives:* Compliance with critical area regulations, zoning regulations, and performance standards contained in the Monroe Municipal Code, and state and federal regulations Shoreline Use *All Alternatives:* Excavating and restoring within the Urban Conservancy shoreline environment area is planned as an enhancement of flood protection and habitat	Land Use *Alternative 1:* Changes in the character of the land *Alternative 2:* 1. Change to land use designation of GC (character of the land) Encourages development in previously unserviced areas *Alternative 3:* 1. Change to land use designation of MU (character of the land) 2. Encourages development in previously unserviced areas Shoreline Use *All Alternatives:* No anticipated significant unavoidable adverse impacts
Aesthetics		
All Alternatives: 1. Aesthetic changes in the visual character of the property 2. Increased awareness of commercial activity for motorists along US 2 and residents 3. Conversion of current pasture fields to buildings, parking lots, and landscaped developed area	*All Alternatives:* 1. Enhancing wetland buffers with vegetation provides site screening 2. Architectural treatment of structures to give development an appealing, community feel 3. Landscape planting of visually appealing vegetation amid buildings and parking 4. Screening of non-desirable or offensive elements 5. Building placement and orientation	*All Alternatives:* 1. Visual aesthetics would change for individuals traveling along US-2 looking towards the property, and for residents in the vicinity of the study area 2. Increased impervious surfaces 3. Loss of grass covered pasture land 4. Building structures to replace current pasture land

Table 3: Impacts & Mitigation Measures

Environmental Impacts	Mitigation Measures	Significant Unavoidable Adverse Impacts
		5. Temporary unattractive views of property as development is constructed 6. Blockage of view of SR-2 and river for residents on north slope
Light & Glare		
All Alternatives: 1. Final development under any alternative will likely include installation of on-site light (such as street or parking lot lights) for operation and security purposes. This lighting may cause glare and light intrusion onto US-2 or adjacent properties	*All Alternatives:* 1. Shielding of light and glare sources, including use of landscaping and compliance with MMC Chapter 15.15 'Lighting Standards'	*All Alternatives:* 1. Increase in glare and light spill onto adjacent properties, including SR-2 2. May cause lightening of the night sky when lights are illuminated
Transportation		
Alternative 1: 1. Potential to generate approximately 1,602 new average daily trips with 169 new PM peak-hour trips 2. Slight decrease in delay at intersection of US-2 and Old Owen Road *Alternative 2:* 1. Potential to generate approximately 5,230 average daily trips with 459 PM peak hour trips 2. Slight increase in delay at intersection of US-2 and Old Owen Road *Alternative 3:* *1.* Potential to generate approximately 3,427 average daily trips with 318 PM peak hour trips *2.* Slight decrease in delay at intersection of US-2 and Old Owen Road *All Alternatives:* 1. Increased traffic will also increase potential pollutants *2.* Access to the site will operate at LoS C[2] *3.* Slight increase in delay at intersection of US-2 and Chain Lake Road	*All Alternatives:* 1. Construction of acceleration/deceleration lanes for US-2 at site access to enable acceptable LoS delay by decreasing LoS from F to C 2. Separate outbound lanes and an outbound left-turn acceleration lane are proposed to allow the access to operate at LoS C with development of the site 3. Mitigation fees	*All Alternatives:* 1. Additional delay at the off-site intersections 2. The site access will require an inbound left-turn lane
Public Services		
Police *All Alternatives:* 1. Increased police call volumes Fire *All Alternatives:* 1. Increase in demand for fire services 2. Domestic water and fire protection service would be required Schools *Alternative 1 & 3:* 1. Potential for increased student enrollment within Monroe School District's boundary 2. Depending on the type of residential development, creates potential to add zero to up to as many as 60 new students	Police *All Alternatives:* 1. Tenants could fund private security to reduce demands and/or calls for service 2. Adherence to Crime Prevention Through Environmental Design (CPTED) regulations and standards Fire *All Alternatives* 1. New buildings would be constructed in compliance with the most recently adopted building and fire codes 2. Coordination with Monroe Fire Department #3 during the final design, construction, and operation of future development Schools *Alternative 1 & 3:* 1. If the schools within the attendance area cannot serve the additional student population, it is likely that other schools within the vicinity of the study area could accommodate new student generation (redistricting) 2. School impact fees would be determined at the time of building permit application	Police *All Alternatives:* 1. Potential for increased call volumes Fire *All Alternatives:* 1. Potential for increased call volumes Schools *Alternative 1 & 3:* 1. Potential for new students

Table 3: Impacts & Mitigation Measures

Environmental Impacts	Mitigation Measures	Significant Unavoidable Adverse Impacts
Utilities		
Water *All Alternatives:* 1. Extension of public water service 2. Potential upgrades and/or expansions to the existing transmission and distribution system, the City's Water Treatment Plant and increase in storage capacity 3. Increased needs/demands for water resources and water service 4. Installation of water main has potential for temporary impacts Sewer *All Alternatives:* 1. Increased needs/demands for sanitary sewer service 2. Increase in demand for the City of Monroe Wastewater Collection System and Treatment Plant Stormwater *All Alternatives:* 1. Changes to the hydraulic regime of the stormwater flows 2. Increase in stormwater runoff, pollutants entering the water, and sediment and erosion due to: a. Increases in pollution-generating impervious surfaces (PGIS) b. New development will also increase the non-pollution-generating impervious surfaces c. Slight increase in staff time to monitor future on-site systems d. Extension of the City's existing stormwater, water, and sanitary sewer infrastructure to the project site	Water *All Alternatives:* 1. Analysis of the water system including a source, storage, transmission and pumping analysis to determine the size and location of proposed facilities 2. Encourage water conservation measures 3. Planning for potential additional water system storage 4. System extensions would be paid for by the developing property owners in the form of connection charges 5. Storage and transmission requirements could be mitigated by looping a new water main from the site on SR-2 to existing water system facilities located north of the site along Calhoun Road 6. Payment of wastewater system capacity expansion fees Sewer *All Alternatives:* 1. Extension of sanitary sewer service will be accomplished by construction of collection and conveyance facilities from the project site to a point of connection to the existing system 2. Payment of wastewater system capacity expansion fees 3. Connection to the existing system eliminates impacts associated with serving the property by on-site septic systems 4. Sewer lift station likely required to provide service Stormwater *All Alternatives:* 1. Construction of on-site stormwater management systems (flow control and water quality) 2. Revenues from the monthly stormwater fees will defray the cost of increased inspection and monitoring 3. Implementation of BMP's in a TESC plan 4. On-site detention systems with flow control, to prevent an increase in discharge rate, will be designed specific to a proposed development for permit application 5. An oil control device may need to be provided, depending on which alternative is selected	Water *All Alternatives:* 1. Increased demand on water system facilities Sewer *All Alternatives:* 1. Increased demand on sewer system facilities Stormwater *All Alternatives:* 1. Increased demand on stormwater system facilities

Notes:
Potential impacts are considered in terms of a maximum developable area and pursuant to development requirements of the MMC and all applicable federal, state, and local regulations.
[1] - One of the few allowable uses within the UC designation is flood management and some shoreline stabilization techniques for modification. A copy of the matrix is included in Appendix G and demonstrates allowable uses within designated shoreline and Urban Conservancy areas.
[2] - The intersection operations are evaluated based on level of service (LoS), and are rated from LoS A, little/no delay, to LoS F, extreme delays.

2. Proposed Action and Alternatives

The three alternatives considered in this DEIS show a range of potential development options. Each alternative considers a different land use and zoning designation, with each designation allowing different types of permitted land use. Regardless of which alternative is chosen, compliance with the City of Monroe Code and critical areas ordinance is achieved through enhancement of the NGPA, wetland buffer, and stream and shoreline areas occurring on the property. This will result in no net loss of critical area, significant improvement to the value and function of currently low quality wetlands and buffers and ultimately, a more pristine and habitable wetland environment. The goal of each alternative is to show how the proposal can achieve a balance between human development and critical area protection for wildlife. All alternatives are conceptual in nature and intended only to show possible development scenarios. The purpose of the alternative scenarios is to show likely development potential and associated mitigation strategies to first avoid, then eliminate or reduce impacts to the environment and community. All alternatives are based on site reconnaissance, wetland and shoreline mapping, regulatory restrictions and anticipated buffer requirements and all alternatives include preservation of the wooded area on the northern portion of the site undisturbed and in its natural state.

The proposed Comprehensive Plan amendment and subsequent rezone is a non-project action, however, consideration of potential future development under the proposed zoning designation is required for a complete evaluation under City of Monroe requirements and SEPA regulations. Although three potential development concepts have been considered, no specific development proposal is known or under application at this time. Future development concepts are speculative and the DEIS only anticipates what could be proposed. Any application for a project action will be required to demonstrate that work in critical areas complies with Monroe Municipal Code (MMC) requirements. It is incumbent upon the applicant to demonstrate compliance with the standards in the MMC, and all other local, state, and federal regulations at the time of application for development.

2.1 PROPOSED ACTION

The Proposed Action is an amendment to the City of Monroe's Comprehensive Plan to change the land use designation from Limited Open Space (LOS) to General Commercial (GC) with a subsequent rezone from LOS to GC. This action is discussed in detail as Alternative 2. The City of Monroe Official 2013 Comprehensive Plan Map is provided in Appendix A.

2.2 ALTERNATIVES

The three alternatives considered are conceptual in nature. The scope and magnitude of the development alternatives, including estimated building footprint sizes and the space requirements associated with parking, landscaping and other site improvements are summarized in Table 4. The scenarios presented are only examples and in no way represent required or exact development proposals by the applicant, the City or any private party. To establish logical alternatives, assumptions were made regarding how regulatory requirements would impact developable area. Key assumptions are:

- Floodplain elevations are based on Preliminary FEMA Flood Insurance Rate Maps (FIRMs), issued in 2007.
- Critical areas are based on field reconnaissance, mapping, and interpretation of the City of Monroe Municipal Code, Critical Areas regulations, Shoreline Management Program and NPDES Phase 2 Permit requirements.
- Buffer averaging and off-site wetland or floodplain mitigation have not been considered in this analysis but are not excluded from future development proposals.
- Development of the site will require coordination with, and review and approval by the Washington State Department of Transportation.

- Ingress and egress from the site is assumed to be through one access point to SR-2 via a temporary frontage road along the southern property boundary. The proposal also acknowledges a roundabout and other WSDOT planned improvements. Permanent access to the site may change with changes to SR-2.

- Access to the northeast portion of the site could be achieved by construction of a bridge across the stream or the through a north south easement along the eastern property line. Development of the site will be subject to the codes, requirements and regulations at the time of permit application. The analyses and assumptions put forth herein assess the impacts, avoidance and mitigation measures but in no way replace full evaluation of any development proposal or land use action.
- Conceptual development alternatives were developed to balance parking requirements put forth in MMC 18.86.050 with building square footage to arrive at feasible scenarios that maximize the gross leasable area in conjunction with anticipated buffers, setbacks and mitigation measures. Under-structure parking was not considered in this DEIS.

Table 4: Alternatives Overview [1]

	Alternative 1	Alternative 2 (Proposed Action)	Alternative 3
Zoning Classification	LOS	GC	MUC
Development Type	Fitness Facility, Daycare & Church	Retail & Restaurants	Professional Office, Medical Office, & Residential
Estimated Developable Area (SF)	457,380	457,380	457,380
Estimated Developable Area (AC)	11.3	11.3	11.3
Building			
Gross Leasable Area[2] (SF)	125,000	140,000	121,000
Residential (Units)	-	-	Up to 90 Units
Total Building Footprint (SF)	83,000	133,000	66,600
Parking			
Number of Parking Stalls	550	660	680
Parking Area (SF)	220,000	263,200	273,200
Other Area (SF)			
Landscaping / Open Space / Misc.[3]	154,380	61,180	117,580

Notes:
LOS = Limited Open Space; GC= General Commercial; MU= Mixed Use Commercial
[1] Area and sizes are planning level estimates based on potential allowances and are only an example of potential land uses under current codes. They do not represent a development plan by the applicant, the City or any private party.
[2] Gross Leasable Area may be achieved with multiple stories.
[3] Area outside of critical areas and associated buffers.

2.2.1 ALTERNATIVE 1: NO ACTION – RETAIN LIMITED OPEN SPACE ZONING

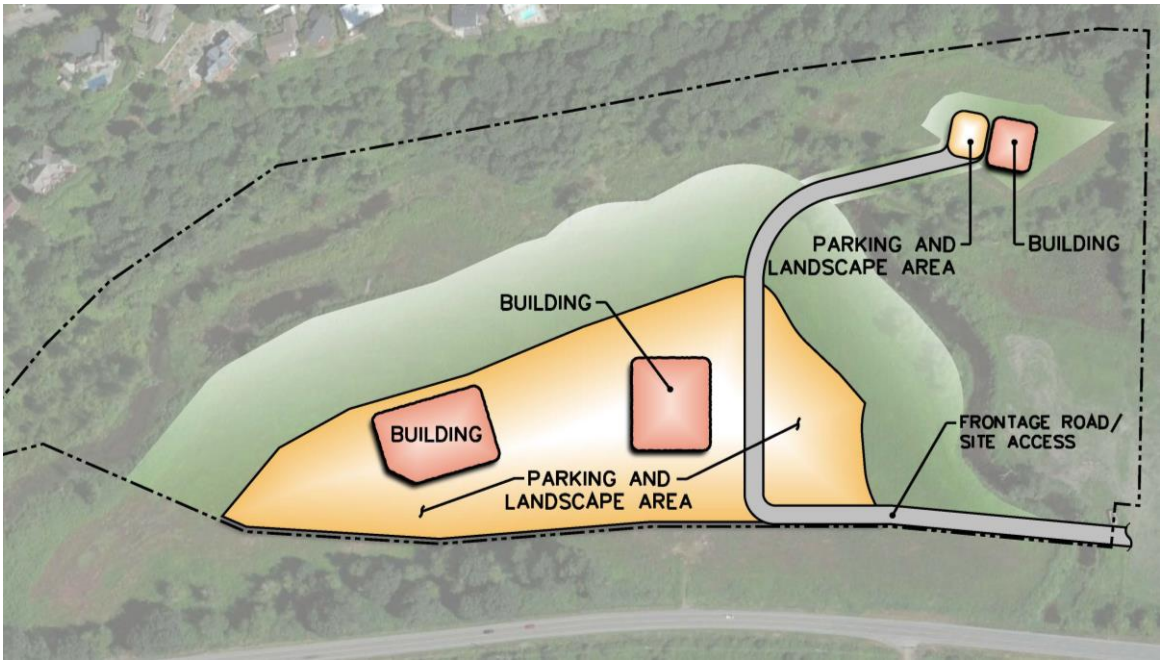
Alternative 1 is a "no action" alternative in that no change to the existing Comprehensive Plan or rezone is proposed. It is presented to demonstrate the likely impacts associated with collective development of the property under current LOS zoning as allowed by Monroe Municipal Code (MMC) Section 18.10.045. Alternative 1 also shows the similarity of mitigation measures that would be required under any of the development alternatives put forth in this DEIS. The current or future property owner may develop the property within the constraints for LOS zoning as outlined in the MMC, and applicable state, and federal regulations provided that all applicable permits are obtained and critical area protection is achieved. Under Alternative 1, no changes to the existing Comprehensive Plan are proposed and development plans could begin immediately.

At a minimum level of development, one dwelling unit per five acres is allowed under LOS zoning. The maximum development scenario suggested under Alternative 1 includes a fitness club, daycare and church. Other uses allowable (either outright, as special or conditional permits or as essential public facilities) under the current LOS zoning are:

- Government and education facilities: fire stations and schools;
- Industrial uses: animal slaughtering/processing and/or incidental rendering, cement manufacturing, processing of sand/gravel/rock/soil; and
- Infrastructure and utility uses: electrical transmission lines, transit stations, and sewer treatment plants.

A full list of land uses comparing the LOS, GC, and MUC zoning (per MMC Section 18.10.050) is included in Appendix B. A conceptual layout of Alternative 1 is presented in Figure 4 and is based on a mixture of uses that include fitness/health club, a daycare facility, and public gathering place such as a church. These uses were identified to provide the basis for evaluating potential space, parking and setback requirements and transportation impacts.

Figure 4: Alternative 1 – Limited Open Space Conceptual Layout



2.2.2 ALTERNATIVE 2: REZONE TO GENERAL COMMERCIAL (PROPOSED ACTION)

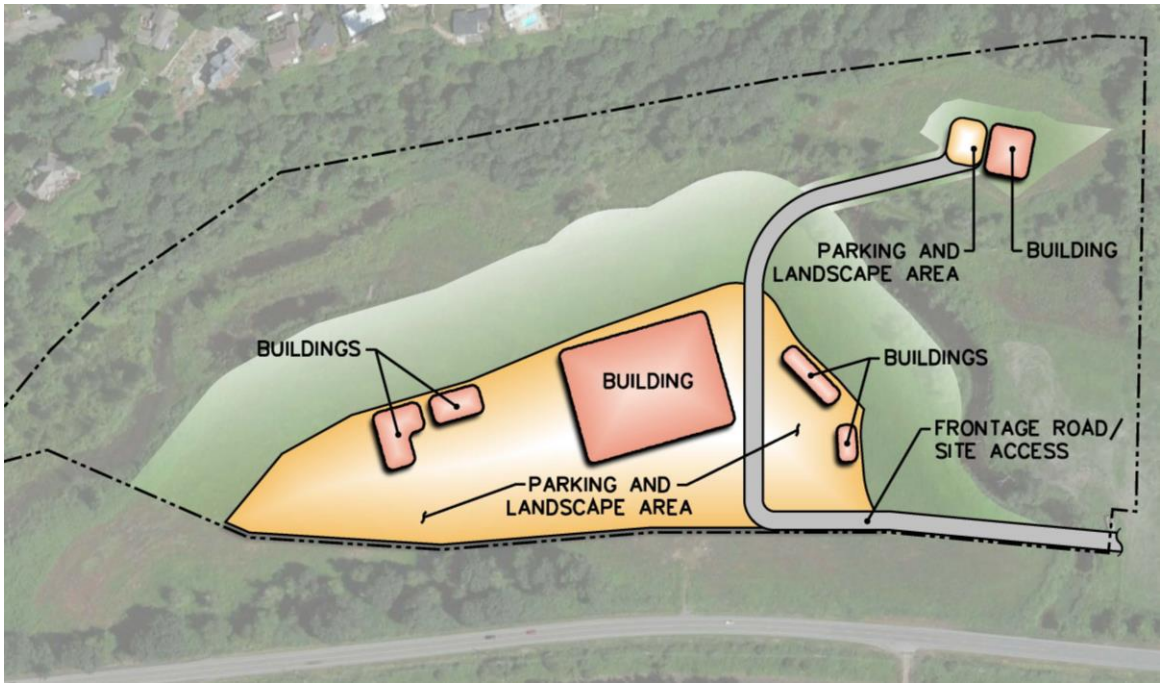
Alternative 2 is consistent with the applicant's desire to change the land use designation and zoning from LOS to General Commercial (GC) and is the Proposed Action for this DEIS. Upon approval of the required Comprehensive Plan Amendment and subsequent rezone by the Monroe City Council, a variety of commercial activities will be possible, provided development is accomplished in accordance with the City's Critical Areas Ordinance, City Plans and Policies, the MMC and all requirements of necessary permit approvals.

The Proposed Action is for commercial development is a response to a lack of limited undeveloped commercial property and support economic development within the City of Monroe. The property has valuable commercial frontage potential on SR-2 and provides the City with an economic opportunity to create a quality gateway presence at the eastern entrance to the City. It is consistent with the Growth Management Act (GMA) objective of directing greater density and higher uses to properties within the established Urban Growth Area (UGA). It supports the GMA mandate for provision of an urban level of service to areas within the UGA. Also consistent with GMA objectives, Alternative 2 balances development with environmental protection through conservation, preservation and enhancement of critical areas. The site has valuable potential to enhance critical areas and support local flood management systems. Site grading, strategic plantings and enhanced drainage facilities will ensure no net loss of wetlands and improve wetland with a low to moderate value rating up to systems with higher function and value ratings, as discussed in Appendix D.

Alternative 2 is conceptually shown in Figure 5 and could include design features to enhance the community feel of the development, contribute to the greater good of the City, and promote economic development. Examples of potential design features are landscaping and screening with appropriate plant species, trails, enhanced wetland and shoreline buffers, and hardscape features, such as seating, planters and public art.

Alternative 2 contemplates a high-volume or discount store accompanied by other sundry establishments common to this type of development, such as a delicatessen, specialty service shops, convenience store, coffee shops, etc.

Figure 5: Alternative 2 – General Commercial Conceptual Layout



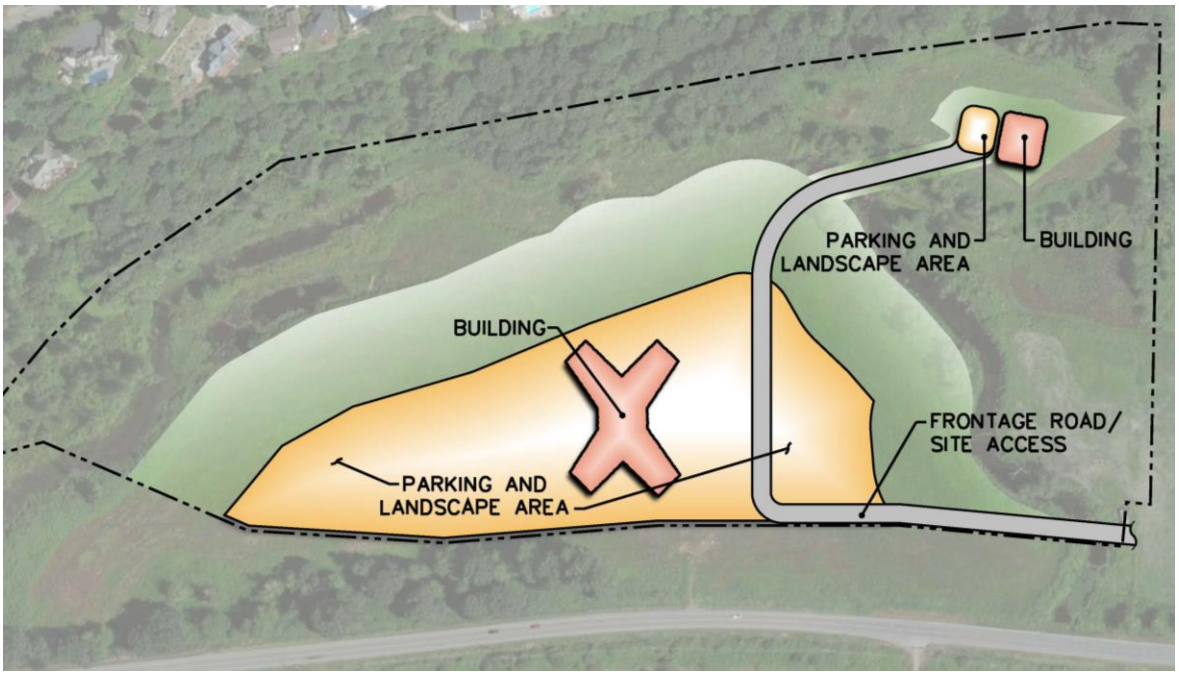
2.2.3 ALTERNATIVE 3: REZONE TO MIXED USE COMMERCIAL

Alternative 3 includes an amendment to the City of Monroe Comprehensive Plan changing the land use designation to Mixed Use (MU) and a subsequent rezone to Mixed Use Commercial (MUC). The Mixed Use alternative was chosen to respond to the lack of undeveloped commercial land in the SR-2 corridor, promote economic development and determine the range of impacts and mitigation measures that would be associated with mixed use development.

Consideration of Alternative 3 helps identify the highest and best use of the property, shows that other zoning options are available and analyzes an expanded range of activities and uses. MU allows for many of the same land uses as those contemplated in Alternatives 1 and 2 but allows for residential, professional office, medical clinics, and other retail and commercial uses. Similar design features as listed for Alternative 2 can be implemented for Alternative 3 to enhance the community feel of the development, contribute to the greater good of the City, and promote economic development.

Figure 6 shows a conceptual configuration of mixed uses to illustrate the potential character of development. This alternative contemplates retail, restaurants, commercial, and service uses and considers the potential for professional office space, medical clinics, and multi-family residential uses. The northeast portion of the site proposes a multiple story mixed use building with offices and services on the first floor and multi-family residential units above.

Figure 6: Alternative 3 Mixed Use Commercial Conceptual Layout



2.3 PLANNING REQUIREMENTS

This DEIS has been prepared to reflect appropriate community growth as planned for in the state Growth Management Act. It also considers local planning and regulatory requirements including but not limited to those outlined in the following paragraphs.

2.3.1 GROWTH MANAGEMENT ACT

The Washington State Growth Management Act (GMA) was adopted because the Washington State Legislature found that uncoordinated and unplanned growth posed a threat to the environment, sustainable economic development and the quality of life in Washington. The GMA (WAC 197-11-158 and RCW 36.70A) requires state and local governments to manage Washington's growth by identifying and protecting critical areas and natural resource lands, designating urban growth areas, preparing comprehensive plans and implementing them through capital investments and development regulations.

The GMA established state goals, set deadlines for compliance, offered direction on how to prepare local comprehensive plans and regulations and set forth requirements for early and continuous public participation. Within the framework provided by the mandates of the GMA, local governments have many choices regarding the specific content of comprehensive plans and implementing development regulations.

The City of Monroe is subject to GMA planning for Snohomish County and the establishment of an Urban Growth Area (UGA) Boundary. The Proposed Action occurs entirely with the Monroe city limits and UGA. As such, an urban level of service is proposed and planned.

2.3.2 CITY OF MONROE COMPREHENSIVE PLAN

The City of Monroe Comprehensive Plan dictates public policy as a means to guide future decisions related to land use, transportation, housing, parks and recreational facilities, capital facilities, utilities, economic development, and shoreline management. The City of Monroe 2005-2025 Comprehensive Plan (Comp Plan) and subsequent amendments were used for analysis of the proposed land use action. A comprehensive plan amendment and rezoning the project area are required to accomplish the proposal put forth herein. Copies of the Comp Plan can be found on the City of Monroe's website.

2.3.3 CITY OF MONROE MUNICIPAL CODE

The Monroe Municipal Code (MMC) is a published compilation of City laws and their revisions organized according to subject matter. The MMC is updated periodically as new ordinances are adopted by the City Council. All future growth, action, development, etc. must be in accordance with the code under penalty of law. This proposal assumes that any future development on the subject property, regardless of its consistency with the alternatives put forth herein, will be subject to the review and approval process prescribed by the MMC at the time of application.

2.3.4 CITY OF MONROE CRITICAL AREAS ORDINANCE

The purpose of the City of Monroe's Critical Areas Ordinance is to protect the public health, safety and welfare by preventing adverse impacts of development. It also preserves and protects critical areas as identified by the Washington State Growth Management Act by regulating development, mitigating unavoidable impacts, preventing adverse cumulative impacts, protecting the public and public resources from hardship due to flooding, erosion, landslides, and soils subsidence or steep slope failure. The Critical Areas Ordinance implements the goals, policies, guidelines and requirements of the City of Monroe Comprehensive Plan and the Washington State Growth Management Act.

2.3.5 CITY OF MONROE SHORELINE MASTER PROGRAM

The primary purpose of the Washington State Shoreline Management Act (SMA) is to provide the management and protection of the State's shoreline resources by planning for their reasonable and appropriate use. A citizen's initiative in 1972 designated the area to be regulated under the SMA, and includes lands within two hundred (200) feet of the shoreline. By law, the City of Monroe is responsible for preparation of a "Master Program" to determine the future of the shorelines and the Washington State Department of Ecology (DOE) must approve it before it becomes effective. The Shoreline Master Program (SMP) coordinates state and local jurisdictions to address the types and effects of development occurring along the State's shorelines. The SMP must be consistent with the guidance and intent provided in the SMA. The SMA defines a Master Program as a "comprehensive use plan for a described area." The shoreline planning process differs from a more traditional planning process in that the emphasis is on protecting the shoreline environment and utilizing the shoreline appropriately for preferred uses through management of uses, rather than trying to maximize development potential. Key objectives of the Monroe SMP are:

1. To carry out the responsibilities assigned to the City of Monroe by the Washington State Shoreline Management Act (RCW 90.58).

2. To promote the public health, safety, and general welfare by providing a guide to regulations for the future development of the shoreline resources.

3. To further, by adoption, the policies of RCW 90.58 and the goals of the Master Program.

These objectives are attained through implementation of the City's Shoreline Master Program, issued August 2008 and enforced by the City's development requirements and code.

2.3.6 CITY OF MONROE WATER SYSTEM PLAN

The principal goal of the 2009 Water System Plan and 2011 Addendum thereto is to make the best use of available resources in order to provide high quality service and to protect the health of customers. The Monroe Water System Plan takes a comprehensive look at all of the City's needs, desires, and statutory requirements associated with water supply, transmission and distribution systems and charts a plan of action for achieving them.

2.3.7 CITY OF MONROE SANITARY SEWER SYSTEM PLAN

The 2008 Sanitary Sewer System Plan and 2011 Addendum thereto address the City's comprehensive planning needs for wastewater collection, transmission, treatment, and disposal for a 20-year planning period. The planning period for this Sanitary Sewer System Plan is from 2005 through 2025, to provide consistency with population projections and other planning documents. Development of the Sewer Plan has been coordinated with the City's Comprehensive Plan, Water System Plan and Snohomish County planning efforts.

2.4 BENEFITS AND DISADVANTAGES OF DELAYING THE PROPOSED ACTION

SEPA requires a discussion of the benefits and disadvantages of reserving, for some future time, the implementation of this proposal compared to possible approval at this time.

Benefits to delaying adoption of this proposal until a future date include:

- No additional traffic generated;
- Existing aesthetic environment of the property remains;
- No temporary disturbance to animal and plant habitat; and
- No temporary impacts associated with construction.

Disadvantages of delaying the proposal until a future date include:

- Does not address need for additional developable commercial property along SR-2 corridor;
- Potential loss of opportunity to develop while market conditions are favorable;
- Potential loss of opportunity to increase employment opportunities for Monroe and area residents;
- Potential loss of opportunity to increase economic growth through development fees and sales and property taxes;
- Missed opportunity to attract a wider range of development opportunities, benefiting the City of Monroe and enriching the community;
- Delay in expansion of municipal utility services that would improve service to the unserved eastern parts of the City between the project site and the utility connection locations; and
- Missed opportunity to enhance shoreline plant environment and fish habitat.

3. Affected Environment, Impacts & Mitigation Measures

An evaluation of alternatives presented in this DEIS has been accomplished to consider the Proposed Action for a Comprehensive Plan Amendment and Subsequent Rezone of five parcels in East Monroe from Limited Open Space (LOS) to General Commercial (GC). The alternatives analyzed herein range from development under the current LOS zoning, or development under GC or MUC zoning. Future land use activities as a result of the rezone will likely have impacts on the environment and community. This section of the DEIS provides a comprehensive view of the effects of the alternative development scenarios and presents potential mitigation strategies. It is augmented and supported by the technical appendices put forth in Volume 2 of this DEIS. Identified potential impacts and avoidance and mitigation strategies are not intended to be attached to the property or encumber it in any way. Although future development proposals may elect to utilize information put forth herein, this analysis is not intended to reduce or change application requirements.

As noted in Sections 1 and 2, the subject property is complicated by a myriad of shoreline, wetland, steep slope, floodplain and NGPAs. While this limits the total developable area, it inspires development proposals that work within the constraints of the land and also enhance the value and ecological functions of the documented sensitive and critical areas. Figure 9 presents a composite drawing of critical areas and buffers used to evaluate the proposal. Additional discussion regarding critical areas is provided in the Critical Area Study and Habitat Conservation Report provided in Volume 2, Appendix D. The established NGPA (shown on the 2003 short plat and boundary line adjustments, included as Appendix H) is less extensive than the buffers and setbacks outlined in this report. The buffer and setback limits indicated herein extend further and cover a larger area than the recorded NGPA. Future development within the project area will undergo a complete and thorough evaluation under the City of Monroe development review and permitting processes. Information provided in this DEIS may be used when more specific development actions are proposed, but supplemental information confirming applicability of the analyses herein would be required.

3.1 EARTH

3.1.1 AFFECTED ENVIRONMENT

Topography and Soils

Topography of the developable portion of the project site south of the slough is generally flat, ranging in elevation from approximately 55 feet to approximately 80 feet. There is some variation in topography along stream banks that bisect the area and a steep (>40%) slope at the north edge of the project area. The steepest slope surveyed in the project area is 40.48% located at the north edge of Parcel C. Overall, the site has three distinct topographies: the lower pasture, the slough corridor, and the upper terrace.

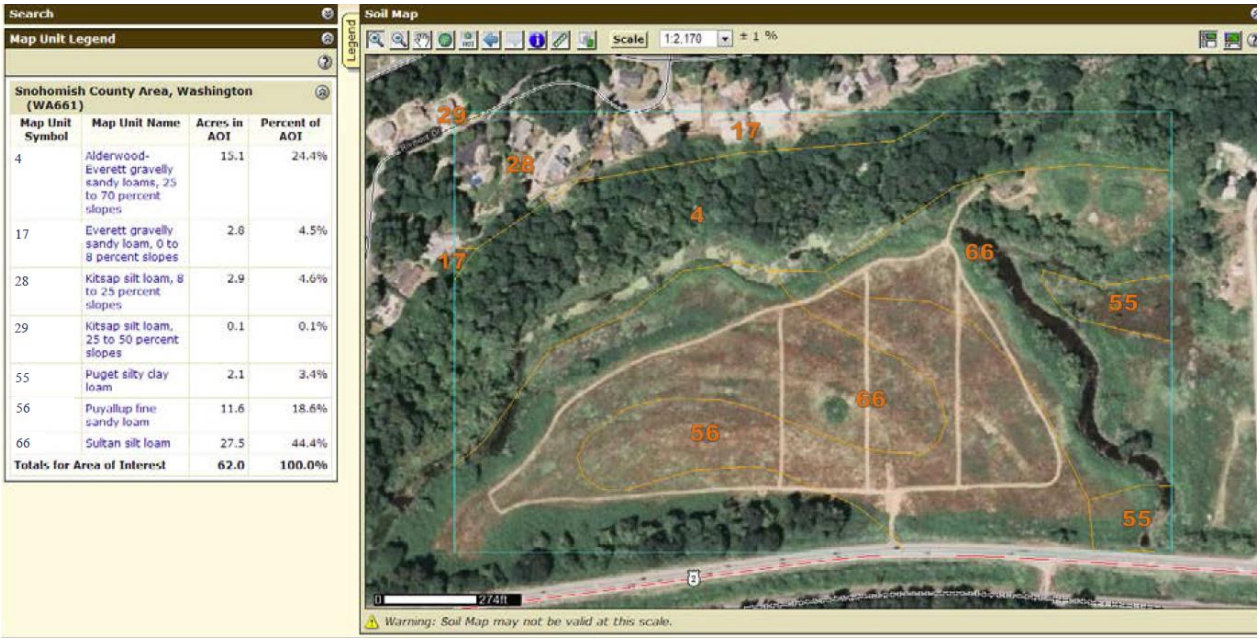
Alluvial soils located in the proposed development area consist of sand, gravel, silt, and peat. The transitional beds mapped along the slopes consist primarily of finer grained silt, clay and sand. This geologic unit is typically stiff or medium dense to dense and can be unstable in steep terrain. Advance and recessional outwash deposits are mapped above the transitional beds at the top of the slope. These soils typically consist of clean, stratified granular deposits of sand and gravel. The landslide deposits are described as unstable recessional deposits perched on hillsides, overlying the silt and clay of the transitional beds.

Landslide and Erosion Hazard

Landslide and erosion hazards are detailed in the Geotechnical Soils Evaluation of the property prepared by GeoEngineers, Inc. (Appendix C). Geologic maps of the site area indicate that subsurface soils consist of recent alluvium in the proposed development area; organic peat and silt in the vicinity of the oxbow slough; transitional beds of clay, fine sand, and silt along the slope; and outwash deposits offsite at the top of the slope. Landslide deposits are also mapped on a portion of the slope in the western area of the site. Figure 7 shows area soils as mapped in the USDA Web Soil Survey.

According to the USDA Web Soil Survey, erosion hazard areas are rated in value as slight, moderate, or severe. As indicated on Figure 8, the USDA classifies the northern portion of the site and adjoining properties to the north (orange highlight) as severe hazard area. The majority of the site is located in the minimal or slight hazard area (Green). Other areas highlighted (yellow and light green) are outside of the project vicinity and not considered in this evaluation.

Figure 7: Area Soils

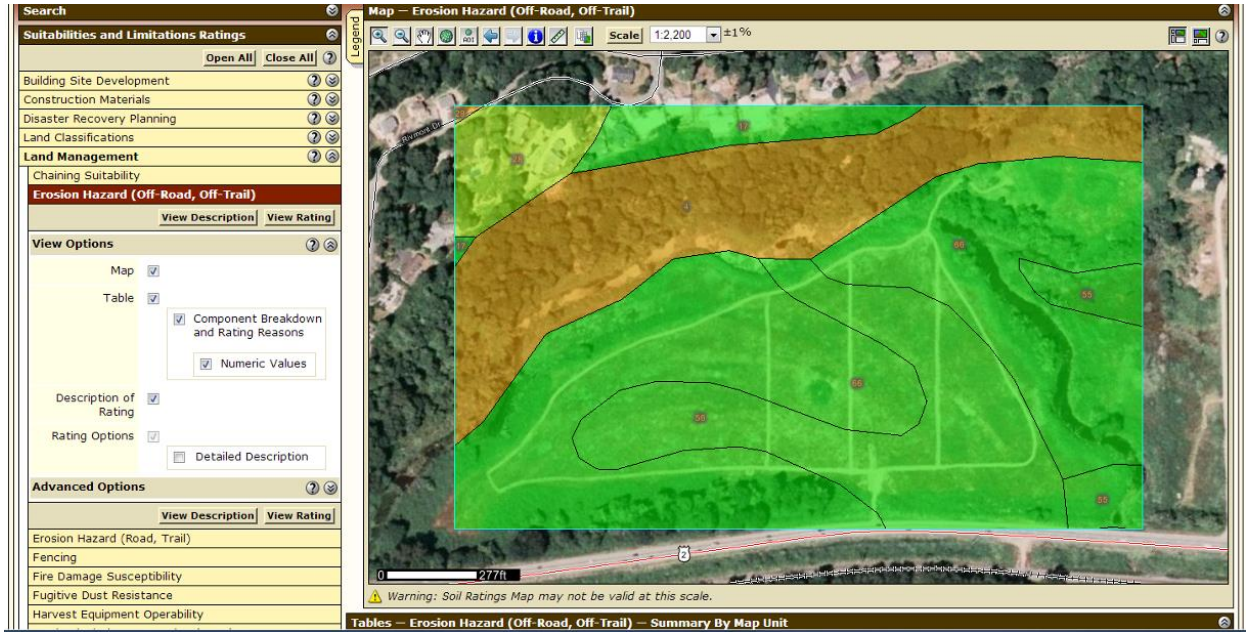


Snohomish County Area, Washington (WA661)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
4	Alderwood-Everett gravelly sandy loams, 25 to 70 percent slopes	15.1	24.4%
17	Everett gravelly sandy loam, 0 to 8 percent slopes	2.8	4.5%
28	Kitsap silt loam, 8 to 25 percent slopes	2.9	4.6%
29	Kitsap silt loam, 25 to 50 percent slopes	0.1	0.1%
55	Puget silty clay loam	2.1	3.4%
56	Puyallup fine sandy loam	11.6	18.6%
66	Sultan silt loam	27.5	44.4%
Totals for Area of Interest		62.0	100.0%

Note: Information attained from USDA Web Soil Survey, 2013.

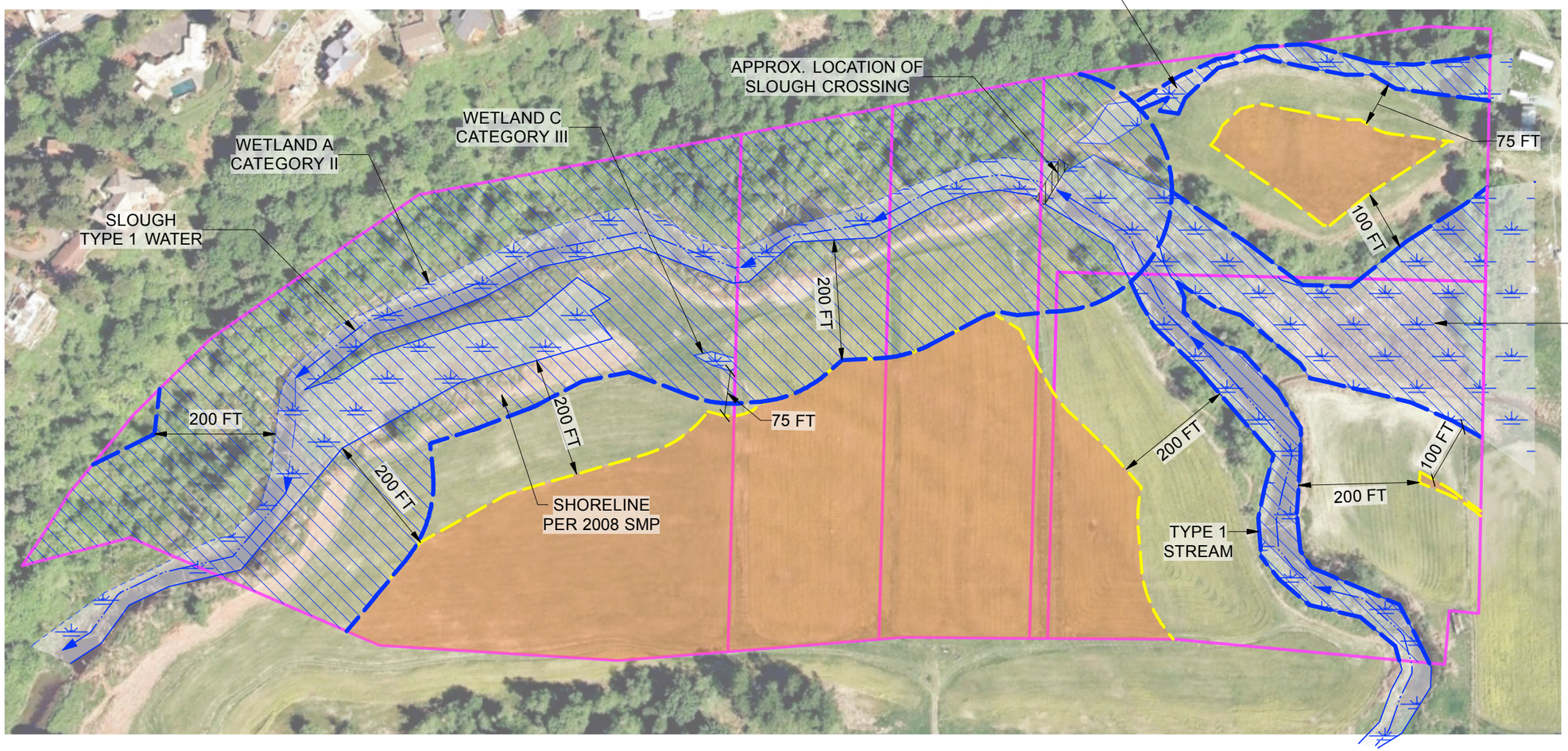
Figure 8: Erosion Hazard Areas

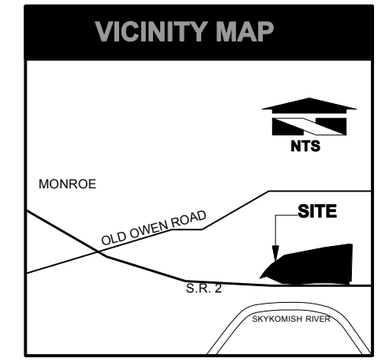


WETLAND, STREAM, BUFFERS, AND SHORELINE DESIGNATION COMPOSITE MAP

EAST MONROE REZONE

PORTION OF SECTIONS 5 AND 6, TOWNSHIP 27, RANGE O7E, WM.





LEGEND

- DELINEATED WETLAND
- WETLAND AND STREAM BUFFER*
- APPROXIMATE NORTH WETLAND AND STREAM BOUNDARY
- SHORELINES
- DEVELOPABLE AREA

* WHERE WETLAND AND STREAM BUFFERS OVERLAP, THE MORE RESTRICTIVE BUFFER IS DEPICTED ON THIS MAP.

SCALE 1" = 200'

0 100 200 300 400

Figure 9

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett,Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND, STREAM, BUFFERS, AND SHORELINE DESIGNATION COMPOSITE MAP
EAST MONROE REZONE

PACE Engineers, Inc.
Attn: Susan Boyd
11255 Kirkland Way #300
Kirkland WA 98033

Sheet 4/4
WRI Job # 13133
Drawn by: MK
Date: 08.09.2013

3.1.2 ENVIRONMENTAL IMPACTS

Topography and Soils

The biggest impact to topography and soils is the amount of cut and fill required to meet regulatory requirements associated with grading in the flood plain, including compensatory flood storage. For each of the Alternatives, considerable cut and fill is required to avoid flooding impacts by raising the site above the 100-year floodplain elevation of approximately 67 feet, as designated in the preliminary FEMA Flood Insurance Rate Maps (FIRMs) dated 2007. Raising the elevation of land in a designated floodplain zone requires compensatory flood storage and other mitigation measures in accordance with the National Flood Insurance Program and Endangered Species Act.

The compensatory flood storage volume provided must be equal to or larger than the volume displaced by fill. For the speculative development scenarios put forth herein, compensatory flood storage is provided within the floodplain, shoreline jurisdiction, wetland and stream buffer, and Native Growth Protection Area (NGPA) on Lots A through E as a means of maximizing developable area of the site. If the level of developable area shown herein is not desired or required for a specific development proposal, the compensatory flood storage required could be reduced and/or accomplished elsewhere on the site.

If compensatory flood storage is accomplished in portions of the NGPA and shoreline designation area, excavation (cut) would be to a minimum elevation of approximately 59.8 (average ordinary high water mark (OHWM) elevation). Excavation would start where the OHWM intersects the existing grade on the interior limits of the stream/slough and will continue at a 1% slope to the outer limits of the critical area buffer (approximately 200 feet on average). From there, the site will be filled at a 2 to 1 slope with on-site fill and/or suitable structural fill to an approximate elevation of 68, or 1 foot above floodplain elevation. Raising the site to this new elevation will mitigate potential flooding of new construction by placing development above floodplain elevation. More information on floodplains is in Section 3.3.3.

Currently, the NGPA and shoreline designation area generally follows the stream/slough and associated wetlands. The limits of the current NGPA are indicated on the 2003 property survey included in Appendix H. The NGPA and Urban Conservancy shoreline designation area are overrun with invasive species. Canarygrass generally covers the outer 10 feet of stream/slough (within the stream boundary) for its entire length. On average, blackberries cover a 70 foot wide swath parallel and adjacent to the entire length of the stream/slough.. Excavating and grading will remove these invasive species, providing a significant benefit to enhancing critical area buffers. The entire excavated area will be replanted with native plants to support a thriving wetland area. There would be no ongoing, negative environmental impact to the NGPA after the area is enhanced with new plants and trees.

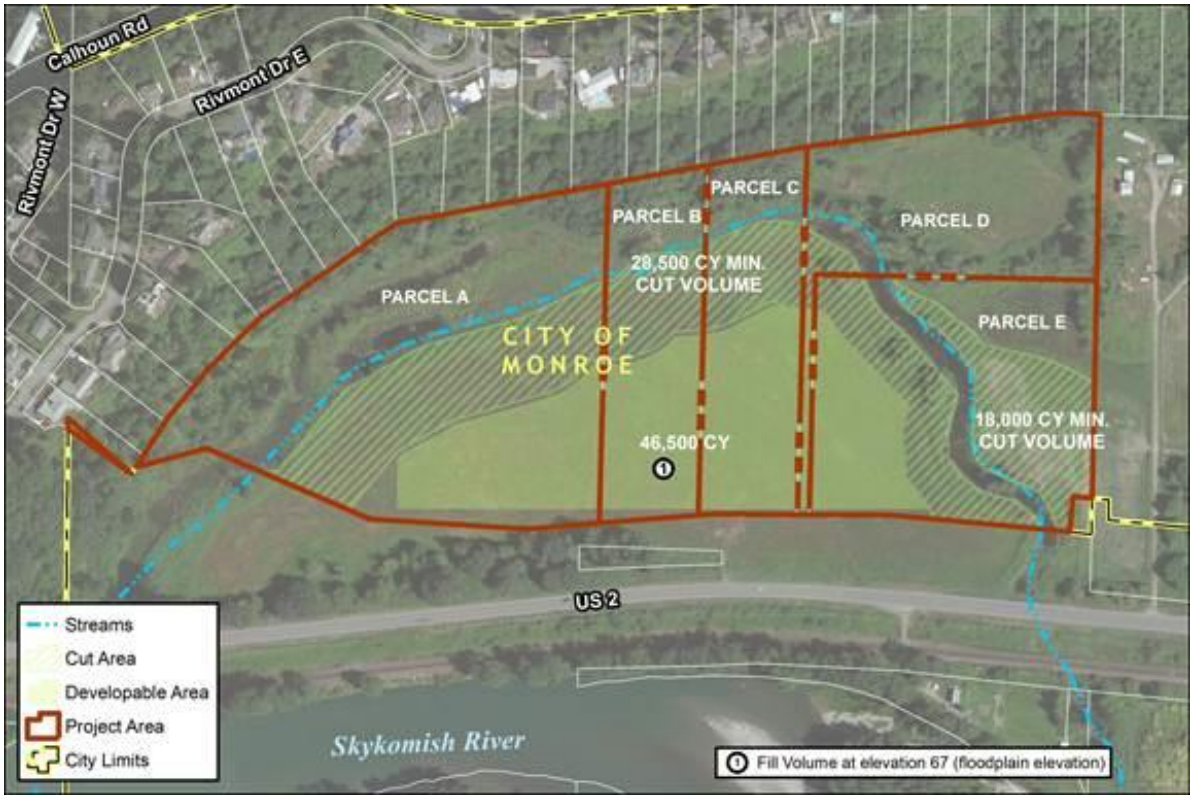
An extended benefit of excavating and enhancing wetland and shoreline buffers is the ability to provide on-site mitigation for flood storage lost due to fill activity in the floodplain. The amount of fill required to bring the developed area to floodplain elevation and maximize developable area as shown in the conceptual development scenarios is estimated at 46,500 cubic yards (CY). An equal quantity of compensatory flood storage is required for on-site flood management. Soil excavated from the NGPA and shoreline designation area, or other areas of the site, will not exceed the actual compensatory flood storage requirement determined at the time of development of the property. For all three proposed alternatives put forth herein, cut and fill for flood management is 46,500 CY. Figure 10 indicates suggested cut and fill areas at a planning level of detail. Figure 11 provides a cross-section of the proposal for enhancing areas adjacent to wetlands, streams and buffers. Note that no work is proposed north of the identified stream/slough. Steep slopes along the north property line will not be altered and the area will remain in its current natural state.

Access to the site will require at least one stream crossing near the southern property line adjacent to the SR-2 right-of-way. This crossing would likely be either by installation of a box culvert with a paved roadway over it or by a bridge crossing of the stream. The exact method of the crossing will be determined as coordinated with WSDOT to ensure that The Type 1 stream crossing is outside of shoreline jurisdiction and designated wetland areas and no lasting impact to the stream would occur.

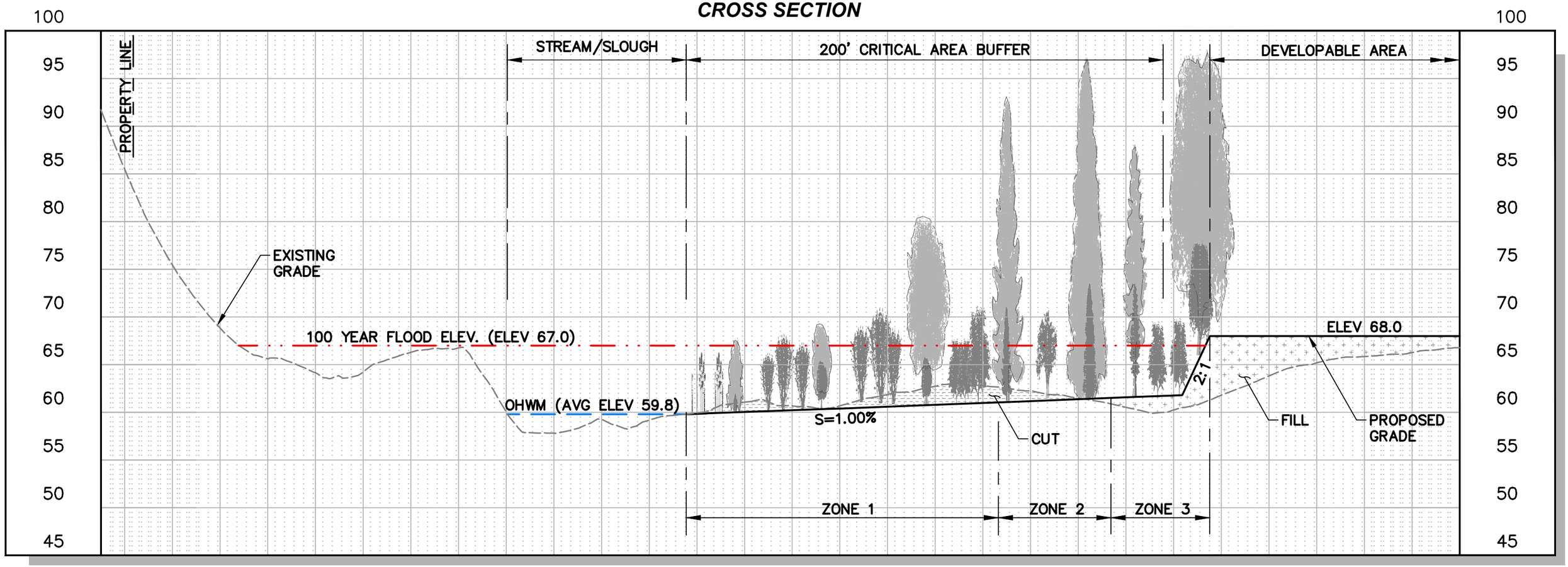
Proposed access to the northeastern portion of the site, as shown in the conceptual development scenarios, would be accomplished by a bridge extending from the main developable area of the site resulting in minimal impacts to the stream and wetland. The advantage of a bridge crossing is that abutments could be constructed outside of the wetlands and shoreline areas to avoid impacts.

Alternatively, access to the northeast portion of the site could be acquired through an easement on the adjacent parcel immediately east. This is the least disruptive method of accessing the northeastern portion of the site and would avoid impacts to wetlands and critical areas. Lastly, access could be accomplished by a stream crossing by expanding the existing crossing and installing a box culvert with a paved roadway over it. The method of stream would require placement of fill in wetlands and disturbance of both wetlands and streams. This is the least preferred alternative. Any of the access options to the northeast portion of the site would be constructed in accordance with all applicable regulatory requirements and best management practices to achieve no net loss in critical area size, value or function.

Figure 10: Cut and Fill Areas



TYPICAL ENHANCEMENT AREA/COMPENSATORY FLOOD STORAGE CROSS SECTION



LEGEND

HEIGHT AT TIME OF PLANTING

APPROXIMATE 20 YEAR HEIGHT

WEST SIDE

VERT. 0 5 10 20 Scale In Feet

HORIZ. 0 20 40 80 Scale In Feet

Figure 11

Zone 1 Typical Planting Plan

COMMON NAME	LATIN NAME	Spacing	Est. Height At Maturity
PACIFIC WILLOW	*SALIX LUCIDA*	5'	40'
SITKA WILLOW	*SALIX SITCHENSIS*	5'	26'
RED OSIER DOGWOOD	*CONUS SERICEA*	5'	20'
BLACK TWINBERRY	*LONICERA INVOLUCRATA*	5'	10'
SLOUGH SEDGE	*CAREX OBNUPTA*	18"	5'
SAWBEAK SEDGE	*CAREX STIPATA*	18"	3'-4'
SMALL-FRUITED BULRUSH	*SCIRPUS MICROCARPOS*	18"	5'

Zone 2 Typical Planting Plan

COMMON NAME	LATIN NAME	Spacing	Est. Height At Maturity
WESTERN RED CEDAR	*THUJA PLICATA*	10'	200'
SITKA SPRUCE	*PICEA SITCHENSIS*	10'	230'
WESTERN CRABAPPLE	*MALUS FUSCA*	10'	40'
SCOULER WILLOW	*SALIX SCOULERIANA*	5'	40'
SALMONBERRY	*RUBUS SPECTABILIS*	5'	13'

Zone 3 Typical Planting Plan

COMMON NAME	LATIN NAME	Spacing	Est. Height At Maturity
BIG LEAF MAPLE	*ACER MACROPHYLLUM*	5'	100'
DOUGLAS FIR	*PSEUDOTSUGA MENZIESII*	5'	230'
WETERN HAZELNUT	*CORYLUS CORNUTA*	5'	13'
OCEANSPRAY	*HOLODISCUR DISCOLOR*	5'	13'
BALD HIP ROSE	*ROSA GYMNOCARPA*	18"	5'
SNOWBERRY	*SYMPHORICARPOS ALBUS*	18"	6'-7'
SALAL	*GAULTERIA SHALLON*	18"	15'

Landslide and Erosion Hazard

Determination of impacts and mitigation measures is based primarily on observations made by soil engineering specialists at GeoEngineers, Inc. during a site visit on June 11, 2013, and review of topographic maps, and aerial photographs dating back to 1990. The proposed development area is located in the central portion of the site within a relatively level to gently sloping grass field. A stream/slough and sensitive areas surround the perimeter of the proposed development. The channel meanders in the vicinity of the toe of the slope. Based on review of aerial photographs, the general alignment of the channel has not changed since 1990.

The slope inclination appears to vary from about 1.5H:1V (horizontal to vertical) to 3H:1V, with an overall topographic relief on the order of 140 feet. The slope is heavily vegetated with mature conifer and deciduous trees, with a thick undergrowth of brush. Signs of slope instability were observed, as evidenced by leaning trees and what appears to be shallow sloughing in lower portions of the slope. This is consistent with the geologic mapping where the transitional beds become unstable when exposed on steep slopes, particularly where seepage emerges on the slope through the cleaner lenses of outwash.

3.1.3 MITIGATING MEASURES

Topography and Soils

Mitigation will be similar for all three alternatives and vary only in scope and scale, depending on the size and type of structures associated with each development. Fill of the developable area to above the 100-year flood elevation will be accomplished only with suitable soils and site preparation prior to placement of fill material to ensure that proper compaction and stability of soils. The development alternatives put forth herein all assume similar developable areas and building footprints within floodplain area. Under all three alternatives, compensatory flood storage is provided on-site. Planning level estimates of cut and fill required are put forth in Figure 10.

Work within the NGPA must be approved by the City of Monroe, must adhere to the critical area regulations outlined by the MMC, and must avoid impacts to existing wetlands to the greatest extent practicable.

Work within the 200-foot boundary of the OHWM of the stream/slough (the shoreline designation area for the project site) will be within the Urban Conservancy environment, according to the Monroe SMP. The Monroe SMP states:

> *"The purpose of the "Urban Conservancy" environment is to protect and restore ecological functions of open space, floodplain and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses."*

It allows "Flood Hazard Management" as one of the few permitted activities (with the applicable permits and approvals) under the SMP (Chapter 2, Section C: "Shoreline Use and Modification Matrix" Page 25) (Appendix G). The matrix also indicates shoreline modifications related to environmental restoration are allowable if the City determines that there will be a net increase in desired shoreline ecological functions. The suggested mitigation and enhancement measure put forth herein are consistent with the stated conditions of the SMP.

The shoreline designation area is allowed to be excavated only for purposes of floodplain management. During construction, the shoreline designation area will be protected and stabilized by following the 2012 DOE Manual's Volume II Construction Stormwater Pollution Prevention, preparing a SWPPP, and following all requirements of the NPDES permit. BMPs for controlling erosion and sedimentation during construction are outlined in the DOE Manual. Examples of implementation include installation of silt fences, perimeter berms, on-site temporary sediment ponds and treatment of runoff prior to discharge.

All activities will be performed under the strict requirements of the MMC and utilizing best available science. Best management practices put forth by DOE, FEMA, Washington Fish and Wildlife, and US fish and Wildlife will be employed as appropriate to ensure that all clearing, grading, excavation and fill activities are properly accomplished to avoid permanent adverse impacts.

No clearing or grading will occur within wetlands boundaries under the alternatives evaluation under this DEIS. However, clearing of invasive and noxious plants, earthwork and planting in buffers adjacent to wetlands and streams will enhance these critical areas and improve fish and wildlife habitat as discussed in subsequent sections of this document and further discussed in Appendix D. A conceptual site grading and planting schematic is shown in the cross-section in Figure 11.

Grading will provide the requisite storage and enhanced habitat without creating new wetlands or standing water and the hydrology of the existing wetlands will be maintained or improved. The area will be enhanced with new, primarily native plants and trees to create a more pristine and improved habitat for small mammals, birds and potentially fish during a flood event. Approval from the City will be required in accordance with MMC 20.05.0700, Critical Areas Protection and Mitigation Measures.

Soils removed from the NGPA and shoreline setback area are not likely to be entirely suitable for structural fill. A complete soils investigation by a geotechnical engineer will be required prior to construction to determine if the soils are suitable for building foundations. Any material deemed unsuitable for use on-site will be hauled to a pre-approved disposal site and suitable structural fill material will be imported.

For a project specific development proposal, the area receiving fill material will first need proper preparation. This may include stripping and the upper layer exposed ground static rolled to a firm and unyielding condition. If the sub-grade contains too much moisture, the area to receive fill could be blanketed with washed rock, quarry spalls, or crushed recycled concrete to act as a base. After the exposed ground is approved or a free-draining rock course is laid, structural fill may be placed to attain desired grades. Structural fill is defined as non-organic soil, meeting the specification of Gravel Borrow from the Washington State Department of Transportation (WSDOT) specification 9-03.14(1), or acceptable to a geotechnical engineer, placed in loose lifts, with each lift being compacted to at least 95 percent of the modified Proctor maximum density using ASTM:D 1557 as the standard.

Landslide and Erosion Hazard

The development boundary will be offset approximately 200 to 400 feet from the toe of the slope, and approximately 100 feet (on the east side of the site) to 200 feet from the existing stream/slough. No grading or earthwork for the development will occur within close proximity to the slope. Furthermore, flow velocities of the channel will not change because the DOE Stormwater Management Manual for Western Washington will be followed, which prohibits increases in flow of developed properties. Geotechnical investigations would need to be performed prior to on-site construction to ensure proper grading and drainage, fill material recommendations and stability, and potential preloading requirements.

3.1.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Topography and Soils

With enhancement of the excavated area and adherence to the MMC Critical Areas Ordinance, Shoreline Plan and floodplain regulations including maintaining hydrology of existing wetlands, there will be no significant unavoidable adverse impacts to topography and soils.

Temporary unavoidable impacts associated with earthwork include dust, increased traffic along haul routes and noise. These temporary impacts will be mitigated by typical construction mitigation measures and best managements practices. Another unavoidable impact is the changed topography of the site that will result from development but at the same time will be accomplished in a manner that is aesthetically pleasing and achieves site screening, site drainage, buffer enhancement, habitat enhancement and provision of flood storage.

Landslide and Erosion Hazard

Significant impacts are avoided because the proposed development is located more than 200 feet away from the toe of the slope, and approximately 100 to 200 feet from the existing stream/slough. Significant impact avoidance is confirmed in the soils evaluation (Appendix C) and the following statement contained therein: "The proposed development will not impact the existing stability of the slope provided stormwater facilities and discharge follow regulations required by the Department of Ecology Stormwater Management Manual".

Temporary erosion is expected on all site development projects and adherence to the 2012 DOE Manual Volume II: Construction Stormwater Pollution Prevention is strictly enforced. Temporary erosion on the south side of the stream/slough due to construction activities is expected and will be mitigated by strict adherence to code and by following federal, state and local regulations and BMP's established in permits associated with future development proposals.

3.2 GROUND WATER

3.2.1 AFFECTED ENVIRONMENT

The Snohomish County Groundwater Management Plan (Golder Associates, Inc., 1999) identifies the project area as being within the Snohomish County Groundwater Management Area. Due to the high ground water level (0 to 40 feet) in the vicinity, the area is considered to have high aquifer sensitivity. The project area is not within a United States Department of Ecology (DOE) designated sole source aquifer or in a wellhead protection area.

DOE maintains an online database of well log information (Washington State Department of Ecology). This database does not contain any information regarding wells in the immediate vicinity of the project area. The only information available at this time is from seven soil logs completed in 1999 by Whalen Designs (Whalen Designs, 1999) for the purposes of investigating the suitability of the project area for on-site sewage disposal systems. These soils logs were 48 to 60 inches in depth and did not indicate any groundwater. This level most likely varies seasonally and with the amount of rainfall received.

3.2.2 ENVIRONMENTAL IMPACTS

Groundwater can be affected by stormwater infiltration, on-site sewage disposal systems, and groundwater wells for providing water service. In that the property is located within the Urban Growth Area and an urban level of service is proposed for compliance with Growth Management Act goals and policies, public water and sanitary sewer service are proposed for all alternatives. On-site sewage disposal systems are not an option for any alternative, so sewage contamination is not an impact.

Potential development under Alternatives 1, 2 and 3 as proposed herein will increase runoff due to increased impervious areas, which would decrease groundwater recharge. For Alternative 1, the currently allowed agricultural uses (which are not allowed under Alternatives 2 and 3) would have a greater impact on groundwater quality due to animal waste, fertilizer, and pesticide residues leaching into the groundwater.

Excavation is adjacent to the stream/slough, and lowest excavation will be at the OHWM elevation of approximately 59 feet or above. As such, any groundwater encountered by the excavation will add to the hydrology of the site and will not produce any negative impacts. The only potential for encountering groundwater would be during construction and appropriate dewatering techniques and best management practices will be employed.

3.2.3 MITIGATING MEASURES

Installation of municipal water and sanitary sewer facilities are proposed for all alternatives to provide an urban level of service consistent with the GMA. Municipal services would eliminate the need for groundwater withdrawals for public water supply as well as impacts associated with on-site sewage disposal.

Any on-site stormwater infiltration systems would be required to comply with the latest requirements for flood control and water quality standards. Standards include Best Management Practices (BMP's) put forth in the DOE Stormwater Management Manual for Western Washington (DOE Manual).

Due to the potential for encountering groundwater during construction and with subsurface structures, further geotechnical exploration would need to be performed at the time of building permit application to determine the groundwater elevation and any buoyancy issues. Buoyancy analysis for below grade structures is common in land development and requires specific design consideration but does not pose unusual issues.

3.2.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

There are no significant, unavoidable adverse impacts to groundwater associated with any of the alternatives. Some temporary impacts to groundwater are possible during construction but will be avoided by typical dewatering and groundwater protection measures.

3.3 SURFACE WATER

3.3.1 AFFECTED ENVIRONMENT

Streams/Slough

The subject property is located approximately 400 feet north of the Skykomish River, a Type S water, or shoreline of the state. A slough (Type 1 Stream) extends northeast from the Skykomish River and onto the subject property via a large box culvert under Highway 2 and the Burlington Northern – Santa Fe (BNSF) railroad tracks. For a detailed description of the on-site critical areas, please see Appendix D, Critical Area Study and Habitat Conservation Report for East Monroe Rezone (Wetland Resources, Inc. June 13, 2013).

The slough meets the criteria for a Type 1 stream, or fish-bearing water. Fish were observed within the stream/slough during the June 2013 site inspections, and the stream/slough is connected to the Skykomish River. The Skykomish River contains several anadromous and salmonid fish species, including federally listed threatened and endangered (T and E) species. Per section 20.05.090(D) of the City of Monroe Municipal Code (MMC), a 200-foot buffer is required from the ordinary high water mark (OHWM) of Type 1 streams.

Wetlands

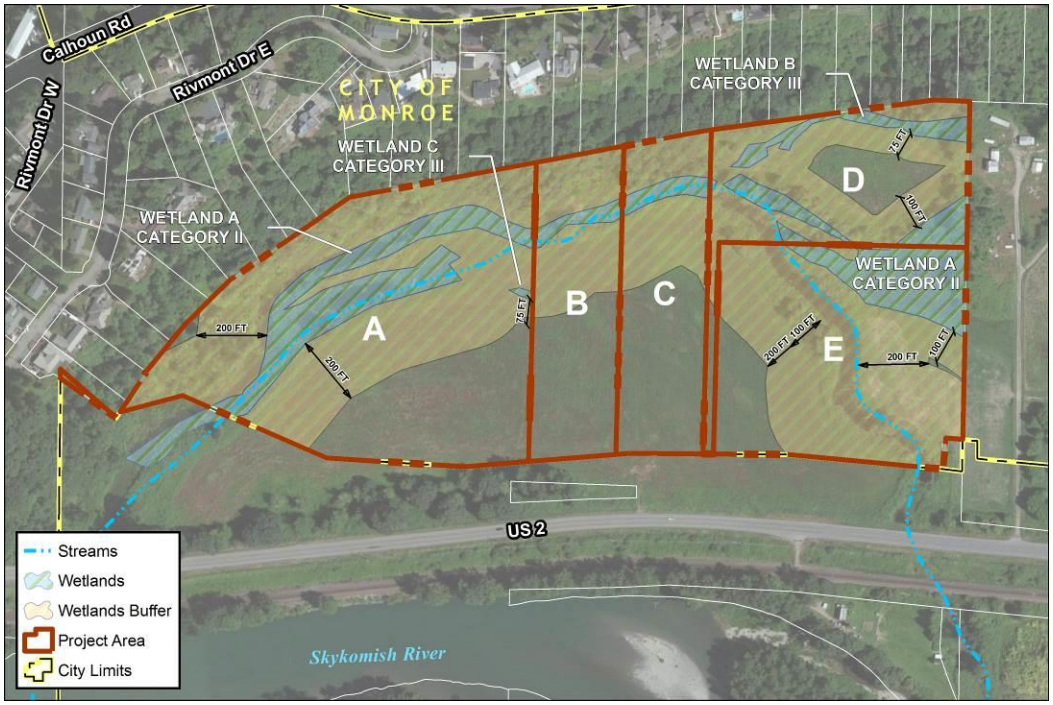
Three wetlands, referred to as Wetlands A through C, are located on the subject property. These wetlands were delineated, mapped, and rated in June of 2013 by Wetland Resources, Inc. For a detailed description of on-site wetlands and on-site critical areas, please see Appendix D. A summary of wetlands identified is as follows:

Wetland A: Wetland A is an approximate 7.3 acre (on-site) riverine wetland that meets the criteria for a Category II wetland per the Washington State Wetland Rating System for Western Washington (Hruby et. al 2004). It is further classified as a palustrine emergent and riverine/lower perennial/emergent system per the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et. al. 1979). Wetland A is located along the fringes/shallow water of the stream/slough and extends in an eastward direction across parcels D and E. The City of Monroe would typically designate a 100-foot protective buffer from the delineated boundaries of Category II wetlands.

Wetland B: Wetland B is an approximate 0.57 acre (on-site) slope wetland that meets the criteria for a Category III wetland. It is further classified as a palustrine emergent system per the Cowardin classification system. Wetland B is located in the northeast corner of the subject property and is not associated with the stream/slough. The City of Monroe would typically designate 75-foot protective buffers from the delineated boundaries of Category III wetlands.

Wetland C: Wetland C is an approximate 0.03 acre depressional wetland that meets the criteria for a Category III wetland. It is further classified as a palustrine emergent system per the Cowardin Classification system. Wetland C is located in the western portion of the subject property, primarily on parcel A. It is a very small, isolated wetland that is not associated with the stream/slough. The City of Monroe would typically designate 75-foot protective buffers from the delineated boundary of Category III wetlands.

Figure 12: Wetlands



Flood Hazard Area

The project area is located in the Skykomish River drainage basin. The project area is shown on the Federal Emergency Management Agency (FEMA) National Flood Insurance Program Flood Insurance Rate Map (FIRM) effective September 1999 as "Shaded X" which is defined as "Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood" (National Flood Insurance Program, 1999).

The revised preliminary FIRM 53061C1377G issued January 12, 2007 shows the project area, except for the northern plateau area of Parcel E, as "Zone AE" with a base flood elevation of between 66 feet and 68 feet NAVD'88 (National Flood Insurance Program, 2007). Although the Preliminary Maps were used for the conservative evaluation put forth herein, most jurisdictions in the Pacific Northwest and western U.S. have delayed adoption of the maps due to concerns of whether non-certified levees can be used to remove floodplain areas from a special flood hazard area. Decisions regarding challenges to the methodology and implementation of the new floodplain maps are expected to generate a federal decision on whether the new maps should become effective. If the maps are rejected or altered, the amount of earthwork required to provide compensatory storage will decrease significantly and developable area would increase slightly.

3.3.2 ENVIRONMENTAL IMPACTS

Stream/Slough

Each of the three alternatives has the potential to impact the on-site stream. Typically, a smaller construction footprint/envelope and smaller lot coverage would most likely result in fewer stream and/or stream buffer impacts than would a larger development. However, section 20.05.090(A) of the MMC specifically prohibits most development activities in Type 1, 2, and 3 streams and indicates that development activities shall not result in a loss of stream and/or stream buffer functions and values. The restrictive stream development regulations outlined in section 20.05.090 of the MMC are meant to reduce or completely avoid impacts to streams and buffers. While a development proposal might result in some level of unavoidable

critical area impacts, under the MMC, they must be reduced and/or mitigated to the greatest extent practicable.

Generally as lot coverage increases, the intensity of development and overall human activity increases. Indirect stream impacts could come in the form of habitat loss from removal of native vegetation along the riparian zone, loss of water quality improvement functions, and/or loss of hydrologic functions. Indirect impacts to the stream/slough could include an increase in the amount of runoff entering the stream. This would result from an increase in the amount of impervious surface on the subject property. Different types of development will result in varying quantities of impervious surfaces (as discussed above) and, therefore, varying amounts of stormwater runoff.

In addition to increased stormwater flow/runoff, a rise in the amount of pollutants and/or sediment entering the stream/slough may result from development under any of the proposed alternatives. This could possibly impact water quality within the slough as well as fish and other aquatic species that inhabit the slough. Impacts to the stream/slough may also affect downstream resources, primarily the Skykomish River and associated tributaries.

Any of the proposed land use alternatives have the potential for indirect adverse impacts to the functions and values of the on-site stream and as previously discussed, if lot coverage increases, the potential for direct adverse impacts also increases. In that cutting, grading and fill activity in the vicinity of wetland and shoreline boundaries will be outside of the OHWM, no adverse impacts to the stream will result.

Wetlands

Each of the three alternatives has the potential to impact on-site wetlands. Typically, a smaller construction footprint/envelope and smaller lot coverage would most likely result in fewer wetland and/or wetland buffer impacts than would a larger development. However, MMC 20.05.080 may allow for filling of wetlands or buffers, or the outright impact of wetlands and buffers provided the conditions of MMC 20.05.08(A) are met, and when applicable, the mitigation measures established in MMC 20.05.080 (E), (F), (G), and (H) are provided. Mitigation measures would typically include buffer averaging, wetland and buffer enhancement, wetland creation, and/or mitigation banking. Therefore any development activity, regardless of which alternative is utilized, is required to adhere to the critical area regulations outlined by the City in MMC and must avoid direct wetland impacts to the greatest extent practicable.

The current zoning designation (Alternative 1) of the subject property allows for maximum lot coverage of 30%. Under the Proposed Action (Alternative 2) the allowable lot coverage is 100%. Alternative 3 is exempt from maximum lot coverage requirements per MMC 18.10.140. No direct impacts to wetlands are expected from any of the proposed alternatives. Vehicular access to the developable northeast portion of the site would be accomplished by installing a bridge with abutments located outside of wetland boundaries and using standard BMP's for minimizing temporary construction impacts. Access via easement from the adjacent eastern parcel would cause no disturbance to the wetland areas. Temporary impacts to wetland buffer are expected from the implementation of a compensatory storage and habitat enhancement plan.

Generally as lot coverage increases, the intensity of development and overall human activity increases. Indirect wetland impacts could come in the form of habitat loss (primarily within the buffer areas), loss of water quality improvement functions, and/or loss of hydrologic functions. An increase in the amount of impervious surface on the subject property could result in an increase in stormwater runoff entering the wetlands. Alternatively, development of the site could also divert water away from the wetlands, thereby impacting wetland

hydrology as well as infiltration rates. Any of the proposed land uses and possible development alternatives has the potential for indirect adverse impacts to the functions and values of the on-site wetlands. As previously discussed, if lot coverage increases, the potential for adverse impacts could also increase.

Flood Hazard Areas

Based on the Preliminary FIRM Map 53061C1377G implemented by MMC, the floodplain elevation varies from 66 to 68 feet and has a designation of Zone AE. Zone AE refers to special flood hazard areas subject to inundation by the 1% annual chance of flood where a base flood elevation has been established. Base flood is more commonly referred to as a 100-year flood. A copy of the FIRM map showing the site designation is provided in Appendix E.

The development alternatives put forth in this DEIS assume that compensatory flood storage is required and provided through excavation and grading of the area adjacent to the stream/slough and filling of floodplain areas as discussed in Section 3.1.2. Verification of the magnitude of impacts will require a more detailed topographic survey to establish site elevations prior to a firm development proposal. Additional discussion on floodplain designation and required earthwork to accommodate compensatory flood storage is provided in Sections 3.3 and 3.1 respectively. The applicant may elect to use under-structure parking to reduce fill requirements and elevate building structure to above the established floodplain elevation, reducing parking lot area and increasing gross leasable area. Additionally, all development activities must comply with the Washington State Department of Ecology Stormwater Manual for Western Washington, which will limit pollutants through water quality treatment measures and limit changes to the hydrologic regime.

3.3.3 MITIGATING MEASURES

Stream/Slough

Development activities occurring under any of the proposed alternatives must comply with the Protection and Mitigation Measures outlined in section 20.05.070 of the MMC, as well as the Stream Development Standards outlined in section 20.05.090. Specific mitigation actions will depend on the type and quantity of impacts occurring to the slough and its associated buffers. Per section 20.05.090(H) of the MMC, a development project shall not result in a net loss of stream functions and values.

The methods outlined in section 20.05.070 will accomplish the purposes of the Critical Areas Ordinance and ensure protection of critical areas. Section 20.05.070 applies to all approved development applications and alterations when a proposed activity is implemented. This includes the following measures: Native Growth Protection Easements (NGPE); critical area tracts; building setback lines (BSBL); marking and/or fencing; monitoring; notice on title; fees; performance standards including oil control and enhanced water quality treatment of runoff from pollution generating surfaces; and limited density transfer. In addition, all the proposed mitigation measures identified in the wetland section of this document will also provide direct mitigation for potential impacts to the on-site Type 1 steam.

During construction, the stream will be protected by following the 2012 DOE Manual's Volume II: Construction Stormwater Pollution Prevention, preparing a Stormwater Pollution Prevention Plan (SWPPP), and following the requirements of the NPDES permit. These codes generally regulate potential pollutants released into the stream and provide guidelines for BMP's for controlling erosion and sedimentation during construction. For example, the stream may be protected by implementing silt fences, perimeter berms, on-site temporary sediment ponds, and treatment of run-off prior to discharge. Construction should be planned and scheduled to occur during the dry season.

If, as part of any future development proposal, direct impacts are proposed or indirect impacts are identified, then on-site mitigation in the form of wetland creation, wetland/buffer enhancement, and off-site mitigation banking are all feasible options for the subject property. Federal, State and Local regulations may be a requirement of any proposed mitigation measures for project impacts.

Wetlands

Development activities occurring under any of the proposed alternatives must provide critical areas studies that comply with; MMC 20.05.050, the Protection and Mitigation Measures outlined in section 20.05.070 of the MMC, which include Native Growth Protection Easements, Critical Area tracts, building setback lines (BSBL), marking and/or fencing, monitoring, notice on title, fees, performance standards, and limited density transfer, as well as the Wetland Development Standards outlined in section 20.05.080.

Specific mitigation actions will depend on the type and quantity of impacts occurring within the on-site wetlands and/or their buffers. Per section 20.05.080(H) "Wetland Development Standards" of the MMC, no net loss of wetland functions and values shall occur as a result of a project. If a wetland alteration is allowed, then the associated impacts will be considered unavoidable and specific mitigation measures shall be required to minimize and reduce wetland impacts. Compensation for impacts to wetland buffers is also required.

During construction, the wetlands will be protected by following the 2012 DOE Manual's Volume II: Construction Stormwater Pollution Prevention, preparing a SWPPP, and following the requirements of the NPDES permit. These codes generally regulate potential pollutants released into the wetlands and provide guidelines for BMP's for controlling erosion and sedimentation during construction. For example, the wetlands may be protected by implementing silt fences, perimeter berms, on-site temporary sediment ponds, and treatment of run-off prior to discharge. Construction should be planned and scheduled to occur during the dry season.

Regardless of which alternative is implemented, specific measures are required by the City of Monroe to limit potential impacts to on-site Critical Areas. A SWPPP will be prepared and submitted to the City to propose measures to reduce the potential for siltation to downstream systems during the construction phase on the project. Stormwater systems will be designed to comply with the Washington State Department of Ecology Stormwater Management Manual for Western Washington, which will address potential impacts to water quality and the hydrologic regime of the on-site wetlands. Maintaining the hydrology of on-site wetlands must be incorporated into/addressed by stormwater management systems. In addition, all critical areas will be permanently protected in a new NGPE tract, which will be demarcated with signage.

If, as part of any future development proposal, direct impacts are proposed or indirect impacts are identified, then on-site mitigation in the form of wetland creation, wetland/buffer enhancement, and off-site mitigation banking are all feasible options for the subject property. Federal, State and Local regulations may be a requirement of any proposed mitigation measures for project impacts.

Flood Hazard Areas

All alternatives include provisions for on-site compensatory storage constructed to provide ample volume for retaining the volume for rising floodwaters without impacting on-site development. Compensatory storage will be created by excavation of soils immediately adjacent to the stream, allowing for access of floodwaters. Fish and wildlife, water quality and flood-flow attenuation functions will also be further enhanced by the planting of diverse native vegetation, placement of habitat features such as snags and logs, and control of the invasive vegetation species currently located with the shoreline area. An indirect impact of

development of the property is that the on-site drainage system and flood protection measures will acknowledge and support area-wide flood management. Provision of natural compensatory flood storage can be accomplished in a way that will benefit the site and downstream properties. Grading, planting and site development in general can be accomplished to achieve on site storage and drainage at a rate that does not increase flooding downstream.

Filling the grassland and floodplain area in the approximate center of the site within the floodplain will remove existing flood storage. Flood storage will be replaced adjacent to the stream/slough and there will be net loss of flood storage on site. Providing flood storage at a lower elevation will likely reduce impacts of flooding with downstream properties receiving less flow in smaller storm/flood events.

3.3.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

The Proposed Action addressed in this DEIS, a change in the comprehensive land use designation and associated rezone of the subject property, will not result in any unavoidable adverse impacts. Development activities that occur under any of the proposed alternatives will be able to avoid significant adverse impacts to critical areas provided that the requirements of the MMC Critical Areas Regulations, state and federal regulations are adhered to. No significant adverse environmental Impacts associated with surface water are expected from any of the proposed alternatives.

3.4 PLANTS

Information presented in this section addresses the effects of proposed development alternatives on plants located within or in the vicinity of the project area. This information is based on both primary and secondary sources assembled and reviewed by Wetland Resources, Inc. Primary research was limited to the scope of work required to prepare the Critical Area Study and Habitat Conservation Report, and does not include any site specific comprehensive plant inventories. Secondary sources include spatial information on rare plant occurrences, provided by the Washington Department of Natural Resources (WA DNR), Washington Natural Heritage Program (WNHP), as well as Snohomish County's list of known occurrences of rare plants in Washington (August, 2012). The goal of this section is to describe existing vegetative cover, the likelihood of rare plant occurrences on-site and in the vicinity of the property, and also to assess and compare likely impacts to vegetative cover resulting from each of three proposed development alternatives. Note that a cross-section of a potential planting plan was provided earlier in this section as Figure 11 and is discussed in detail in the critical areas report provided in Volume 2 Appendix H.

3.4.1 AFFECTED ENVIRONMENT

Land use within the project area is most accurately described as abandoned agricultural. Historic aerial imagery (Google Earth) confirms that tilled fields have been a consistent feature of the southern portion of the project area since 1990, and it is likely that farming has occurred there for many years prior to 1990. A mix of native and non-native grasses currently dominates the agricultural portion of the project area. Various non-mature trees, non-native and native shrubs, grasses, sedges, rushes, and forbs dominate a large riparian wetland that exists on the fringe of the stream/slough channel that spans the northern third of the project area. A more detailed site description, including a list of observed species can be found in the attached Critical Area Study and Habitat Conservation Report (prepared by Wetland Resources, Inc. and dated June 18, 2013).

Three dominant vegetation types are located within the project area: Palustrine Emergent wetland, Himalayan blackberry dominated upland/riparian interface, and regularly maintained upland grasses. Within a small portion of the northwest corner of the project area, overlap exists between the emergent wetland and maintained grasses. Generally, the on-site

vegetation is comprised of pasture, invasive Himalayan blackberry and reed Canarygrass, with small areas of native species.

No rare, sensitive, or threatened plant species, or high quality ecosystems, were observed on-site or are noted in the information provided by the WA DNR WNHP list of surveyed land sections in Washington that contain Natural Heritage Features (Data current as of March 1, 2013).

3.4.2 ENVIRONMENTAL IMPACTS

It is logical to discuss potential impacts to vegetative cover in terms of a "full build-out" scenario for each of three proposed alternative zoning designations for the project area. Full build-out in this case refers to the maximum allowable lot coverage area and intensity that is permitted outright for each zoning designation, pursuant to development requirements set forth in the Monroe Municipal Code (MMC).

Impacts to vegetative cover resulting from development under LOS zoning are mostly a function of the limits imposed by the bulk requirements found in MMC 18.10.140, specifically the 30% maximum lot coverage requirement. Due to requirements set forth in the City of Monroe's Shoreline Master Program, the location of the proposed lot coverage will be within the former agricultural portion of the property. Therefore, the likely development activity under the LOS zoning is expected to cause the conversion (and loss) of maintained grass area to impervious surface. Also under the LOS zoning the remaining developable portion of the site could be converted from pasture to landscaping or open space, further impacting the existing vegetation.

Development under each of the three scenarios will require flood storage to be provided within the required 200-foot limit of Shoreline Jurisdiction and of the standard buffers surrounding critical area features. The impacts associated with flood storage activities are limited to the areas dominated by Himalayan blackberry and pasture and are expected to be temporal.

Development will also decrease total vegetative cover within the project area. The difference in total lot coverage between LOS and GC/MU zoning is minimal, and the proposed impact area consists of a vegetation assemblage that has been disturbed by agricultural use for many years. The functions performed by the existing vegetation in the impact area are of relatively low value to water quality improvement, hydrologic control, and fish and wildlife habitat, especially considering that human development could be located adjacent to the vegetation under each scenario. Therefore the additional potential loss of vegetative cover created by the GC and MU scenarios is not expected to significantly degrade functions within the project area.

3.4.3 MITIGATING MEASURES

Under any development scenario, impacts to vegetative cover will occur within areas characterized by ongoing and significant human disturbance (maintained upland grasses and invasive species).

Impacts to vegetative cover resulting from development under any of the proposed zoning designations could be mitigated by:

- Retaining native vegetation to the greatest extent possible;
- Removing invasive vegetation species such as Himalayan blackberry and reed canarygrass, and or planting additional native trees, shrubs, and emergent;
- Siting new impervious surfaces as far from the wetland and stream/slough complex as feasible could also somewhat mitigate impacts associated with any proposed development activity; and,

- An increase in the fish and wildlife habitat function, stormwater storage function and water quality function can be expected by removing invasive species along the wetland, stream and shoreline areas, by excavating flood storage area, and by planting native trees, shrubs and emergent plants throughout.

3.4.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Any development scenario within the project area will reduce the overall vegetative cover within the pasture portion of the site. Given the existing disturbed/managed agricultural condition of the site, this may lead to temporary reductions in water quality improvement, hydrologic control, and wildlife habitat.

3.5 ANIMALS

Information presented in this section addresses the effects of proposed development alternatives on animals located within or in the vicinity of the project area. This information is based on both primary and secondary sources assembled and reviewed by Wetland Resources, Inc. Primary research was limited to reconnaissance level wildlife observations and does not include any site specific wildlife inventories beyond what was conducted during the wetland and stream field investigations. Secondary sources include spatial information on threatened and endangered species, provided by the Washington Department of Fish and Wildlife (WDFW) SalmonScape interactive mapping tool, Priority Habitat and Species viewer, and Fish Passage Program Maps. The goal of this section is to describe animal use of the site, with a focus on threatened and endangered species. Impacts to wildlife resulting from each of the proposed development alternatives will also be discussed.

3.5.1 AFFECTED ENVIRONMENT

On the landscape-scale, the project area is disconnected from other habitat types by SR2 to the south, downtown Monroe to the west, residential development on Rivmont Drive to the north, and Calhoun Road to the east. These terrestrial blocks do not impede avian use of the site, but do limit access to many mammals. The lack of corridor and connection to other valuable habitat patches reduces the opportunity for species to gain access to the project area.

At the site-scale, low to moderate quality habitat does exist. The structural complexity of the stream/slough channel, surrounded by wetlands and adjacent to upland forest and tall grasses, creates a transition zone between habitats, which is known to provide niches that encourage use by many species. Steep slopes on the north side of the property discourage human intrusion, and connect the wetland to a patch of upland forest. Multiple hydroperiods within the wetland and diversity of vegetation create quality cover and foraging opportunities for numerous species, particularly birds. Within the stream/slough channel, submerged logs and rooted aquatic vegetation provide cover for salmonids. The project area has moderate potential to provide quality wildlife habitat.

To provide valuable wildlife habitat, sites require both potential and opportunity. While on-site habitat creates potential to provide wildlife habitat, it is somewhat limited by the lack of connectivity to other larger blocks of habitat (opportunity) and the large amount of non-native vegetation along the edge of the wetland and upland habitats. Therefore, the site provides only moderate value for supporting wildlife. Avian populations do not require terrestrial connections, and therefore are more likely to utilize the habitats within the project area.

Despite the lack of corridor and connection to larger habitat patches, wildlife inhabiting the project area and vicinity likely includes a fairly wide variety of species. The following species were directly or indirectly observed (evidence of recent use) during the June 2013 site visits: black-tailed deer (Odocoileus hemionus columbianus), North American beaver (Castor canadensis), mouse (Apodemus spp.), Pacific mole (Scapanus orarius), bald eagle (Haliaeetus

leucocephalus), red-tailed hawk (Buteo jamaicensis), Pileated woodpecker (Dryocopus pileatus), American robin (Turdus migratorius), red-winged blackbird (Agelaius phoeniceus), American bullfrog (Rana catesbeiana), Pacific tree frog (Pseudacris regilla), and common garter snake (Thamnophis sirtalis).

The following list of species, while not directly or indirectly observed by Wetland Resources staff, are expected to utilize the project area based on the habitat characteristics present there: common raven (Corvus corax), American crow (Corvus brachyrhynchos), house finch (Carpodacus mexicanus), black-capped chickadee (Poecile atricapillus), bushtit (Psaltriparus minimus), northern flicker (Colaptes auratus), hairy woodpecker (Picoides villosus), downy woodpecker (Dendrocopus villosus), red-breasted nuthatch (Sitka canadensis), brown creeper (Certhia americana), swainson's thrush (Hyocichla ustulata), varied thrush (Ixoreus naevius), Vaux's swift (Chaetura vauxi), sharp-shinned hawk (Accipiter striatus), Virginia opossum (Didelphis virginiana), shrew (Sorex spp.), striped skunk (Mephitis mephitis), coyote (Canis latrans), gray squirrel (Sciurus carolinensis), eastern cottontail rabbit (Sylvilagus floridanus), northwestern salamander (Ambystoma gracile), and rough-skinned newt (Taricha granulosa). These lists are not meant to be all-inclusive and likely omit species that currently utilize or could utilize the site.

The Skykomish River, a shoreline of the state, flows adjacent to the south of the project area. A box culvert connects the on-site stream/slough channel with the Skykomish River off site to the southwest, and is not considered a fish passage barrier, based on data obtained from the WDFW Fish Passage Program Maps. The Washington Department of Natural Resources (WA DNR) further substantiates the presence of fish within the stream/slough channel, mapping the feature as Type 1 water. It is expected that all species known to utilize the Skykomish River in the vicinity of the project area are similarly present within the on-site stream/slough channel. Therefore, the following fish species are presumed to inhabit the project area: Chinook salmon (Oncorhynchus tshawytscha)-summer and fall runs, Chum salmon (Oncorhynchus keta)-fall run only, Bull trout (Salvelinus malma), Pink salmon (Oncorhynchus gorbuscha), Steelhead trout (Oncorhynchus mykiss)-summer and winter runs, Coast resident cutthroat (Oncorhynchus clarki), Coho salmon (Oncorhynchus kisutch), Rainbow trout (Oncorhynchus mykiss), and Cutthroat trout (Oncorhynchus clarki).

Several of the aforementioned species have been listed by the state and federal government as threatened, endangered, candidate, or sensitive species. Federally threatened species include: steelhead trout, bull trout (also State Candidate), and Chinook salmon (also State Candidate). State candidate species include pileated woodpecker and Vaux's swift. State sensitive species include bald eagle. Threatened and endangered species require specific habitat protections, defined at the federal level by the NOAA Fisheries and the United States Fish and Wildlife Service and at the state level by the WDFW. "Candidate" status is a state listing afforded to species where sufficient evidence suggests that their status may meet the listing criteria defined in WAC 232-12-297. "Sensitive" status is a state listing afforded to any wildlife species native to the state of Washington that is vulnerable or declining and is likely to become endangered or threatened.

3.5.2 ENVIRONMENTAL IMPACTS

It is logical to discuss potential impacts to wildlife in terms of a "full build-out" scenario for each of three proposed alternative zoning designations for the project area. Full build-out in this case refers to the maximum allowable impact area and intensity that is permitted outright for each zoning designation, pursuant to development requirements set forth in the Monroe Municipal Code (MMC).

Impacts to wildlife resulting from the development of the project area relate to habitat loss, fragmentation, and proximity to human disturbance regimes. Species particularly impacted

will be small mammals residing within the pasture areas and predators that feed on them. Habitat degradation will increase as a function of the proximity of urban development and intensity of land use. The three development scenarios each necessitate daily human disturbance within the project site, but not within the enhanced wetland and areas where habitat will likely reside. Due to requirements set forth in the City of Monroe's Shoreline Master Program, the location of the lot coverage area will be within the former agricultural portion of the property. Therefore development under each alternative is expected to cause the conversion (and loss) of maintained grass area to impervious surface, and may impact the wildlife habitat within these areas. The remaining area located outside of critical areas and shoreline would likely be converted from abandoned pasture to maintained landscaping and/or open space.

The primary differences between LOS zoning and GC/MU zoning are intensity of human use and total square footage of impervious surface. Close proximity to urban development will deter animal use of the agricultural portion of the site, and also the use of on-site wetland and stream/slough habitat, to some degree. At this time there is no objective measure that can illustrate the level of deterrence each scenario might create. Impact to habitat value, as expected, will occur as a function of the intensity and proximity of land use. All of the proposed alternatives are considered an increase in the intensity of existing land use.

Habitat functions provided by maintained grasses are limited for medium to large mammals, as they are unable to provide cover from predators, and also due to limited grazing/foraging opportunities. Smaller mammals, such as mice, rabbits, moles, voles, and shrews are likely to utilize these areas for nesting and cover. The physical separation from human development is likely the most valuable function provided by the grassland area.

3.5.3 MITIGATING MEASURES

In order to mitigate the potential impact of any of the proposed land uses, the applicant should incorporate WDFW guidelines for threatened, endangered, candidate, sensitive, and monitored species, and Washington DOE measures to minimize impacts to wetlands (Table 8C-8, from BAS document titled Wetlands in Washington State Volume 2- Protecting and Managing Wetlands, dated April 2005). In addition, designating the highest quality habitat on site as NGPE and segregating this habitat from the proposed development activity through fencing and signage will provide the biggest benefit to on-site wildlife habitat. In addition, the proposed compensatory storage and associated enhancement activities will have a long-term benefit for wildlife habitat by controlling/removing existing invasive species, planting a diversity of native vegetation, and by installing habitat features such as snags and logs.

3.5.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Build-out of the project area under any scenario will have limited impact to wildlife through habitat loss and fragmentation by impacting the lowest quality habitat on-site. Species displaced from any of the proposed alternatives are likely to be small mammals and the predators which feed on them. Similar impacts are likely to be realized from each of the development alternatives.

3.6 NOISE

3.6.1 AFFECTED ENVIRONMENT

Land within the project area is best described as abandoned agricultural. The area immediately adjacent to the project area is most likely to be affected by noise. Land to the north is zoned residential with lot sizes ranging from 0.5 acres to 1.78 acres. The homes in this residential area are located approximately 100 to 120 feet above the project area and 200 to 300 feet horizontally from the north property line of the project area parcels.

Located immediately south of the project area is the SR-2 right-of-way and the Burlington Northern Santa Fe railroad tracks. Currently, in addition to traffic noise from SR-2, approximately 23 locomotives a day pass through Monroe every day (Monroe Monitor, 2013). Under the 'Train Horn Rule', locomotive engineers are required to sound their horns at least 15 seconds, and no more than 20 seconds, in advance of all public grade crossings. If a locomotive is traveling faster than 60 mph, engineers will not sound the horn until it is in within one-quarter mile of the crossing, even if the advance warning is less than 15 seconds, (U.S. Department of Transportation Federal Railroad Administration). Locomotive horns range in decibel (dB) ratings from 110-150.

For the purpose of comparison, a 5-ton 'Trane' packaged rooftop heat pump (common for a home improvement store) is rated at 87 dB, power lawn mowers are typically rated at 65-95 dB, a vacuum cleaner has 60-85 dB, and typical conversational speech ranges from 55-65 dB. The property to the south of the railroad tracks is agricultural land and the Skykomish River. Properties in the vicinity of the study area (north, east and west), may experience increased noise volumes as construction of potential development occurs. Table 5 shows the maximum permissible environmental noise levels per WAC 173-6-040. In this table, EDNA means the environmental designation for noise abatement.

Table 5: Maximum Permissible Environmental Noise Levels

(Per WAC 173-60-040)

EDNA of Noise Source	EDNA of Receiving Properties		
	Class A	Class B	Class C
Class A	55 dBA	57 dBA	60 dBA
Class B	57	60	65
Class C	60	65	70

Note:
1. No person shall cause or permit noise to intrude into the property of another person which noise exceeds the maximum permissible noise levels set forth below in this section.
2. (a) The noise limitations established are as set forth in the following table after any applicable adjustments provided for herein are applied
(b) Between the hours of 10:00 p.m. and 7:00 a.m. the noise limitations of the foregoing table shall be reduced by 10 dBA for receiving property within Class A EDNAs.
(c) At any hour of the day or night the applicable noise limitations in (a) and (b) above may be exceeded for any receiving property by no more than:
(i) 5 dBA for a total of 15 minutes in any one-hour period; or
(ii) 10 dBA for a total of 5 minutes in any one-hour period; or
(iii) 15 dBA for a total of 1.5 minutes in any one-hour period.

3.6.2 ENVIRONMENTAL IMPACTS

Future development actions that will be allowed under all of the alternatives may generate additional noise during construction activities. Residents in the adjacent properties of the project area may become aware of increased noise levels as construction and development occurs. Operational noise sources in the project area will depend on the type of development activity that takes place but can include excavating equipment that includes dump trucks, backhoes, and other machinery used in hauling soils and land work.

Noise sources can also include unloading of shipments, building support machinery (heating, ventilation and air conditioning, and refrigeration), and local traffic noise. A list of the allowed uses for the three alternatives is provided in Appendix B.

Increased traffic volumes under any of the alternatives may also contribute to increased traffic noise for residents in the vicinity of the study area. Please refer to Section 3.10 "Transportation" for an analysis of potential traffic volumes.

3.6.3 MITIGATING MEASURES

Potential noise impacts will be mitigated through compliance with Monroe Municipal Code Section 18.10.270 – Performance Standards, particularly subsection E, "Noise", which establishes a maximum acceptable sound pressure level in residential districts and by complying with WAC 173-60 Maximum Environmental Noise Levels.

3.6.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Future development activities will result in increased noise levels during construction activities and an increase in background and traffic noise during operation.

3.7 LAND AND SHORELINE USE

3.7.1 AFFECTED ENVIRONMENT

Land Use

The project area currently has a comprehensive land use designation and zoning of LOS. It has been used for agriculture in the past and is unused at the present time. This designation allows for residential uses at a maximum density of one dwelling unit per five acres and a host of other more intensive developments. Appendix B provides a complete table comparing land uses of LOS, GC, and MU designations and Table 6 provides a summary of land inventory in the City of Monroe.

Table 6: City of Monroe Land Use Inventory (2012)

City of Monroe Comprehensive Plan 2012

Category	Approximate Acres	Percent of Total
Single Family Residential	2108	43
Multi-Family Residential	146	3
Commercial	355	7
Professional Office	29	1
Mixed Use	125	3
Industrial	243	5
Limited Open Space	328	7
Limited Open Space Airport	65	1
Parks and Open Space	403	8
Public Facilities- City/School	94	2
Special Regional Use	997	20
Total	**4873**	**100%**

Source: City of Monroe Comprehensive Plan 2005-2025; Land Use Element – LU-19

The following paragraphs explain the purpose of the zoning districts associated with this proposal, as stated in the Monroe Municipal Code (MMC).

Limited Open Space

Per MMC Section 18.10.045: "The purpose of the limited open space zoning district is to provide for low-density residential uses on lands that lack the full range of public services and facilities necessary to support urban development and that are severely impacted by critical areas. This zone also provides a buffer between urban areas and

transitional land uses on the urban growth boundaries of the city, and/or may also provide for enhanced recreational facilities and linkages to existing trails or open space systems."

General Commercial
Per MMC Section 18.10.030: "The purposes of the commercial districts are to provide opportunities for the enhancement of existing commercial uses and for the location of new commercial development. General commercial uses (GC) should be located on traffic corridors that have adequate capacities for traffic flow. Such location assures that uses do not generate traffic through residential areas. Uses located in this (GC) class should be designed into planned centers with safe and convenient access to minimize curb cuts and facilitate better parking and traffic flows."

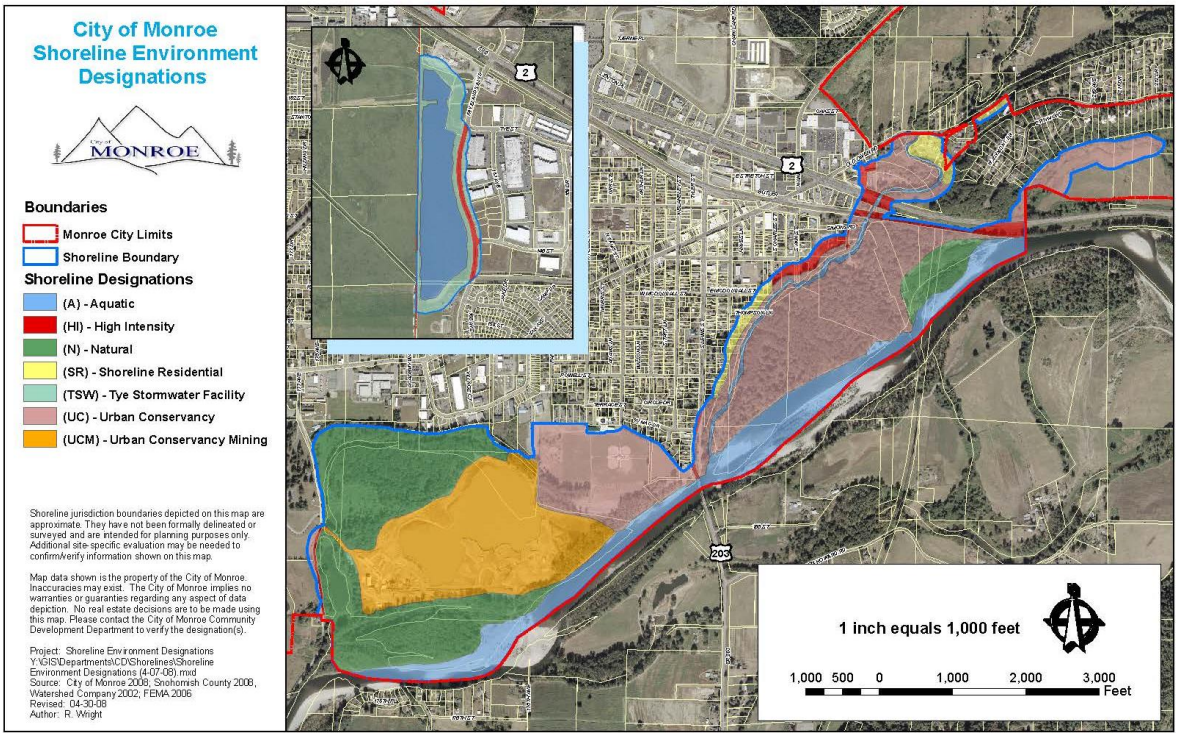
Mixed Use Commercial
Per MMC Section 18.10.030: "The purposes of the mixed use zoning districts are to integrate a mix of office, retail, light industrial, institutional, public facilities, and attached residential units throughout the district, within the same property, or inside a single building. Mixed use commercial (MUC) should be located on corridors with available public services and adequate traffic capacities. The mixed use commercial district allows high-intensity development and requires that new developments provide safe and convenient access, minimize curb cuts, and facilitate better parking and traffic flow. This district permits residential, commercial, office, and light industrial land uses.

Shoreline Use
According to the City of Monroe Shoreline Environment Designations Map (Figure 13 and included in Appendix I), a portion of the subject property is designated as an Urban Conservancy Shoreline Environment. This designation is illustrated on the map as including only the western and northern portions of the slough, consistent with the City of Monroe's 2008 Shoreline Master Program.

Chapter 2 Section 4 of the adopted Shoreline Management Program cites designation of the subject property as Urban Conservancy and states: "The purpose of the "Urban Conservancy" environment is to protect and restore ecological functions of open space, floodplain and other sensitive lands where they exist in urban and developed settings, while allowing a variety of compatible uses."

In these areas, the shoreline jurisdiction extends 200 feet from the slough. The eastern portion of the slough and the associated wetlands are also included in the shoreline environment, but do not have the 200-foot setback.

Figure 13: City of Monroe Shoreline Environment Designations Map



3.7.2 ENVIRONMENTAL IMPACTS

Land Use

Alternative 1 would retain the current land use and zoning designation of LOS. Alternative 2 would change the land use designation of the project area to General Commercial (GC) which is described in the 2005 City of Monroe Comprehensive Plan Section LUP-1.1 as:

> "This designation comprises more intensive retail and service uses than described under Service Commercial above. General Commercial uses typically require outdoor display and/or storage of merchandise, greater parking requirements, and tend to generate noise as a part of their operations. Such uses include but are not limited to shopping centers, grocery stores, auto, boat and recreational vehicle sales lots, tire and muffler shops, equipment rental, and mini-warehouses and vehicle storage."

Alternative 3 would change the land use designation of the project area to Mixed Use which is described in the 2005 City of Monroe Comprehensive Plan as:

> "Mixed-use areas should be concentrated in areas of the city characterized by mixed uses; where there is the ability to develop land efficiently through the consolidation and infill of under-utilized parcels; and where infrastructure, transit and other public services/facilities are available or where the city or proponent can provide public services. Mixed-use areas encourage office, retail, and light-industrial uses; compatible high technology manufacturing; institutional and educational facilities; parks and other public gathering places; entertainment and cultural uses; and attached residential units up to 20 dwelling units per acre integrated throughout the district, within the same property, or inside a single building". (Policy LUP-1.1-17 Land Use Element the City of Monroe Comprehensive Plan).

Shoreline Use

Per the City of Monroe Shoreline Master Program, non-water dependent commercial activities, single-family residential and multi-family residential activities are prohibited within Urban Conservancy shoreline environments (Chapter 2, section C: "*Shoreline Use and Modification Matrix*" Pg. 25). A copy of the matrix is included in Appendix G and demonstrates allowable uses within designated shoreline and Urban Conservancy areas.

One of the very few allowable uses within the UC designation is flood management. All alternatives considered in this DEIS include activity within the shoreline environment to maximize developable area by using this area for provision of compensatory storage as detailed in earlier sections. Work would be performed under specific approval by the City of Monroe at the time of permitting and would be consistent with MMC and the City's 2008 SMP. Enhancement of the shoreline area and flood management would entail excavation, grading and planting to accomplish restoration and enhancement of drainage, vegetation and habitat.

While no structures should be proposed or occur within the shoreline area, excavation of this area adjacent to the slough is proposed to improve/increase floodplain storage. This area falls within the 200-foot boundary of the OHWM of the slough and, therefore, within the Urban Conservancy environment. "Flood Hazard Management" is one of the few permitted activities (with the applicable permits and approvals) under the City's Shoreline Master Program (Chapter 2, section C: "*Shoreline Use and Modification Matrix*" Pg. 25). The excavation of this area is described in further detail in Section 3.1.3 and the effects on the floodplain are discussed in Section 3.3.3.

Anticipated impacts to the shoreline environment include enhancement of fish and wildlife habitat through clearing, grading and planting in shorelines adjacent to the stream/slough and associated wetlands, increasing the functional value of the areas. Implementation of a sound habitat management plan through site enhancements will also provide the beneficial use of the shoreline area for controlled flood storage. Temporary construction impacts to the shoreline setback area are also anticipated. These impacts occur under any of the alternatives.

3.7.1 MITIGATING MEASURES

Land Use

Potential land use impacts resulting from a zoning classification change will be mitigated by complying with critical area regulations, zoning regulations, and performance standards contained in the Monroe Municipal Code. This proposal is for the non-project action of a Comprehensive Plan amendment and rezone. Although adequate review of the impacts resulting from this action is achieved through evaluation of potential development scenarios, additional environmental analyses and documentation should be expected when a specific development proposal is reached. Any additional evaluation will be as required by the City of Monroe's development review and permitting processes.

Mitigation measures associated with the changed land use and zoning designations put forth under Alternatives 2 and 3 are similar to what would be expected for development under the current designations. They consist primarily of developing the site in accordance with the requirements, restrictions and allowances under the selected land use and zoning designation. Other mitigation strategies to lessen the impacts of changed land use to neighboring properties are addressed in later sections of this DEIS and include measures to lessen the impacts of light, glare, aesthetics and traffic.

Shoreline Use

Pasture grasses and emergent vegetation common to the region dominate the proposed excavation area. There is little, if any, wildlife habitat within the excavation area. Excavating and restoring this area is planned as an enhancement of flood protection and habitat.

3.7.2 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Changes in the character of land use will occur.

The Proposed Action addressed in this DEIS, a change in the comprehensive land use designation and associated rezone of the subject property, will result in unavoidable impacts in the sense that if the land use designation is changed, the intensity and type of development would increase. These impacts are not considered adverse with appropriate development guidelines and mitigation as outlined throughout this DEIS.

Development activities that occur under any of the proposed alternatives will avoid significant adverse impacts to shoreline areas provided that the requirements of the City of Monroe Shoreline Master Program are adhered to and the proposed flood hazard management, including habitat enhancement, is fully implemented. No permanent adverse impacts to the shoreline environment or the slough are expected. Temporary construction impacts will be mitigated through typical best management practices, as outlined in the DOE Manual.

3.8 AESTHETICS

3.8.1 AFFECTED ENVIRONMENT

A mix of native and non-native grasses currently dominates the abandoned agricultural portion of the project area. Various non-mature trees, shrubs, grasses, sedges, rushes, and forbs dominate a large riparian wetland that exists on the fringe of the stream/slough channel that spans the northern third of the project area. Directly to the north of the property is a slope that is covered entirely by vegetative growth including shrubs, bushes, trees, and other types of existing foliage that would remain untouched throughout development under any of the alternatives.

The central acreage of developable land is currently dominated by a mix of native and non-native grasses. After potential development occurs, which is allowed by any of the alternatives, the grassy areas would be removed and replaced with impervious surfaces such as parking lots and buildings. Landscaping, open spaces, lights, and other articles associated with development will also exist once development is complete.

The area is easily visible only from motorists traveling along SR-2 (at approximately 55 mph), and residents to the east. The south portion of the property can be seen from residents located on the bluff to the north of the property. Their view can be seen in Figure 14.

Figure 14: South-Facing Property View from Bluff North of Study Area

3.8.2 ENVIRONMENTAL IMPACTS

All Alternatives mentioned in this DEIS allow for future development actions that would alter the current visual circumstance of the property. Alternative 1 would retain the LOS zoning designation. Allowed uses include, but are not limited to: animal slaughtering, cement manufacturing, processing of sand/gravel, rock, black soil, and other natural deposits, and RV parks. Alternative 1 in this DEIS considers a probable development of a daycare, church, and fitness facility. Alternative 2 could include, but not be limited to: retail facilities, home improvement centers, professional offices, and restaurants. Alternative 3, rezoning to MU, could include, but not be limited to: accessory dwelling units, multi-family residential, retail facilities, and wholesale establishments. Please refer to Appendix B, Allowable Land Uses for more usage examples.

Future development of the site would include the need to remove the current grass cover and replace it with impervious surfaces such as buildings and parking lots. However, there will also be landscaping, open space, a large percent of undeveloped property, and natural vegetation surroundings.

The current pasture land would be converted into developed land, changing the visual character of the property. Potential development could also result in an increased awareness of commercial activity for motorists along SR-2. A change in views from residences on the ridge above and north of the project area could include blocking SR-2 and Skykomish River views, as shown in Figure 14.

3.8.3 MITIGATING MEASURES

A variety of measures could lessen visibility and soften the impact of the potential development. Measures could include:

- Enhancing wetland buffers with vegetation to continue to attract wildlife;
- Architectural treatment of structures to give development an appealing, community feel;
- Screening of glare; and

- Landscape planting between the buildings and amongst the parking to provide interest and aesthetically break up the impervious surfaces.

3.8.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Once the property is developed, visual aesthetics would change significantly for individuals traveling along SR-2 looking towards the property. Visual changes for the residences on adjacent properties to the north are also a significant unavoidable impact.

3.9 LIGHT AND GLARE

3.9.1 AFFECTED ENVIRONMENT

There currently are no light or glare producing structures or objects on the proposed project site. The subject property has been used in the past for agricultural purposes, but is currently vacant. If new development were to occur under any of the alternatives, residents in the surrounding area are likely to notice a difference in light and glare sources during construction and after completion of development as new structures and parking lots are lit. Located immediately south of the project area is the SR-2 right-of-way and the Burlington Northern Santa Fe railroad tracks. Motorists traveling along SR-2 would also become more aware of light intrusion coming from the property.

3.9.2 ENVIRONMENTAL IMPACTS

All Alternatives mentioned in this DEIS allow for future development actions that would alter light and glare from what is typically seen on the site now. Passersby and property owners to the north are likely to notice an increase in light and glare coming from the new development as the night sky darkens. The permanent building structures of Alternative 2 may provide the worst case light and glare scenario of all alternatives only due to the potential of a large box store with skylights. At night, light could escape from the skylights and potentially create glare for the properties above.

The final development under any alternative will likely include installation of on-site light (such as street lights) for operation and security purposes. This lighting may cause glare and light intrusion onto SR-2 or adjacent properties.

3.9.3 MITIGATING MEASURES

Potential impacts of light spill and glare can be mitigated by shielding of light and glare sources, including use of landscaping. Any future construction would be subject to the requirements of MMC Chapter 15.15 'Lighting Standards', including but not limited to "parking lot light fixtures should be non-glare and mounted no more than twenty-five feet above the ground to minimize the impact onto adjacent properties. All fixtures over fifteen feet in height shall be fitted with a full cut-off shield", "exterior lighting installations shall be designed to avoid harsh contrasts in lighting levels", and "light heads for parking lots and display area light fixtures shall not have bulbs or reflectors that project below the bottom rim of the fixture unless shielded by a softening diffuser".

3.9.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Future development under any of the Alternatives referred to in this DEIS are likely to increase glare and light spill onto adjacent properties, including SR-2, and cause some lightening of the night sky when illuminated.

3.10 TRANSPORTATION

3.10.1 AFFECTED ENVIRONMENT

The site is located on the north side of SR-2, east of Old Owen Road and west of Calhoun Road. WSDOT purchased the access rights as part of the planning for the Monroe Bypass for US-2 and therefore the site does not have direct access to SR-2. The site is likely to have access through an easement with the parcel to the east (Parcel F in the 2012 FPEIS) at the southeast corner of the site. The intersections that will be significantly impacted and have been analyzed are:

- SR-2 at Chain Lake Road;
- SR-2 at Old Owen Road/E Main Street; and
- SR-2 at Access.

The impacts have been analyzed for a 10-year horizon period to the year 2023. The future volumes have been calculated by using a combination of known development and a general growth rate. The full transportation analysis is included in Appendix F.

3.10.2 ENVIRONMENTAL IMPACTS

Alternative 1 is anticipated to generate approximately 1,602 new average daily trips with 169 new PM peak-hour trips. Alternative 2 would increase this trip generation to 5,230 average daily trips with 459 PM peak-hour trips, an increase of 3,628 average daily trips and 290 PM peak-hour trips over the existing zoning. Alternative 3 would increase this trip generation to 3,427 average daily trips with 318 PM peak-hour trips, an increase of 1,825 average daily trips and 149 PM peak-hour trips over the existing zoning.

The transportation impacts have been analyzed based on the methodology from the Highway Capacity Manual: 2010 Edition (HCM). The intersection operations are evaluated based on level of service (LoS), and are rated from LoS A, little/no delay, to LoS F, extreme delays. Future volumes are based on existing volumes at the intersection multiplied by a growth rate for the area and the addition of the trips generated by each alternative. The study intersections show that the operations will be similar for all three analysis scenarios. The intersection of SR-2 at Chain Lake Road is anticipated to operate at LoS E with development of the site and the intersection of SR-2 at Old Owen Road/E Main Street will operate at LoS D. The access to the site will operate at LoS C. The intersection operations are summarized in Table 7.

Table 7: Intersection Operations

Intersection		2013 Existing Conditions		2023 Baseline Conditions		2023 Future Conditions					
						Alternative 1		Alternative 2		Alternative 3	
		LoS	Delay (sec)	LoS	Delay (sec)	LoS	Delay (sec)	LoS	Delay (sec)	LoS	Delay (sec)
1	SR-2 at Chain Lake Road	D	46.1	E	67.3	E	76.7	E	75.6	E	70.5
2	SR-2 at Old Owen Road	D	43.4	D	51.0	D	50.2	D	51.5	D	50.6
3	SR-2 at site Access					F	153.8	F	680.3	F	87.9
	(With Acceleration Lane)					C	17.1	C	22.1	C	16.0

The acceptable levels of service for the signalized intersections of US-2 at Chain Lake Road and US-2 at Old Owen Road/E Main Street are based on the level of service before development of the site, regardless of the rezone or not. If the level of service is LoS D before development, LoS D must be maintained after development. If the level of service is LoS E before development, LoS E must be maintained after development.

3.10.3 MITIGATING MEASURES

The analysis shows that the off-site intersections will operate at an acceptable level of service without the requirement for improvements. The access to the site will warrant an inbound left-turn lane. Additionally, separate outbound lanes and an outbound left-turn acceleration lane are proposed to allow the access to operate at LoS C with development of the site, regardless of the zoning alternative.

3.10.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Gibson Traffic Consultants, Inc. prepared an analysis that shows that the traffic impacts for Alternatives 1, 2, and 3 do not vary significantly. The traffic analysis conclusions include:

- The off-site intersections will operate at acceptable levels of service for the projected 2023 future conditions. The intersection at Old Owen Road will operate at slightly less delay than the projected 2023 existing conditions baseline. The intersection at Chain Lake Road will operate at a larger delay than projected for the 2023 baseline but still within limits of LoS E, as projected for the 2023 existing conditions baseline.
- The access will require inbound left-turn channelization, at the minimum
- Separate outbound lanes and an outbound left-turn acceleration lane will be required
- The access will operate at LoS C with these improvements, regardless of the alternative
- Due to WSDOT limited access control, the access will be required to be in the same acceptable location to WSDOT, regardless of the alternative

Based on these results, the change in zoning is not anticipated to result in a significant impact to the access or the surrounding off-site intersections. Refer to Appendix F for Gibson Traffic Consultants, Inc.'s full report.

3.11 PUBLIC SERVICES

3.11.1 AFFECTED ENVIRONMENT

Police

Police protection service to the project area is provided by the City of Monroe Police Department. The Police Station is located at 818 W. Main St, approximately two miles from the project area. The Monroe Police Department actively patrols the City of Monroe and proactively initiates service when warranted to do so (i.e. traffic enforcement, potential crimes occurring in the sight of the officer, etc.) The Monroe Police Department has established a minimum response time of three minutes or less for an "in progress" request for service within the UGA.

Fire

Monroe Fire District #3 serves a 55 square mile area that includes the City of Monroe and portions of unincorporated Snohomish County. The District provides fire, rescue, and emergency medical services to approximately 27,000 people in Monroe and the surrounding community and provides advanced life support (ALS) services to approximately 50,000 people in east Snohomish County.

Monroe Fire District #3 currently has 40 Career members and 21 Part-time firefighters. All of the firefighters in the District are certified as Emergency Medical Technicians (EMT's) or Paramedics and provide 24-hour emergency response from two fire stations.

Currently the closest fire station is located at 163 Village Court, approximately two miles from the property. A study has been completed to determine how many fire stations will be needed in the future and where they should be located. This resulted in a five fire station plan that

will be implemented as funding becomes available. The impact of the selected alternative under this DEIS, and any other development proposals that may arise before the five-station plan is implemented, will need to be evaluated.

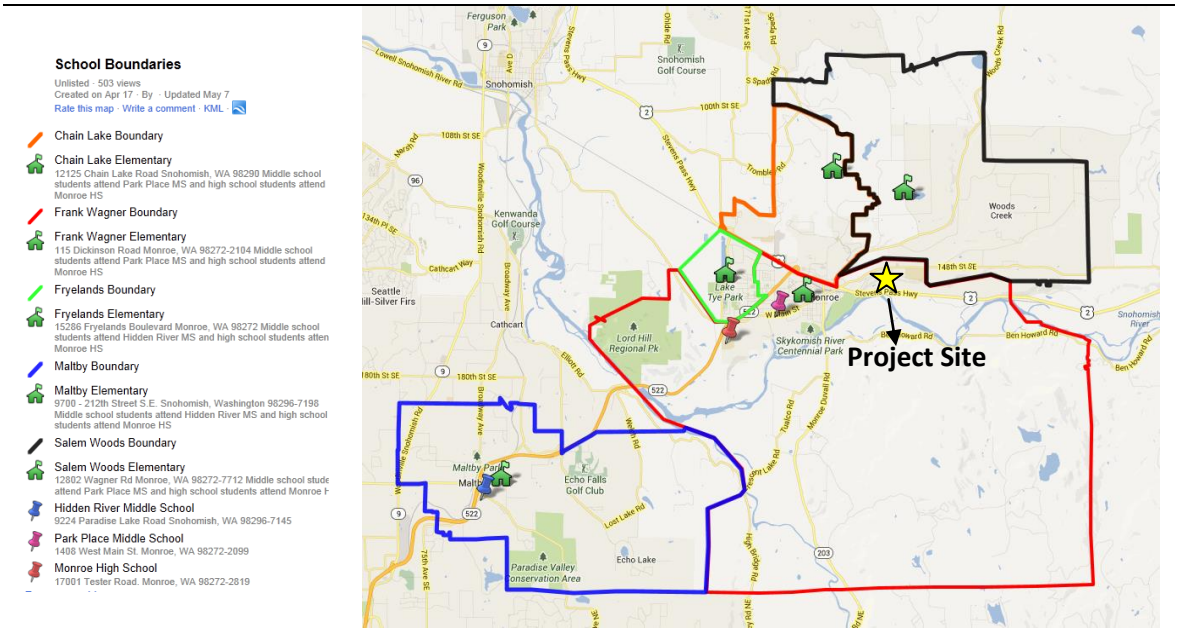
Monroe Fire District No. 3 seeks to achieve response time per Resolution 2009-2 (April 2009) of five (5) minutes or less 90% of the time in the city and eight (8) minutes or less 90% of the in the remainder of the service area.

Schools

The Monroe School District encompasses 82 square miles located in the southeast corner of Snohomish County and was established in 1909. The District serves Monroe and the surrounding unincorporated areas, including Maltby. As of October 1, 2011, there were approximately 7,879 students enrolled in the 11 school facilities located in the District boundaries (Monroe School District No. 103 Capital Facilities Plan 2012-2017), as shown on Figure 15.

An OFM Trend Analysis is an estimate based upon Snohomish County population estimates as provided by the State Office of Financial Management (OFM). The County has forecasted the same 2025 population for the District as it did in 2010 (44,354) with an estimated population in 2017 of 40,531. On average, the student population between 2005 and 2011 was 19.0% of the total District population.

Figure 15: Monroe School District Boundaries



Note: Yellow star indicates property location

3.11.2 ENVIRONMENTAL IMPACTS

Police

Police call volumes could increase under all of the Alternatives. Actual call generation could vary depending on the nature of development within the study area; larger stores would likely result in fewer calls, while smaller stores in separate ownership could have a higher call to square foot ratio. In addition, the use of private security by commercial tenants could be expected to further reduce potential call volumes.

For the purpose of this analysis, it can be estimated that each officer within the department could respond to 5,020.4 calls for service annually. This is based on the number of calls

received by the City in 2012 (25,102), divided by the number of officers that would be available if the department were fully staffed (5 during a day shift). It is important to note, however, that all calls received may not have resulted in officer dispatch. This information was obtained from the City of Monroe Police Department, 2013.

There are three options proposed for vehicular access to the developable northeast portion of the site. The preferred method of access is a bridge from the main developable area of the site. A second option would be to access the northeast portion of the site from the adjacent parcel on the east. Lastly, access could be achieved through extension of the existing box culvert and a raised roadway above the culvert. Regardless of which access option is chosen for development, police access to the proposed building structures will not be affected.

Fire

There currently is no municipal water service in the project area to provide fire flow, but under all of the proposed alternatives, domestic water and fire protection service would be required.

Regardless of which vehicular access option is selected for development, the roadway (whether a bridge, embankment over culvert, or easement to the east) will be designed to conform to the requirements for fire truck access and turn radius.

Schools

As shown in Figure 15, the study area is within the Monroe School District's Frank Wagner boundary and is in close proximity to the Salem Woods boundary. Monroe has an open boundary rules, meaning that any student could go to any school.

The District expects that 0.615 students will be generated from each new single-family home and two bedroom multi-family units would create 0.602 students per dwelling unit (Monroe School District No. 103 Capital Facilities Plan 2012-2017). For the proposed scenarios in Alternatives 1 and 2, no new residential units are proposed so there will be no new associated school impacts. Alternative 3 proposes up to 90 multi-family residential units. Depending on the type of residential development, this could add zero to up to as many as 60 new students.

3.11.3 MITIGATING MEASURES

Police

All alternatives discussed in this DEIS could result in a higher demand for police services. Increases in population in any kind of environment, either temporary or permanent, have the potential to increase a need for Police services. Potential mitigations measures include:

- Funding private security of residential, office, and retail tenants in order to reduce demands and/or calls for service to the Monroe Police Department.
- Enhance public safety through adherence to Crime Prevention Through Environmental Design (CPTED) regulations and standards.

Fire

All alternatives discussed in this DEIS could result in a higher demand for fire protection services. An evaluation of source, storage and transmission/distribution mains will be performed to ensure that adequate fire protection is available in the system. It is assumed that at the time of development an integrated plan for developer extension of the water system to provide fire protection service and on-site sprinklers will be developed to meet Fire Marshal requirements and comply with MMC, especially chapter 15.04.110 "International Fire Code Adopted". Water system connection fees coupled with developer financed improvements will ensure that fire protection standards are maintained.

Schools
Future increases in housing units and students associated with these units could impact the potential for increased student enrollment. If the schools within the attendance area cannot serve the additional student population, it is likely that other schools within the vicinity of the study area could accommodate new student generation. School impact fees would be determined at the time of building permit application, and if the capacities of schools are exceeded, redistricting could be employed to accommodate students outside of the existing attendance boundaries.

3.11.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

With the implementation of appropriate mitigation measures, significant adverse impacts will be avoided.

3.12 UTILITIES

3.12.1 AFFECTED ENVIRONMENT

Water
The project area is within the City of Monroe water service area as shown in Figure 1.1 of the City of Monroe 2008 Water System Plan (Water Plan). This section is based on information from the Water Plan and the June 2011 Addendum thereto.

Although the project area is within the City's water service area, there is currently no water service to the property. Development of the site under any of the alternatives requires extension of the City's water system, as stated in the Water Plan. Chapter 1.6 of the Water Plan states:

> "As a general rule the Monroe Water System does not proactively extend distribution mains into unserviced areas. Monroe works with developers to bring water service to newly developing areas. If it is not economically feasible to extend water service individual wells are usually installed."

Provision of public water service is consistent with the City's duty to serve under Municipal Water Law and eliminates the potential for proliferation of new groundwater wells that could impact the local aquifer. Well service is not a feasible option for an 11 acre development such as in this proposal. Therefore, regardless of which alternative is selected, water service will likely need to come from the City of Monroe water system. The closest connection point to the existing system is located near the intersection of SR-2 and East Main Street and would require the installation of approximately 1.15 miles of water main with a minimum size of eight inches.

Sewer
According to the City of Monroe's 2008 Sanitary Sewer Plan (Sewer Plan and 2011 amendment), the proposed sewer service area consists of the current City limits, and the City's Urban Growth Area (UGA). The project area is not currently served by a sanitary sewer collection system, but public facilities and services to facilitate urban-level development and meet the Growth Management Act overall urban density for the City of Monroe Urban Growth Area are available to be extended to the area.

Similar to the water system, the City of Monroe would work with property developers to extend service to the property and meet the overall objective of provision of sewer service to all areas within the UGA. The nearest connection point for the sanitary sewer system is near the intersection of Main Street and SR-2.

Stormwater Utility
The affected environment includes the surface water within and downstream of the area of the study, including the Skykomish River. The City of Monroe has three drainage basins, the French Creek Watershed, Woods Creek Watershed, and the Skykomish River Watershed. The study area is within the Skykomish River Watershed. The study area is generally flat. No municipal stormwater facilities are currently located in the project area; stormwater currently infiltrates into the ground or flows to the fish bearing stream/slough located on the northern part of the project area, which discharges to the Skykomish River.

The City of Monroe created its stormwater utility in 1996 and since then, the City's stormwater management program has ensured compliance with a number of local, state, and federal regulations related to stormwater quality. The City of Monroe has a federal permit generally referred to as the National Pollutant Discharge Elimination System (NPDES) Phase II to operate its stormwater system. Although this is a federal permit that regulates stormwater and wastewater discharges, the regulatory authority and oversight is provided by the Washington State Department of Ecology (DOE). The City of Monroe follows the DOE Stormwater Management Manual for Western Washington (DOE Manual) for all stormwater regulations including sediment and erosion control, flow control and water quality requirements, and wetlands protection.

3.12.2 ENVIRONMENTAL IMPACTS

Water
Any of the alternatives will require extension of public water service. The area is within the planning area and retail water service area of the City of Monroe and is therefore planned for in the future. Proposed development would require additional water resources to support the development. As such, a complete water system needs analysis will be required to determine the facilities required to provide domestic water service and fire protection service consistent with the requirements of the State Department of Health and the City of Monroe. As with any construction project, installation of water main has potential for temporary impacts such as the ones listed for each element under this DEIS.

Sewer
Because the subject property is within the established UGA, provision of public sanitary sewer service is proposed. Future development under any of the alternatives contemplated herein will increase demand on Monroe's wastewater collection and sewage treatment facilities. Connection to the existing system will eliminate environmental degradation and impacts associated with serving the property by on-site septic systems. Installation of sewer facilities has the potential for temporary impacts such as the ones listed for each element under this DEIS.

Stormwater Utility
Development under any of the alternatives will result in changes to the hydrologic and hydraulic regime for or of the study area. Any new development will also cause an increase in stormwater runoff, pollutants entering the water, sediment and erosion. However, these impacts are expected and as such are strictly controlled and mitigated by the NPDES, DOE Manual, and the MMC - especially title 15, which discusses stormwater management and maintenance. Development is only allowed to occur if all aspects of the codes and requirements are met and permits are obtained.

New development on undeveloped land in the study area will result in increases in pollution-generating impervious surfaces (PGIS). PGIS includes surfaces subject to vehicular traffic (roads, driveways, and parking lots). New development will also increase the non-pollution-generating impervious surfaces, which are surfaces such as roofs, sidewalks, and other

hardscapes. Converting any undeveloped land to any type of impervious surface will increase stormwater runoff volume and discharge rates if unmitigated.

Increased traffic and other possible site uses will also increase potential pollutants, metals, and oil entering the stormwater system and downstream wetlands and fish-bearing waters. These pollutants can have an impact on the plants and animal life if they are not mitigated.

Land disturbance created through the construction process can itself generate sediment loading on receiving waters during construction if adequate Temporary Erosion and Sediment Control (TESC) mitigation measures are not in place.

As stormwater must be handled on-site, the increase will not impact the capacity of infrastructure required by the City stormwater utility in the area. A slight increase in staff time to inspect and monitor the future on-site systems could be expected.

3.12.3 MITIGATING MEASURES

Water

Further analysis of the water system to accommodate development under any of the alternatives would include a source, storage, transmission and pumping analysis to determine the size and location of proposed facilities. Consistent with Growth Management Act planning, an urban level of service is anticipated and furthermore, system extensions would be paid for by the developing property owners in the form of connection charges and facilities that would be constructed as part of the development and deeded to the City. Increased source requirements could be mitigated through installation of low water use fixtures and landscaping coupled with implementation of conservation programs utilized by the City to control water use throughout the service area. Storage and transmission requirements could be mitigated by looping a new water main from the site on SR-2 to existing water system facilities located north of the site along Calhoun Road. All water system improvements must be constructed in accordance with the following:

- MMC Chapters 13.04 and 13.16 (Chapter 10.1.4);
- Washington State Department of Health requirements (WAC 246-290);
- Section 7-08 through 7-15 of the WSDOT/APWA Standard Specifications;
- City of Monroe Public Works Design and Construction Standards (Chapter 10.1.5); and
- Payment of water system capacity expansion fees.

Sewer

Extension of sanitary sewer service will be accomplished by the construction of collection and conveyance facilities from the project site to a point of connection to where the existing system is located near the intersection of SR-2 and East Main Street. Due to topography, a sewer lift station and force main would likely be required to provide service. Sanitary sewer system impacts from future development can be mitigated by:

- Compliance with the Monroe Municipal Code, Title 13;
- Compliance with state regulations for sewer system improvement construction;
- Compliance with City of Monroe construction standards; and,
- Payment of wastewater system capacity expansion fees.

Stormwater Utility

All new development proposals are required to meet stormwater management thresholds as regulated by federal, state, and local laws and ordinances, below:

- Federal Clean Water Act
- Washington State Department of Ecology Stormwater Management Manual for Western Washington
- City of Monroe Municipal Code
- MMC Chapter 13.32 'Stormwater Management Utility
- MMC Chapter 13.34 'Illicit Discharge Detection and Elimination'

On-site flow control must be provided for all alternatives because the developed 24-hour, 100-year storm event will increase flows by more than 0.1 CFS (cubic feet per second) when compared to forested conditions and because the project proposes to construct more than 10,000 square feet of impervious surface area. To mitigate for the increase in stormwater peak runoff rates from the site, the rate at which the runoff is released must be controlled in accordance with the DOE Manual. This is accomplished by limiting the rate stormwater discharge rate in the developed condition to one half of the two year and equal to the 50 year storm event rates, prior to its conversion to pasture (forested condition). Changes to stormwater discharge locations must protect wetland and stream hydrology. To prevent an increase in discharge rate, on-site detention systems with flow control will be required at the time of permit application.

The project is also required to provide water quality treatment for all alternatives because each alternative creates more than 5,000 square feet of pollution-generating impervious surface area. An oil control device may need to be provided, depending on which alternative is selected. Oil control is required for "high-use" sites as defined in the DOE Manual. Stormwater runoff from pollution generating surfaces in commercial project sites must be treated to the enhanced treatment level to improve the quality of the water released into the stormwater system and discharge to fish-bearing streams. The treatment facility will be designed specific to a proposed development for permit application.

For each alternative, mitigation measures also include construction of on-site temporary erosion and sediment control (TESC) measures in compliance with the Volume II of the DOE Manual. A TESC plan will be developed for the site, including standards that are put in place in order to prevent or reduce pollution of stormwater runoff caused by construction activities and to minimize the amount of sediment-laden runoff leaving the project site. The DOE Manual contains 12 elements of construction storm water pollution prevention that cover the general water quality protection strategies. These elements are: mark clearing limits, establish construction access, control flow rates, install sediment controls, stabilize soils, protect slopes, protect drain inlets, stabilize channels and outlets, control pollutants, control dewatering, maintain BMP's, and manage the project. For each of these elements, the DOE suggests the use of specific Best Management Practices (BMP's). Specific measures and a TESC plan will be developed for a proposed development for permit application.

Payment of monthly stormwater fees from this property will defray the cost of increased inspection and monitoring.

3.12.4 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Any of the proposed alternatives discussed may lead to increased demand on water, sewer and stormwater system facilities. If the mitigation measures outlined in this DEIS, the Water Plan, Sewer plan, and mandated in federal, state, and local regulations are followed, significant unavoidable adverse impacts as a result of the proposal are not anticipated.

4. Summary of Cumulative Impacts

Cumulative impacts are the result of combining the potential effects of a project with other planned developments, as well as with any foreseeable development projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. Cumulative Impacts that are associated with a non-project action can be difficult to ascertain without a specific development proposal or timeframe to consider, however, in keeping with the premise of this DEIS, this section presents the potential cumulative impacts associated with the identified potential development scenarios. In addition, impacts of various mitigation measures proposed have been reviewed to determine the cumulative impacts associated with the overall development of the site collectively, rather than individual development of the five parcels that constitute the project area. As is the case with the direct and indirect impacts identified in Section 3, cumulative impacts would be similar under any of the alternatives, including Alternative 1 which evaluates allowable development under the current land use and zoning designation of LOS.

No specific development proposals have been identified for the subject property and none are known for neighboring properties. In that this DEIS considers potential development of the five parcels collectively and with a combination of allowable commercial and residential uses, it is logical to assume that a similar change in land use and zoning designation might be requested for approximately 35.5 acres of remaining LOS property situated between this proposal and the eastern city limits of Monroe. With or without the additional development of these two additional properties, the proposed land use action put forth herein and subsequent development of the property will result in a change to the character of the site and surrounding neighborhood of East Monroe.

The proposed Comprehensive Plan amendment and subsequent rezone is a non-project action, however, consideration of potential future development under the proposed zoning designation is required for a complete evaluation under City of Monroe requirements and SEPA regulations. Although three potential development concepts have been considered, no specific development proposal is known or under application at this time. Future development concepts are speculative and the DEIS only anticipates what could be proposed. Any application for a project action will be required to demonstrate that work in critical areas complies with Monroe Municipal Code (MMC) requirements. It is incumbent upon the applicant to demonstrate compliance with the standards in the MMC, and all other local, state, and federal regulations at the time of application for development.

A summary of cumulative impacts associated with relevant elements of the environment evaluated under Section 3 is provided below.

<u>Earth</u>

Development of any kind will require clearing, grading and fill to bring the site to a developable elevation above the floodplain. These actions, together with an increase in impervious surface from buildings and parking structures, combine to impact site drainage flows to the onsite stream and wetlands. Mitigation measures outlined in Section 3 demonstrate that development of the property can be accomplished in a manner that will mitigate impacts to surface and ground water and improve the condition and functionality of the stream and associated wetlands for habitat. Incidental to this is the opportunity to improve the function of the stream/slough and adjacent area for flood management. The cumulative impacts of activities related to cut, fill and re-vegetation of the site and especially critical area buffers generally south of the stream will be beneficial to the site itself and downstream properties. They include grading to improve site drainage as a component of flood management, enhancement of stream and wetland areas, and regulating runoff from the site, and reducing flooding impacts to downstream properties in small storm events.

Cumulative impacts associated with landslide and erosion hazard are avoided by leaving the hillside areas leading to the bluff north of the site in a natural state. No disturbance of the steep

slope areas north of the stream and wetlands is proposed or contemplated and it is assumed that these areas will remain part of the existing or redefined Native Growth Protection Area.

Ground Water
No long term impacts to ground water are associated with the project and the temporary impacts associated with dewatering during construction will not have a cumulative impact. Cumulative impacts associated with increased impervious surfaces and reduced groundwater recharge will be mitigated by drainage design to mitigate the addition of impervious surface. It is noted that nearly 75% of the site will be left in either its current state, or will be enhanced with new planting of native species as appropriate to improve habitat and performance of streams and wetlands.

Surface Water
This DEIS recognizes the importance of the stream that flows through the site by means of an oxbow connecting to the Skykomish River, and acknowledges that the stream is regulated through box culverts as it enters and leaves the site. Field reconnaissance and study of stream and wetlands on the site has been accomplished as detailed in Appendix D and discussed in Section 3. It has been determined that if the site is left undeveloped, continued degradation of the stream and wetland areas will occur.

A land use change allowing for collective development of the site at a higher density will provide the economic incentive for a comprehensive stream, wetland, and habitat mitigation plan. Such a plan will have a cumulative impact on the site and neighboring areas by enhancing wildlife and fish habitat, especially during flood events. Site grading also allows the opportunity to provide concentrated, natural flood storage with the established stream and wetland setback areas as opposed to allowing the site to be inundated and left with pockets of standing water after flood events. Existing culverts to and from the Skykomish River provide an opportunity for engineered site drainage for flood control and fish passage. The cumulative impact will be a benefit to downstream properties through comprehensive and improved flood management.

Plants and Animals
Clearing and replanting of the site will have the cumulative impact on efforts to control invasive and noxious plant species and enhance critical areas for animal habitat by planting native plants. Much of the site will remain in its current state and no activity would occur in the steep slope vicinity north of the stream and wetland areas. Landscaping of developed areas and re-vegetation of critical area buffers will have the cumulative impact of improving habitat, providing screening of the proposed development from neighboring parcels, and providing an aesthetically pleasing vegetated area that the community can enjoy.

Noise
In that the subject property is located adjacent to a heavily travelled major state highway and BNSF Railway, and that the property is buffered from neighboring properties by a heavily vegetated hillside and bluff, cumulative impacts to noise are considered insignificant.

Land and Shoreline Use
The proposed change in land use may result in the desire for properties to the east to request a similar change in land use and zoning designations. The cumulative impact would be an increase in commercial property within the City of Monroe. The location of the property adjacent to SR-2 indicates that this would have a cumulative positive impact on the City's economic development efforts. The proposal is consistent with the Growth Management Act's planning goals to confine urban level of development and services to areas within the Urban Growth Area and to balance that growth with more enhanced vegetated areas for wildlife. The proposal is consistent with shoreline management planning and no cumulative impacts are noted.

Transportation
Development resulting from the proposed change to the Comprehensive Plan and zoning designations would have a cumulative impact of increased traffic volumes on SR-2. This DEIS was developed with the consideration of recently approved development proposals as noted in Appendix F. Any development on the property will require coordination with WSDOT and it is noted that WSDOT has already acquired additional right-of-way along the southern edge of the property to accommodate planned improvements to SR-2.

Aesthetics Light and Glare
A cumulative impact of the proposal is that the amount of undeveloped vacant land within the City will be reduced. Views from properties on the bluff to the north will be changed. The abandoned field on the site is becoming overgrown with invasive and noxious plants and will be replaced with a well-designed commercial development. Approximately 75% of the property will remain in its current state or be cleared, graded and re-planted with native species to enhance wetland and stream buffers and improve the functionality of critical areas. The site will be developed in accordance with Monroe architectural standards and requirements for site lighting. Screening will be provided by the mitigation planting and site landscaping required under Monroe Municipal Code. The cumulative impact of increased development of commercial property is not considered negative or adverse, or significantly different from the impacts associated with development of certain allowable uses under the LOS land uses and zoning designation.

Public Services
The cumulative impact of additional commercial property in East Monroe will be increased for police, fire, schools and other municipal services. These increases are not expected to be significant and are within the range of increases expected under regional and local planning efforts.

Utilities
Impacts related to the provision of public utilities are expected to be consistent with infrastructure planning by the City of Monroe and consistent with the urban level of services desired throughout the urban growth area. Consistent with City of Monroe requirements, extension utility services will be paid for by property developers. Cumulative impacts are limited to the positive benefit of extending utility systems in accordance with utility system plans of the City of Monroe.

Bibliography

Stormwater Management Manual for Western Washington (SWMMWW). Olympia, Washington. State Dept. of Ecology, 2005. (2005). https://fortress.wa.gov/ecy/publications/summarypages/0510031.html

Stormwater Management Manual for Western Washington (SWMMWW). Olympia, Washington. State Dept. of Ecology, 2012. (2013). https://fortress.wa.gov/ecy/publications/publications/1210030.pdf

City of Monroe. *City of Monroe Comprehensive Plan 2005-2025*. Monroe, Washington, USA. City of Monroe. (2013).

City of Monroe. (2012). *Monroe Municipal Code*. Retrieved from City of Monroe (2013). http://www.codepublishing.com/WA/Monroe/

City of Monroe. (2012). *Final Phased EIS for the East of Monroe Amendment to the City of Monroe Comprehensive Plan and Concomitant Rezone*. Retrieved from the City of Monroe. (2013). http://monroewa.gov/DocumentCenter/Home/View/563.

City of Monroe. *Rezone Application*. (2012). Retrieved from the City of Monroe. (2013). http://monroewa.gov/index.aspx?NID=419

City of Monroe. *Sanitary Sewer System Plan*. (January 2008). Monroe, Washington. USA. *(2011 Addendum)*. (2013).

City of Monroe. *2012 Stormwater Management Program*. Permit No. WAR04-5530. Monroe, Washington. USA. (2013). http://monroewa.gov/documentcenter/view/1760

City of Monroe. *City of Monroe 2009 Stormwater System Plan*. BHC Consultants and R.W. Beck July, 2009. *(2011 Addendum)*. (2013).

City of Monroe (2008) *Water System Plan*. City of Monroe Engineering (2009). *(2011 Addendum)*. (2013).

Monroe Public Schools. (2013). http://www.monroe.wednet.edu/#

Monroe, WA Police Department. *(official website)* (2013). http://www.monroewa.gov/index.aspx?nid=68

Monroe Fire District 3. (*official website)* (2013). http://www.monroefire.org/

Monroe School District No. 103. *Capital Facilities Plan 2012-2017*. Monroe, Washington, USA. (2013).

Keary, Polly. "Coal Trains on Track to Increase Rail Traffic." The Monroe Monitor, and Valley News [Monroe] 8 Jan. 2013: Print. http://www.monroemonitor.com/2013/01/08/coal-trains-on-track-to-increase-rail-traffic/

Office of Superintendent of Public Instruction Washington State Report Card, Monroe School District. (2013). http://reportcard.ospi.k12.wa.us/summary.aspx?groupLevel=District&schoolId=223&reportLevel=District&orgLinkId=223&yrs=&year=2011-12

Snohomish County Planning Department and City of Monroe. (June 2012). *Monroe School District No. 103 Capital Facilities Plan 2012-2017*. (2013). http://www.monroe.wednet.edu/BOARD/CapitalFacilitiesPlan/CapitalFacilitiesPlan2012.pdf

U.S. Department of Transportation Federal Railroad Administration. (2013). *The Train Horn Rule and Quiet Zones*. http://www.fra.dot.gov/Page/P0104

Draft Environmental Impact Statement

VOLUME II

APPENDICES

East Monroe Comprehensive Plan Amendment and Subsequent Rezone

Submitted August 2013

2013

Appendix A
2013 Monroe Zoning Map

City of Monroe

MONROE WASHINGTON

COMPREHENSIVE PLAN

COMP. PLAN DESIGNATIONS

- (DC) - Downtown Commercial
- (GC) - General Commercial
- (MU) - Mixed Use
- (LOSA) - Limited Open Space Airport
- (SC) - Service Commercial
- (I) - Industrial
- (PO) - Professional Office
- (LOS) - Limited Open Space
- (P/O) - Parks / Open Space
- (PFC) - Public Facilities City
- (PFS) - Public Facilities School
- (SRU) - Special Regional Use
- (R2-5) - Dwellings Per Acre
- (R3-5) - Dwellings Per Acre
- (R5-7) - Dwellings Per Acre
- (R8-11) - Dwellings Per Acre

OVERLAY ZONES

- North Kelsey Planning Area (ORD 009/2010)
- North Kelsey Planned Dev Area (ORD 009/2010)
- Downtown Planning Area (ORD 036-2008)
- Airport Overlay (ORD 026/2006)
- AEO-SOB Boundary (ORD 029/2003)

BOUNDARIES

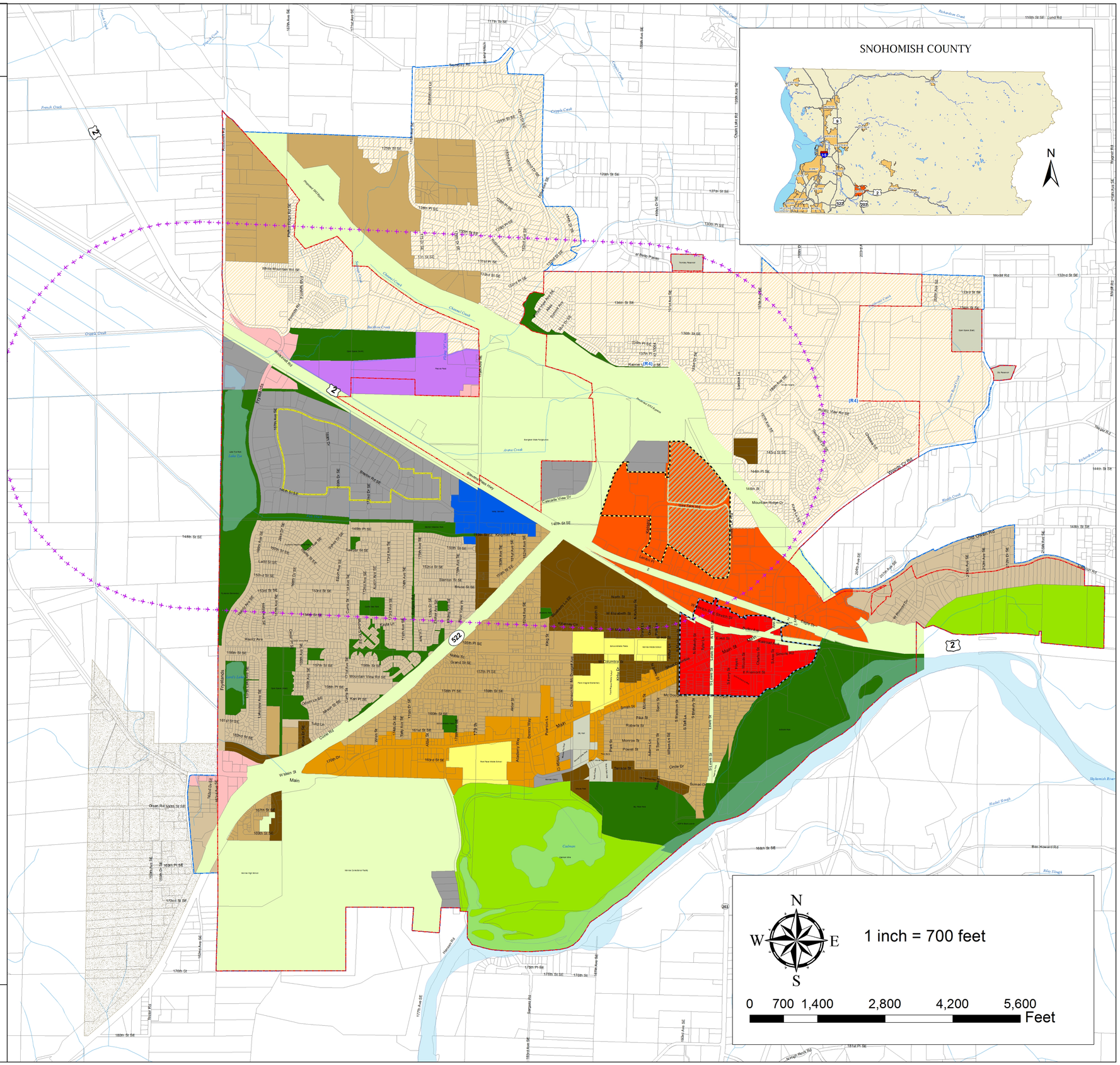
- Southwest Study Area
- Urban Growth Area
- Monroe City Limits

Official City of Monroe 2013 Comprehensive Plan Map

This is to certify that this is the official comprehensive plan map referred to in ordinance of the city of Monroe, Washington.

Adopted
(Signed Copy in City Records)

Map data shown is the property of the City of Monroe & Snohomish County. Inaccuracies may exist and the City of Monroe & Snohomish County imply no warranties or guarantees regarding any aspect of data depiction. No real estate decisions are to be made using this map. Please contact the City of Monroe Planning and Permitting Department to verify the designation(s).



Appendix B
Allowed Land Use Comparison Zoning Matrix Table

Allowed Use Comparison

Zoning Matrix

Conforming Use	Limited Open Space (LOS)	General Commercial (GC)	Mixed Use Commercial P8 (MUC)
Aviation			
Aircraft and flight schools			
Aircraft hangars and parking areas			
Aircraft sales, rentals, repair (major and minor), rebuilds, and maintenance services			
Airports, landing fields, and heliports	EPF		
Aviation fuel sales			
Storage and sale of aviation fuel, oil, and other fluids commonly used in aircraft			
Government and Education			
Fire stations	C	P	P
Government facilities		C	P
Jails			
Libraries		P	P
Preschools	C	C	C
Schools	C	C	C
State and local correctional facilities			
State educational facilities including colleges, community colleges, and universities, ten acres in size or larger		EPF	EPF
Work release facilities			EPF
Health Services			
Clinics, health services		P	P
Hospitals		EPF	EPF
In-patient facilities, including substance abuse and mental health facilities		C	C
Industrial Uses			
Animal shelters		C	C
Animal slaughtering, processing, and/or incidental rendering	S	S	
Asphalt batch plants (mix asphalt)			
Auto wrecking yards			
Cement manufacturing	S		
Fabrication shops		C	C
Mineral extraction	S		
Outdoor storage			A
Printing plants			P
Processing of sand, gravel, rock, black soil, and other natural deposits	S		
Recycling centers			C
Shake and shingle mills			

Allowed Use Comparison

Zoning Matrix

Conforming Use	Limited Open Space (LOS)	General Commercial (GC)	Mixed Use Commercial P8 (MUC)
Tow truck operations		C	C
Warehouses		P	A
Infrastructure/Utilities			
Electrical transmission lines of higher voltage than 115 kV, in existing corridors	P	P	P
Electrical transmission lines of higher voltage than 115 kV, in new corridors	C	C	C
Regional transit stations, including bus, train, and other high-capacity vehicle bases	EPF	EPF	EPF
Sewer treatment plants/facilities	EPF		EPF
State and regional transportation facilities including highways of statewide significance	EPF	EPF	EPF
Utility power-generating facilities, public or private, including hydroelectric			S
Utility services	P	P	P
Parks/Recreation			
Parks and recreation facilities	C4		P
Parks, RV	C	C	
Public stables	C		
Residential and Associated Uses			
Accessory dwelling units			P
Dwellings, caretaker/			C
security			
Dwellings, duplex			
Dwellings, farm worker	A	A	
Dwellings, mobile home/manufactured home	P		
Dwellings, multifamily			P
Dwellings, single-family	P		1,2
Dwellings, townhouse			P
Family day care			A
Group homes, Type 1	P		
Group homes, Type 2	C2		
Halfway houses	EPF		
Home occupations			P
Mobile/manufactured home parks			
Model home(s) and sales offices			P
Nursing and/or convalescent homes		C	P
Retirement housing/			P
Assisted living facilities			
Temporary dwelling unit			A

Allowed Use Comparison

Zoning Matrix

Conforming Use	Limited Open Space (LOS)	General Commercial (GC)	Mixed Use Commercial P8 (MUC)
Retail and Commercial			
Art galleries		P	P
Bakeries		P	P
Breweries			P
Breweries, micro		P	P
Coffee shops		P	P
Convenience stores		P	P
Department stores		P	
Drug store/pharmacy		P	P
Garden produce	P	P	P
Greenhouses, retail	P	P	P
Grocery stores		P	P
Hardware store 1		P	P
Hardware store 2		P	C
Home improvement centers		P	
Lumber yards		P	A
Motor vehicle sales facility		P	P
Restaurants		P	P
Retail stores		P	P
Secondhand stores		P	P
Taverns		P	P
Tool sales and rental		P	P
Wholesale establishments			P
Service			
Amusement facilities		P	P
Auto repair, minor		P	P
Auto repair, major		P	C
Banks		P	P
Bed and breakfasts	C		
Car washes		P	P
Cleaning establishments		P	P
Clubs		P	P
Clubs, fitness	P	P	P
Day care centers	C1	C1	P
Fix-it shops		P	A
Hotels			C
Kennels		C	C
Locksmiths		P	P

Allowed Use Comparison

Zoning Matrix

Conforming Use	Limited Open Space (LOS)	General Commercial (GC)	Mixed Use Commercial P8 (MUC)
Mini self-storage			
Motels		P	C
Print shops		P	P
Professional offices		P	P
Religious institution	C	P	P
Research facilities			P
Service establishments		P	P
Service stations		P	P
Veterinary clinics/animal hospitals		C	P11
Other			
Adult entertainment (business use)		P1	
Agricultural uses	P		
Cemeteries	C		
Hazardous/dangerous waste facilities		EPF	EPF
Mortuaries		P	P
Parking lots		A	P
Shooting ranges (indoor)		P	P
Solid waste handling and/or transfer facilities		EPF	
Solid waste landfills			

Note:
P = Permitted use;
A = Accessory use;
C = Requires a conditional use permit;
S = Requires a special use permit;
EPF = Essential public facility (see Chapter 18.15 MMC)

Appendix C
Monroe Development Letter (GeoEngineers)

GeoEngineers
8410 154th Avenue NE
Redmond, Washington 98052
425.861.6000

June 16, 2013

Heritage Baptist Fellowship
c/o PACE
11255 Kirkland Way, Suite 300
Kirkland, Washington 98033

Attention: Susan Boyd

Subject: Geotechnical Consultation Services
Proposed Development
Monroe, Washington
File No. 21119-001-00

INTRODUCTION AND SCOPE

This letter presents our opinion of the potential impact of a proposed development to the stability of a nearby steep slope located on the east side of Monroe, Washington. We understand the development will be located on five parcels within the central portion of a grass field situated between the north side of State Route 2 (SR 2) and a steep slope that slopes up to a residential neighborhood along Calhoun Road and Rivmont Drive East. An existing drainage channel meanders in the vicinity of the toe of the slope.

Our services were requested to review geologic, topographic, and available information for the site, to complete a brief geologic reconnaissance to assess the existing slope conditions and observe conditions within the proposed development area, and to prepare a brief letter of our opinion of the potential impacts of the development to the stability of the steep slope.

SITE CONDITIONS

Geology

Geologic maps of the site area identify subsurface soils to consist of recent alluvium in the proposed development area, organic peat and silt in the vicinity of the drainage channel, transitional beds of clay, fine sand, and silt along the steep slope, and outwash deposits at the top of the slope. Landslide deposits are also mapped on a portion of the steep slope in the western area of the site.

Alluvial soils located in the proposed development area are described to consist of sand, gravel, silt, and peat. The transitional beds mapped along the slopes consist primarily of finer grained silt, clay and sand. This geologic unit is typically stiff or medium dense to dense and can be unstable in steep terrain. Advance and recessional outwash deposits are mapped above the transitional beds at the top of the slope. These soils typically consist of clean, stratified granular deposits of sand and gravel. The advance outwash is in a dense to very dense condition and the recessional outwash is in a medium dense

condition. The landslide deposits are described as "unstable recessional deposits perched on hillsides, overlying the silt and clay of the transitional beds."

Surface Conditions

Our description of the surface conditions is based on our observations during a site visit on June 11, 2013, review of topographic maps, and review of aerial photographs dating back to 1990. The proposed development area is located in the central portion of the site within a relatively level to gently sloping grass field. A drainage channel and sensitive area surrounds the perimeter of the proposed development. The channel meanders in the vicinity of the toe of the slope. Based on review of aerial photographs, the general alignment of the channel has not changed since 1990.

The slope inclination appears to vary from about 1.5H:1V (horizontal to vertical) to 3H:1V, with an overall topographic relief on the order of 140 feet. The slope is heavily vegetated with mature conifer and deciduous trees, with a thick undergrowth of brush. We observed signs of slope instability evidenced by leaning trees and what appears to be shallow sloughing in lower portions of the slope. This is consistent with the geologic mapping where the transitional beds become unstable when exposed on steep slopes, particularly where seepage emerges on the slope through the cleaner lenses of outwash.

CONCLUSIONS

The development boundary will be located about 200 to 400 feet away from the toe of the slope, and approximately 100 to 200 feet from the existing drainage channel. No grading or earthwork will occur near the slope.

The slope exhibits current signs of instability consistent with the surficial soils described in the geologic mapping and the slope inclination. The existing drainage channel at the toe of the slope may also be influencing slope stability by eroding the toe of the slope. However, based on review of aerial photos dating back to 1990, and the slow moving flow in the channel, it is our opinion that the toe of the slope has not appreciably changed. In addition, provided the flow velocities in the channel do not change, we do not see the potential for future movement of the channel towards the toe of the slope. In our opinion, the proposed development will not impact the existing stability of the slope provided stormwater facilities and discharge follow regulations required by the Department of Ecology Stormwater Management Manual as adopted by the City of Monroe.

Please contact us if you have any questions or if you require any additional information.

Sincerely,
GeoEngineers, Inc.

DEBRA C. OVERBAY
STATE OF WASHINGTON
29247
REGISTERED
PROFESSIONAL ENGINEER

Debra C. Overbay, PE
Senior Geotechnical Engineer

Gordon M. Denby, PE
Senior Principal

DCO:GMD:nld

Disclaimer: Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Copyright© 2013 by GeoEngineers, Inc. All rights reserved.

Appendix D
Wetland Resources, Inc. Critical Areas Report

Wetland Resources, Inc.

Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue
Suite
Everett, Washington 9
(425) 337-
Fax (425) 337-

CRITICAL AREA STUDY AND HABITAT CONSERVATION REPORT

FOR

EAST MONROE REZONE

Wetland Resources, Inc. Project #13133

Prepared By:

Wetland Resources, Inc.
9505 19th Ave SE, Suite 106
Everett, WA 98208
(425) 337-3174

For:

PACE Engineers, Inc.
Susan E. Boyd, Vice President
11255 Kirkland Way #300
Kirkland, WA 98033

July 18, 2013

Table Of Contents

Site Description	1
Project Description	2
Review of Existing Information	2
Shoreline Designation	2
Wetland and Stream Classification - Cowardin	3
Wetland and Stream Classification – City of Monroe	3
Wetland Determination Report	4
Boundary Determination Findings	6
Functions and Values Assessment	13
Permanent Protection	16
Wildlife	18
Fish and Wildlife Habitat Conservation Report	18
Use of This Report	20
References	21

Appendix A: DOE Wetland Rating Forms

Appendix B: Field Data Forms

Critical Areas and Existing Conditions	Sheet 1/3
Critical Areas and Buffer Map	Sheet 2/3
Critical Areas and Shoreline Designation Map	Sheet 3/3

SITE DESCRIPTION

Wetland Resources, Inc. (WRI) delineated the on-site wetlands and the southern boundary of the on-site stream/slough in June 2013, on the 42.81-acre acre site located east of the intersection of State Route 2 & Old Owen Road in the City of Monroe, Washington. The site is located in a portion of Sections 5 and 6, Township 27N, Range 7E, W.M. All Information about off-site features described in this report was gathered from visual observations from the subject site, along public roads and right-of-ways, and aerial photographs of the site and surrounding area.

The majority of the site is relatively flat with the exception of a steep south aspect slope along the northerly edge of the property. The site is characterized by an stream/slough that horseshoes through the sites south of the slope. S.R. 2 borders the southern edge of the site with a railroad track running parallel just south of the highway. The subject property has historically been used for agriculture and is currently dominated by herbaceous plants and pasture grasses. Forested areas are present along the edges of the subject site and a narrow stand of trees is located in the northeast section of the site. Dense, established Himalayan blackberry stands are located along the edges of the stream/slough channel that moves through the site. A driveway off of SR 2 provides access to the site and an old road crosses the slough on the eastern side of the site. Historic aerial photos show an access road running from SR 2 across the site to the slough crossing. No structures currently exist on site.

This stream/slough was historically a channel of the Skykomish River and is now and "oxbow" that enters the site near the southeast property corner. The stream/slough receives water from a ditch that flows along SR 2, which appears to receive water from other drainage ditches on properties to the east of the subject site. A culvert runs under SR 2 and ends before the railroad tracks, was observed on the east area of the slough. It is likely the water moving through this culvert also connected to a channel on the south side of the railroad tracks, but visual information gathered along SR 2 was inconclusive.

After the stream/slough enters the site, it continues northwest to the base of the steep slope, follows the slope from east to west and then flows southwest and exits the site near the southwest corner. As the slough approaches SR 2 off-site, it flows into a four-foot concrete box culvert. This culvert is several hundred feet long and goes under SR 2. Approximately 30 feet south of where the culvert under SR 2 daylights, water from the slough continues through a second four foot concrete round culvert under the railroad tracks. The railroad culvert is approximately 55 feet long and daylights directly into the Skykomish River. There are no significant barriers that would impede the passage of fish from the Skykomish River into the on-site slough during high flow periods and flood events.

Three wetland areas were identified on-site as part of this investigation. One wetland complex is immediately adjacent to the slough in the central and east areas of the site and continues off-site to the east (Wetland A). A second wetland is along the northeast edge of the property and also continues off-site to the east (Wetland B). A third small wetland is located within the

central pasture area and is entirely on-site (Wetland C).

PROJECT DESCRIPTION

The proposed action is a change in the comprehensive land use designation and subsequent rezone of the project area from Limited Open Space (LOS) to General Commercial (GC). No specific development plans exist at this time.

REVIEW OF EXISTING INFORMATION

Before conducting the on-site investigation, a literature review was performed to identify records of wetlands and streams within the project area. The following information was examined:

- U.S. Geological Survey (USGS) topographic map (USGS, 2011)
- National Wetlands Inventory map of project area - online version located at: http://www.fws.gov/wetlands/Data/mapper.html)
- *Web Soil Survey* (USDA) located at: http://www.or.nrcs.usda.gov/pnw_soil/wa_reports.html
- City of Monroe Critical Areas Regulations, Chapter 20.05
- City of Monroe Critical Areas and Buffers Map located at: http://www.monroewa.gov/DocumentCenter/Home/View/199
- Snohomish County Landscape Imaging "Snoscape" website located at: http://gis.snoco.org/maps/snoscape/viewer.htm
- *Hydric Soils List Snohomish County Area Washington* (NRCS, 2001)
- National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary Indicator by Region and Subregion (USFWS, March 2, 1997)
- WDFW Priority Habitats and Species Maps – online version located at: http://wdfw.wa.gov/mapping/phs/

SHORELINE DESIGNATION

Due to the close proximity and association with the Skykomish River, the on-site slough and associated riparian wetland complex fall under the jurisdiction of the Shorelines Management Act WAC 173 and the City of Monroe's Shoreline Master Program. A 200-foot Shoreline Designation from the edge of the ordinary high water mark of the slough and associated wetlands applies to a portion of the site (City of Monroe's Shoreline Master Program). The placement of fill or other disturbance to the slough/stream, associated wetlands, or areas within the 200-foot Shoreline Designation would require a Shoreline Permit from the City of Monroe.

WETLAND AND STREAM CLASSIFICATIONS - COWARDIN SYSTEM

According to the Cowardin System, as described in Classification of Wetlands and Deepwater Habitats of the United States, the classifications for subject wetland and stream are as follows:

Wetland A: Palustrine, Emergent, Persistent, Semi-permanently Flooded.

Wetland B: Palustrine, Emergent, Persistent, Seasonally Flooded.

Wetland C: Palustrine, Emergent, Persistent, Temporarily Flooded.

Stream: Riverine, Lower Perennial, Unconsolidated Bottom, Mud.

WETLAND AND STREAM CLASSIFICATION - CITY OF MONROE

As required by the City of Monroe Critical Areas Regulations, Chapter 20.05, the on-site wetlands were rated and classified using the Washington State Department of Ecology (DOE) Wetland Rating system. Streams were classified using the water typing system set forth in WAC 222-16-031. The wetlands and stream are classified as follows:

Wetland A – Category II
This wetland complex is immediately adjacent to the slough, with a section continuing off-site to the east. Wetland A contains both riverine and depressional characteristics and therefore was rated as a depressional wetland. This wetland receives a total score of 54 points for all wetland functions, including 25 points for habitat functions. With a total score between 51 and 69 points, this wetland is classified as a Category II wetland. In the city of Monroe, Category II wetlands are typically dedicated 100-foot buffers.

Wetland B – Category III
This wetland is a slope wetland at the toe of a steep slope located north of the subject property. Wetland B receives a total score of 38 points for all wetland functions, including 16 points for habitat functions. In the city of Monroe, Category III wetlands are typically dedicated 75-foot buffers.

Wetland C – Category III
This wetland is a small wetland located in a topographic depression in the pasture area of the site. Wetland C receives a total score of 36 points for all wetland functions, including 12 points for habitat functions. In the city of Monroe, Category III wetlands are typically dedicated 75-foot buffers.

Stream/Slough – Type 1 Water
The slough is classified as a shoreline of the state and therefore is classified as a Type 1 Water. The slough has potential to support salmonids due to connectivity with the Skykomish River.

Several species of salmonids use the Skykomish River for breeding and migration. Type 1 streams in the City of Monroe are typically dedicated 200-foot protective buffers.

WETLAND DETERMINATION REPORT

Methodology

Wetland conditions were evaluated using routine methodology described in the *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, (referred as 2010 Regional Supplement). The methodology in the 2010 Regional Supplement coincides with the methodology described in the *Washington State Wetlands Identification and Delineation Manual* (Washington State Department of Ecology Publication #96-94, March 1997). In general, wetland delineation consisted of two tasks: (1) assessing vegetation, soil, and hydrologic characteristics to identify areas meeting the wetland identification criteria, and (2) mapping wetland boundaries using aerial photography and existing survey information.

The following criteria descriptions were used in the wetland boundary determination:

Vegetation Criteria

The 2010 Regional Supplement defines hydrophytic vegetation as "the community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to exert a controlling influence of the plant species present." Field indicators were used to determine whether the vegetation meets the definition for hydrophytic vegetation.

Soils Criteria and Mapped Description

The National Technical Committee for Hydric Soils, as described in the 2010 Regional Supplement, defines hydric soils as "a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part." Field indicators were used to determine whether a given soil meets the definition for hydric soils.

The *Soil Survey of Snohomish County Area Washington* maps four types of soil on the subject site: Puyallup Fine Sandy Loam, Sutlan Silt Loam, Puget Silty Clay Loam, and Alderwood-Everett Gravelly Sandy Loam 25 to 70 percent slopes.

Puyallup Fine Sandy Loam is described as very deep well drained soil on stream terraces. It formed in alluvium of mixed origin. Typically, the surface layer is very dark grayish brown fine sandy loam about 10 inches thick. The upper part of the underlying material is dark grayish brown and olive brown fine sandy loam about 20 inches thick. Included in this unit are small areas of Puget soils in depressional areas on flood plains and Pilchuck, Sultan, Sultan Variant and Sumas soils on flood plains. Included areas make up about 15 percent of the total acreage. Permeability of this Puyallup soil is moderately rapid. Available water capacity is moderate.

Runoff is slow and rare periods of flooding occur from November to April. This soil is not listed as hydric on the Washington State Hydric Soils List.

Sultan Silt Loam is described as a very deep moderately well drained soil on flood plains. It formed in alluvium. Typically, the surface layer is dark grayish brown silt loam about 12 inches thick. The upper part of the underlying material is dark grayish brown silty clay loam about 30 inches thick. Included in this unit are small areas of Menzel soils on terraces, Puget soils in depressional areas on flood plains, Puyallup soils on stream terraces, and Sultan Variant soils on flood plains. Included areas make up about 15 percent of the total acreage. Permeability of this Sultan soil is moderately slow. Available water capacity is high. Puget soils are listed on the *Hydric Soils List for Washington*.

Puget Silty Clay Loam is described as a very deep soil in depressional areas on flood plains. It has been artificially drained. The soil formed in alluvium. Typically, the surface layer is dark grayish brown silty clay loam about 9 inches thick. The underlying material to a depth of 60 inches or more is olive gray and gray silty clay loam. In some areas the soil is not drained and is not protected from flooding. Included in this unit are areas of Snohomish, Sumas, Sultan, and Pilchuck soils on flood plains and Puyallup soils on stream terraces. Puget, Snohomish, and Sumas, soils are listed on the *Hydric Soils List for Washington*.

Alderwood-Everett Gravelly Sandy Loam, 25-70 percent slopes is on till plains, terraces, and outwash plains. This unit is about 60 percent Alderwood gravelly sandy loam and about 25 percent Everett gravelly sandy loam. Included in this unit are small areas of Ragnar, Indianola, McKenna, and Norma soils and Terric Medisaprists in depressional areas and drainageways on plains. Also included are colluvial soils, slump areas, and escarpments. Included areas make up about 15 percent of the total acreage. The Alderwood soil is moderately deep over a hardpan and is moderately well drained. It formed in glacial till. Typically, the surface layer is very dark grayish brown gravelly sandy loam about 7 inches thick. The upper part of the subsoil is dark yellowish brown and dark brown very gravelly sandy loam about 23 inches thick. A weakly cemented hardpan is at a depth of about 35 inches. Depth to the hardpan ranges from 20 to 40 inches. Permeability of the Alderwood soil is moderately rapid above the hardpan and very slow through it. Available water capacity is low. A seasonal perched water table is at a depth of 18 to 36 inches from January to March. Springs or seep areas are common.

The Everett soil is very deep and somewhat excessively drained. It formed in glacial outwash. Typically, the surface layer, where mixed to a depth of about 6 inches, is very dark grayish brown gravelly sandy loam. The subsoil is dark brown very sandy gravelly loam about 12 inches thick. The lower part to a depth of 60 inches or more is dark brown extremely gravelly sand. Permeability of the Everett soil is rapid. Available water capacity is low.

Hydrology Criteria

As stated in the 2010 Regional Supplement, the "term wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season." It also explains "areas with evident

characteristics of wetland hydrology are those where the presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and chemically reducing conditions, respectively."

Additionally, the *US Army Corps of Engineers 1987 Wetland Delineation Manual* states that "areas which are seasonally inundated and/or saturated to the surface for a consecutive number of days ≥12.5 percent of the growing season are wetlands, provided the soil and vegetation parameters are met. Areas inundated or saturated between 5 and 12.5 percent of the growing season in most years may or may not be wetlands. Areas saturated to the surface for less than 5 percent of the growing season are non-wetlands." Field indicators were used to determine whether wetland hydrology parameters were met on this site.

BOUNDARY DETERMINATION FINDINGS

Wetland A

Vegetation in this wetland is characterized by the presence of the following species: red-osier dogwood (*Cornus alba*, FACW), salmonberry (*Rubus spectabilis,* FAC), and lady fern (*Athyrium filix-femina,* FAC), water smartweed (*Persicaria amphibia*, OBL), reed canarygrass (*Phalaris arundinacea*, FACW), cattail (*Typha latifolia*, OBL), giant horsetail (*Equisetum telmateia*, FACW), touch-me-not (*Impatiens noli-tangere*, FACW), skunk cabbage (*Lysichton americanus*, OBL), and red-tinge bulrush (*Scirpus microcarpus*, OBL). Red alder (*Alnus rubra*, FAC) and Sitka willow (*Salix sitchensis*, FACW) are present along the edges of Wetland A.

Soils within Wetland A are typically a very dark grayish brown (2.5Y 3/2) or a very dark brown (10YR 2/2) within the upper 7 to 10 inches. The sublayer is dark gray (10YR 4/1, 5Y 4/1) with dark reddish brown (5YR 3/4) or dark olive brown (2.5Y 3/3) redoximorphic features. Texture in the Wetland A soils varied across the site. Textures documented included: silt loam, silty clay loam, sandy clay loam, and what appeared to be mucky mineral.

Saturated soils, high water table, and standing surface water were observed within the wetland during the June 2013 visit.

The dominance of species rated "Facultative" or wetter meets the criteria for hydrophytic vegetation in the areas mapped as wetland. Based on field indicators, it appears that the areas mapped as Wetland A are saturated to the surface for more than 12.5 percent of the growing season, thereby fulfilling wetland hydrology criteria.

Photo 1: Wetland A just east of the slough. Note dense reed canarygrass.

Photo 2: Wetland A east of the slough.

Photo 3: Wetland A along eastern property edge.

Photo 4: Slough and riparian area of Wetland A in foreground. Ree canarygrass and Upland forest in background.

Wetland B

Vegetation in the wetland is characterized by the presence of the following species: Sitka willow (*Salix sitchensis*, FACW), lady fern (*Athyrium filix-femina,* FAC), reed canarygrass (*Phalaris arundinacea*, FACW), tall fescue (*Festuca arundinacea*, FAC), creeping buttercup (*Ranunculus repens*, FAC), lamp rush (*Juncus effusus*, FACW), giant horsetail (*Equisetum telmateia*, FACW), and velvet grass (*Holcus lanatus*, FAC).

Soils within Wetland B are very dark gray (10YR 3/1) or very dark grayish brown (2.5Y 3/2) sandy silt loam within the top 10 inches. Redoximorphic features present within the sublayer are a yellowish brown (10YR 5/6) or dark yellowish brown (10YR 3/6). The sublayer matrix ranges from very dark gray (10YR 3/1) to gray (10YR 5/1) sandy silt loam. Saturated soils and high water table were observed within the wetland during the June 2013 visit.

The dominance of species rated "Facultative" or wetter meets the criteria for hydrophytic vegetation in the areas mapped as Wetland B. Based on field indicators, it appears that the areas mapped as wetland are saturated to the surface for more than 12.5 percent of the growing season, thereby fulfilling wetland hydrology criteria.

Photo 5: Wetland B on east edge of property.

Photo 6: West side of Wetland B, looking toward slough.

Wetland C

Vegetation in this wetland is characterized by the presence of the following species: lamp rush (*Juncus effusus*, FACW), creeping buttercup (*Ranunculus repens*, FAC), colonial bent grass (*Agrostis capillaris*, FAC), and velvet grass (*Holcus lanatus*, FAC).

Soils within Wetland C are very dark grayish brown (2.5Y 3/2) loam in the upper 16 inches with a dark gray (2.5Y 4/1) silt loam sublayer. Redoximorphic features are present throughout the profile and range from a dark brown (7.5YR 3/4) to a dark yellowish brown (10YR 3/4). Evidence of a high water table was observed within the wetland during the June 2013 visit.

The dominance of species rated "Facultative" or wetter meets the criteria for hydrophytic vegetation in the areas mapped as Wetland C. Based on field indicators, it appears that the areas mapped as wetland are saturated to the surface for more than 12.5 percent of the growing season, thereby fulfilling wetland hydrology criteria.

Photo 7: Wetland C, in small depression in field.

Non-Wetland

Vegetation in the areas mapped as non-wetland is represented by the following species: big leaf maple (*Acer macrophyllum*, FACU), red alder (*Alnus rubra*, FAC), western sword fern (*Polystichum munitum,* FACU), Himalayan blackberry (*Rubus armeniacus*, FACU), tall fescue (*Festuca arundinacea*, FAC), sweet vernal grass (*Anthoxanthum odoratum*, FACU), and bull thistle (*Cirsium vulgare*, FACU).

Soils underlying the areas mapped as non-wetland on the subject site vary from a dark brown (10YR 3/3) to an olive brown (2.5Y 4/3) silt loam in the upper layer with a reddish-brown (5Y 5/3) or reddish gray (5Y 5/2) silt loam in the sublayer. Upland soils ranged from moist to dry across the site.

Based on the lack of field indicators, it appears that area of the site mapped as non-wetland is not saturated to the surface for more than 12.5 percent of the growing season, thereby not fulfilling wetland hydrology criteria.

Photo 8: Buffer/Pasture area in central portion of site.

Photo 9: Dense fringe of Himalayan blackberry along the wetland boundary.

FUNCTIONS AND VALUES ASSESSMENT

Functional Components

Wetlands and streams in Western Washington perform a variety of ecosystem functions. Included among the most important functions provided by wetlands are: stormwater control, water quality improvement, fish and wildlife habitat, aesthetic value, recreational opportunities, and education. The most commonly assessed functions and their descriptions are listed below. Assessments of these functions for the project site are provided in the "Value Assessment" sections of this report.

Hydrologic Functions

Wetlands often function as natural water storage areas during periods of precipitation and flooding. By storing water that otherwise might be channeled into open flow systems, wetlands can attenuate or modify potentially damaging effects of storm events, reducing erosion and peak flows to downstream systems. Additionally, the soils underlying wetlands are often less permeable, providing long-term storage of stormwater or floodflow and controlling baseflows of downstream systems. Stormwater storage capacity and floodflow attenuation are generally a function of the size of the wetland and their topographic characteristics.

Water Quality

Surface water quality improvement is another evaluated function. Surface runoff during periods of precipitation increases the potential for sediments and pollutants to enter surface water. Wetlands improve water quality by acting as filters as water passes through them, trapping sediments and pollutants from surface water. Ponded areas within depressional wetlands also allow sediments to drop out of suspension, thereby increasing water quality. As development increases, the potential for polluted water to reach wetlands and streams also increases. Unnaturally high inputs of pollutants, which are often found in urbanized areas, along with the size of the wetlands and the vegetation structure within them are the main limiting factors of this function.

Wildlife Habitat

Wetlands have potential to provide diverse habitat for aquatic, terrestrial, and avian species for nesting, rearing, resting, cover, and foraging. Wildlife species are commonly dependent upon a variety of intermingled habitat types, including: wetlands, adjacent uplands, large bodies of water, and movement corridors between them. Human intrusion, including development within and adjacent to wetlands, and impacts to movement corridors are the most limiting factors for wildlife habitat functions.

Value Assessment – Wetland A

Hydrologic Function

The Wetland A complex consists of depressional wetland areas adjacent to the on-site slough. These areas receive hydrology from precipitation and from the slough. This structure allows the wetland to collect water during high-volume seasons and storm events. By collecting water during these events, the wetland assists in reducing the volume of water moving through the

channel. This wetland is performing a flood-reducing function. However, because the wetland is directly associated with the slough, the depth of storage in much of the wetland area is less than three feet. Overall, Wetland A provides a low value for this function.

Water Quality

This wetland provides some water quality benefits as water moves through the system. The amount of dense vegetation in this wetland allows for the wetland to perform a bio-filtration function. The areas of permanent ponding provide water quality improvement by increasing residence time, slowing velocity, and allowing particulates to settle. This wetland is near residential areas and SR 2, providing an opportunity for it to improve water quality. This wetland provides a moderate to high value for this function.

Wildlife Habitat

The presence of multiple Cowardin vegetation classes, multiple hydroperiods, and a high diversity of native plant species create the potential for this wetland to perform a high value habitat function. It contains multiple special and priority habitat features. This wetland is connected to vegetated corridors that continue to the northeast and to the Skykomish River. These corridors are disturbed or broken by development and roads, including SR 2. These disturbances in connectivity reduce the opportunity for this wetland to provide a high habitat value. With a habitat score of 25, the wetland provides a moderate value for this function.

Value Assessment – Wetland B

Hydrologic Function

Wetland B is a slope wetland and has a partially constricted outlet. Water in the wetland flows from east to west. The majority of the wetland drains into the slough on-site. This water then continues heading toward the Skykomish River. Typically slope wetlands have reduced potential to perform hydrologic functions because the water moving through them has a low residence time. However, the ponded areas within this wetland do perform a low to moderate hydrologic function by increasing water residence time.

Water Quality

Wetland B provides some water quality benefits as water moves through the system. The amount of dense vegetation in this wetland allows for Wetland B to perform a bio-filtration function. The areas of seasonal ponding provide water quality improvement by increasing residence time and allowing particulates to settle. This wetland is near residential and urban areas, providing an opportunity for it to improve water quality. This wetland provides a low to moderate value for this function.

Wildlife Habitat

The presence of only one Cowardin vegetation class and few special or priority habitat features restricts the potential for Wetland B to perform a high value habitat function. This wetland is connected to vegetated corridors that continue to the northeast and to the Skykomish River. These corridors are disturbed or broken by development and roads,

including SR 2. These disturbances in connectivity reduce the opportunity for this wetland to provide a high habitat value. With a habitat score of 16, Wetland B provides a low value for this function.

Value Assessment – Wetland C

Hydrologic Function

Wetland C is a depressional wetland with no outlet. Wetlands with limited outflow retain water longer and allow for higher potential to perform hydrologic functions. The water retained by this wetland would drain to a river that has flooding problems and therefore has the opportunity to improve hydrologic functions. Wetland C provides a moderate value for this function.

Water Quality

The water residence time, area of ponding, and the persistent vegetation over the entire wetland area creates potential for Wetland C to improve water quality functions. Being located near a residential area provides this wetland opportunity to improve water quality by retaining storm water. However, the functions provided by Wetland C are limited by its small size. Wetland C provides a low to moderate value for this function.

Habitat Quality

Wetland C contains only one vegetation class, few hydroperiods, a moderate diversity of vegetation species, and no habitat interspersion. These characteristics and the small size of the wetland severely limit the potential for Wetland C to perform a high habitat function. While the buffer is vegetated, the majority of this vegetation is herbaceous or Himalayan blackberry. The corridors and connections to other wetlands in the areas are disturbed. With a habitat score of 12, Wetland C provides a low value for this function.

Stream/Slough - Functions and Values Assessment

The slough is classified as a Shoreline of the State, or Type 1 Water. It is presumed to provide habitat for anadromous fish as well as other aquatic species. This stream provides floodwater storage and sediment and organic material transport. The riparian habitat provided by this stream adds to the diversity and complexity of the habitat elements provided by the adjacent wetland complex. The surrounding urban area and culverts along this stream restrict the functions it provides.

<u>Buffer Functions and Values Assessment</u>

Water Quality

Vegetated wetland buffers obstruct water flow, thereby decreasing water velocity, allowing infiltration into the soil, and reducing soil erosion potential. The on-site wetland and stream/slough buffer areas are vegetated with a variety of emergent plants, a few shrubs, Himalayan blackberry, and infrequent trees. The on-site buffers do perform a water quality function, but it is limited by the lack of a diverse vegetation canopy and previous soil disturbance or tilling.

Hydrologic functions
Wetland buffers help to moderate water level fluctuations. Buffer vegetation impedes the flow of runoff, increases the humus content of soil (greater absorption capacity), and preserves soil composition as intense rainfall hits the ground. Buffers adjacent to the wetland and stream/slough appear to perform this function. Again, this function is limited by the lack of diverse vegetation structure.

Wildlife Habitat
Many birds, mammals, and amphibians use wetland buffers for some part of their life needs. Their use of these sites is dependent on the valuable edge habitat found at the wetland/upland border. The on-site buffer vegetation may not be very diverse, but the wetland/stream buffers appear to provide cover for safety, breeding, and escape, and native species as food sources. Overall, the on-site buffer areas provide a low value for habitat functions. Considering the moderate habitat functions score for Wetland A, the buffer adjacent to Wetland A has high potential for providing quality habitat.

PERMANENT PROTECTION

When an application for development occurs within the City of Monroe the following permanent protection measures are required pursuant to Monroe Municipal Code.

Native Growth Protection Easements
The City of Monroe requires that all critical areas and their associated buffers be placed in Native Growth Protection Easements (NGPE) or Critical Area Tracts (Monroe CAO, Section 20.05.070). An NGPE is an easement granted to the city for the protection of a critical area and/or its associated buffer. NGPEs shall be required as specified in these rules and shall be recorded on plats, short plats and final development permits and all documents of title and with the county recorder at the applicant's expense. The required language is as follows:

> *Dedication of a Native Growth Protection Easement (NGPE) conveys to the public a beneficial interest in the land within the easement. This interest includes the preservation of existing vegetation for all purposes that benefit the public health, safety and welfare, including control of surface water and erosion, maintenance of slope stability, visual and aural buffering, and protection of plant and animal habitat. The NGPE imposes upon all present and future owners and occupiers of land subject to the easement the obligation, enforceable on behalf of the public of the city of Monroe, to leave undisturbed all trees and other vegetation within the easement. The vegetation in the easement may not be cut, pruned, covered by fill, removed, or damaged without express permission from the city of Monroe, which permission must be obtained in writing.*
>
> *Before beginning and during the course of any grading, building construction or other development activity on a lot or development site subject to the NGPE, the*

common boundary between the easement and the area of development activity must be fenced or otherwise marked to the satisfaction of the City of Monroe.

NGPE Signs

According to the Monroe CAO, Section 20.05.070.D.1, the outer perimeter of the wetland, stream, or buffer and the limits of these areas to be disturbed pursuant to an approved permit or authorization shall be marked in the field so no unauthorized intrusion will occur and is subject to inspection by the Director or his designee prior to the commencement of permitted activities. This temporary marking shall be maintained throughout construction and shall not be removed until directed by the Director, or until permanent signs and/or fencing, if required, are in place.

Pursuant to the City of Monroe CAO, Section 20.05.070.D.2, the outer perimeter of the critical area or buffer that is not disturbed shall be permanently identified following the implementation of an approved development plan or alteration. Permanent marking and/or fencing is required. This identification shall include permanent wood or metal signs on treated wood or metal posts. Signs shall be worded as follows:

NATIVE GROWTH PROTECTION EASEMENT
PROTECTION OF THIS NATURAL AREA IS IN YOUR CARE.
ALTERATION OR DISTURBANCE IS PROHIBITED.
PLEASE CALL THE CITY OF MONROE FOR MORE INFORMATION.

City of Monroe personnel shall approve sign locations during review of the development proposal. Along boundaries, the signs shall be at least 4" X 6" in size and spaced one per lot or every one hundred fifty (150) feet for lots whose boundaries exceed one hundred fifty (150) feet. At road endings, crossings and other areas where public access to the critical area is allowed, the sign shall be a minimum of 18" X 24" in size and spaced one every one hundred fifty (150) feet.

Critical Area Tracts

Pursuant to the City of Monroe CAO, Section 20.05.070.B, Critical Area Tracts are legally created lots that contain critical areas and their buffers. These tracts are non-buildable and shall remain undeveloped pursuant to the CAO. Critical area tracts shall be incorporated into the area of the parent lot and they are not meant for resale, lease or transfer. When the development is in the form of a subdivision, short subdivision (short plat), planned residential development (PRD) or contract rezone, critical areas and their buffers shall be placed in a critical areas tract rather than a NGPE. As with NGPEs, maintenance and protection for these tracts is the obligation of the landowner. A note identifying these tracts shall be recorded on the face of all plats, PRD's or contract rezones and likewise recorded on the titles of affected lots.

Typical Building Setback Line (BSBL)

Pursuant to the City of Monroe CAO, Section 20.05.070.C, unless otherwise specified, a

minimum Building Setback Line (BSBL) of ten (10) feet is required from the edge of any separate tract, buffer or NGPE, whichever is greatest.

WILDLIFE

During the June 2013 visits, few wildlife species were observed. Documentation by Washington Department of Fish and Wildlife (WDFW) reports the area of the Skykomish River associated with the subject site is used by several species of fish. These species include: Cutthroat trout (*Oncorhynchus clarki*), Chinook salmon (*Oncorhynchus tshawytscha*), Chum salmon (*Oncorhynchus keta*), Coho salmon (*Oncorhynchus kisutch*), Bull trout (*Salvelinus malma*), and Pink salmon (*Oncorhynchus gorbuscha*).

The following avian species expected to use the subject site include: common raven (*Corvus corax*), American crow (*Corvus brachyrhynchos*), American robin (*Turdus migratorius*), house finch (*Carpodacus mexicanus*), black-capped chickadee (*Poecile atricapillus*), bushtit (*Psaltriparus minimus*), northern flicker (*Colaptes auratus*), hairy woodpecker (*Picoides villosus*), downy woodpecker (*Dendrocopus villosus*), red-breasted nuthatch (*Sitka canadensis*), brown creeper (*Certhia americana*), swainson's thrush (*Hyocichla ustulata*), varied thrush (*Ixoreus naevius*), and sharp-shinned hawk (*Accipiter striatus*).

Mammals that may use this site include: Virginia opossum (*Didelphis virginiana*), shrews (*Sorex spp*.), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), gray squirrel (*Sciurus carolinensis*), black tailed deer (*Odocoileus hemionus columbianus*), and eastern cottontail rabbits (*Sylvilagus floridanus*).

Other wildlife expected to use this site include: pacific tree frog (*Hyla regilla*), northwestern salamander (*Ambystoma gracile*), and rough-skinned newt (*Taricha granulosa*). These lists are not meant to be all-inclusive and may omit species that currently utilize or could utilize the site.

FISH AND WILDLIFE HABITAT CONSERVATION REPORT

City of Monroe Fisheries Issues

The following fish are listed on Federal or State reports as endangered, threatened or species of concern and are present on or in the vicinity of the subject site. These fish include: Chinook salmon (*Oncorhynchus tshawytscha*), Coho salmon (*Oncorhynchus kisutch*), and Bull trout (*Salvelinus malma*).

The federal listing of local salmonids under the Endangered Species Act (ESA), in conjunction with the City of Monroe Critical Area Regulations (CAR), requires the preparation of a Fish and Wildlife Habitat Conservation Report for impacts that occur within 300 feet of any salmonid-bearing stream. This report is to include protective measures (if needed) for reducing or

eliminating the impacts of development activities upon critical species in the area.

The Endangered Species Act (ESA) defines "critical habitat" for species in two ways. First, a "critical habitat" can be a designated area for specific species to occupy, which contain physical or biological features essential to conservation of species. Alternatively, a "critical habitat" may extend outside the specific areas occupied by a species if it can be demonstrated that these areas are essential for conservation. Under the ESA, "taking" of a threatened or endangered species or its habitat is not permitted. "Take" is an action that harms a critical species or critical habitat.

When determining fish and wildlife conservation areas, the Washington Administrative Code requires that areas of primary association with habitat for endangered, threatened, or sensitive species be included in the conservation areas. These areas are considered a critical component of the habitats of federally or state listed endangered, threatened, candidate, sensitive, priority, and monitored wildlife or plant species. Altering these habitats may reduce the likelihood that the species will persist and reproduce over the long term. Riparian corridors must remain in at least satisfactory condition for fish and wildlife use, as well as to allow the natural ecosystem to function with minimal disruption. Thus, maintenance of ecosystem function allows ease of fish movement, increased survival and fitness, reproductive success, and the removal of pollutants from stormwater that may otherwise enter the stream.

Salmonids require many habitat features to thrive, especially proper water temperature, availability of food, refuge from predators and high flow periods in the form of pools and undercut banks, clean and pervious gravel for spawning and clear and unpolluted water. Especially important in regulating these habitat features is the vegetation in the riparian area, specifically along banks and within the floodplain. Riparian vegetation provides many crucial aspects of salmonid habitat including shade, bank stabilization, nutrient cycling, pollutant removal and input of large woody debris (LWD) in the channel. LWD is especially important since it facilitates the formation of important habitat features like pools through bed scour, and it buffers the severity of sedimentation and erosion. Healthy floodplains store water during floods and release it during dry periods, thereby maintaining a steady base flow throughout the year. Long-term conservation of salmonids requires protection of both the immediate functions riparian vegetation provides and the ecological conditions within the riparian area needed to maintain natural communities.

Proposed Development

No specific development plan exists at this time. Development within the on-site, especially within critical areas, buffers, or shoreline jurisdiction may present impacts to fish and habitat.

Potential Impacts to Fish and Habitat

<u>Vegetation and Temporal Losses</u>

Vegetation adjacent to the south side of the on-site slough is primarily Himalayan blackberry, which provides little shade over the open water. Trees and shrubs are present along the north

side of the slough. The portion of Wetland A on the east side of the site has a fairly diverse vegetation structure and does provide areas of shade over open water. The majority of the site is previously disturbed agricultural land with herbaceous vegetation. Development on the site outside of the shoreline designation and required buffers would only impact pasture areas and herbaceous vegetation. No vegetation or temporal losses are expected to occur within the habitat conservation area.

Hydrology

Increases of impervious surfaces in Snohomish County have been recognized to influence the magnitude and frequency of peak discharges and reduce summer base flows since less runoff infiltrates to ground water. Increased impervious surfaces on-site may increase the volume of water within the slough and associated wetland. Since the slough connects to the Skykomish River, hydrological changes on-site will affect the water volume of the river as well. Under the current zoning, the allowed maximum lot coverage is 30 percent. If the property is rezoned as General Commercial, MMC allows up to 100 percent of the lot area outside critical areas and associated buffers to be covered. Regardless of the specific development activity proposed in the future, the storm water system will be designed utilizing the most current storm water manual published by Department of Ecology. This manual is specifically developed to reduce the hydrologic impact of impervious surfaces. In addition, the required 200-foot protective buffer provides hydrologic protection to the on-site salmon resources.

Management Strategies

All development on-site will comply with MMC 20.05 and the City of Monroe Shoreline Master Program. Any development proposed within the floodplain will comply with the *Floodplain Habitat Assessment and Mitigation Draft Regional Guidance* provided by FEMA (2011). In addition, Washington Department of Fish and Wildlife's guidance for salmon habitat management (*Land Use Planning for Salmon, Steelhead, and Trout*) and Department of Ecology's best available science documents (*Wetlands in Washington State Volume 2*) will be used in the planning of future development on this site. Any development scenario will likely require mitigation involving controlling at least a portion of the invasive plant species and planting native trees and shrubs on-site. This restoration or enhancement would provide a long-term benefit for fish and wildlife species located on-site and in the immediate vicinity.

USE OF THIS REPORT

This Critical Area Study and Habitat Conservation Report is supplied to PACE Engineers, Inc. as a means of determining on-site critical area conditions, as required by the City of Monroe. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions.

The laws applicable to critical areas are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information

deemed relevant in the applicant's attempt to comply with the laws now in effect.

The work for this report has conformed to the standard of cares employed by wetland ecologists. No other representation or warranty is made concerning the work or this report and any implied representation or warranty is disclaimed.

Wetland Resources, Inc.

Meryl Kamowski
Associate Ecologist

REFERENCES

Cowardin, et al., 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S.D.I. Fish and Wildlife Service. FWS/OBS-79/31. December 1979.

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

Granger, T., T. Hruby, A. McMillan, D. Peters, J. Rubey, D. Sheldon, S. Stanley, E. Stockdale. April 2005. Wetlands in Washington State - Volume 2: Guidance for Protecting and Managing Wetlands. Washington State Department of Ecology. Publication #05-06-008. Olympia, WA.

Hruby, T. 2004. *Washington State wetland rating system for western Washington Revised*. Washington State Department of Ecology Publication # 04-06-025.

Knight, K. 2009. Land Use Planning for Salmon, Steelhead and Trout. Washington Department of Fish and Wildlife. Olympia, Washington.

Mitsch, William J. and James G. Gosselink. 2007. Wetlands, Fourth Edition. Hoboken, New Jersey: John Wiley & Sons, Inc.

Monroe Municipal Code – Critical Areas Ordinance, Chapter 20.05 MMC. Monroe, Washington. 2004.

National List of Plant Species that Occur in Wetlands, Northwest Region. 1996. U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C.

Snohomish County Critical Areas Regulations, Chapter 30.62A Snohomish County, Washington. October 2007.

Soil Survey of Snohomish County Area Washington. U.S.D.A. Soil Conservation Service. July 1983.

U.S. Army Corps of Engineers (2010). *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0), ERDC/EL TR-10-3, U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Washington State Wetlands Identification and Delineation Manual. Washington State Department of Ecology. Publication #96-94. March 1997.

APPENDIX A: DOE WETLAND RATING FORMS

Wetland name or number Wetland A

WETLAND RATING FORM – WESTERN WASHINGTON
Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): Wetland A Date of site visit: 6/6/2013

Rated by NP, JR, MK Trained by Ecology? Yes ☑ No ☐ Date of training 4/2013

SEC: 05 TWNSHP: 27 RNGE: 07E Is S/T/R in Appendix D? Yes ☐ No ☐

Map of wetland unit: Figure ____ Estimated size ~7 acres

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ✔ **II** ___ **III** ___ **IV** ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	24
Score for Hydrologic Functions	6
Score for Habitat Functions	25
TOTAL score for Functions	55

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ **II** ___ **Does not Apply** ___

Final Category (choose the "highest" category from above) II

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		**Depressional**	✔
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above		Check if unit has multiple HGM classes present	✔

Wetland name or number Wetland A

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		✔
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		✔
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		✔
SP4. *Does the wetland unit have a local significance in addition to its functions*? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		✔

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number Wetland A

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
☑ NO – go to 2 ☐ **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe** ☐ **NO – Saltwater Tidal Fringe (Estuarine)** ☐

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
☑ NO – go to 3 ☐ **YES** – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
☑ NO – go to 4 ☐ **YES –** The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
____The wetland is on a slope (*slope can be very gradual*),
____The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
____The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
☑ NO - go to 5 ☐ **YES –** The wetland class is **Slope**

Wetland name or number Wetland A

5. Does the entire wetland unit **meet all** of the following criteria?

____ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river

____ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

☑ NO - go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

☑ NO – go to 7 ☐ **YES –** The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☑ NO – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated		*HGM Class to Use in Rating*	
Slope + Riverine	☐	Riverine	☐
Slope + Depressional	☐	Depressional	☐
Slope + Lake-fringe	☐	Lake-fringe	☐
Depressional + Riverine along stream within boundary	☑	Depressional	☑
Depressional + Lake-fringe	☐	Depressional	☐
Salt Water Tidal Fringe and any other class of freshwater wetland	☐	Treat as ESTUARINE under wetlands with special characteristics	☐

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number Wetland A

D	**Depressional and Flats Wetlands** **WATER QUALITY FUNCTIONS** - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
D	**D 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	***(see p.38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: ☐ Unit is a depression with no surface water leaving it (no outlet) points = 3 ☐ Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 ☑ Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 ☐ Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Provide photo or drawing	**Figure** ___ 1
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* ☑ YES points = 4 ☐ NO points = 0	4
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) ☑ Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 ☐ Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 ☐ Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 ☐ Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	**Figure** ___ 5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* ☐ Area seasonally ponded is > ½ total area of wetland points = 4 ☑ Area seasonally ponded is > ¼ total area of wetland points = 2 ☐ Area seasonally ponded is < ¼ total area of wetland points = 0 Map of Hydroperiods	**Figure** ___ 2
D	**Total for D 1** *Add the points in the boxes above*	12
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☑ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☑ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ ☑ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	***(see p. 44)*** multiplier 2
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	24

Wetland name or number Wetland A

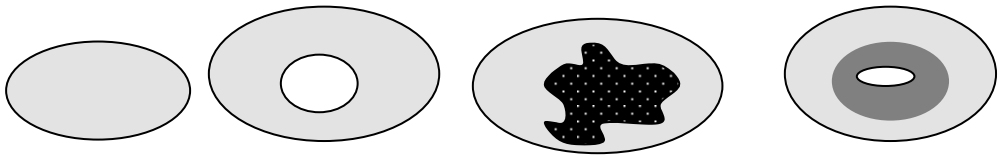
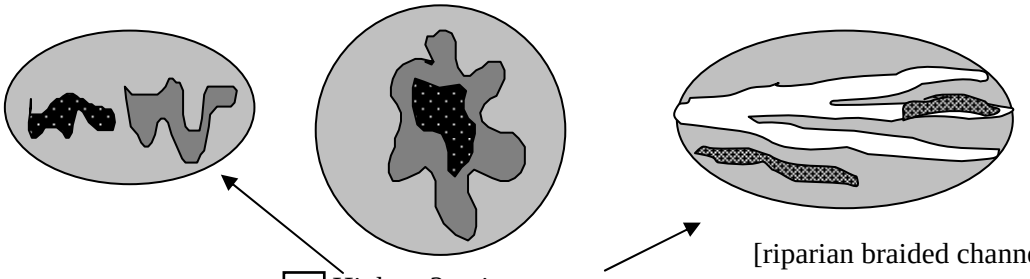
D	**Depressional and Flats Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	**Points** (only 1 score per box)
	D 3. Does the wetland unit have the <u>potential</u> to reduce flooding and erosion?	***(see p.46)***
D	D 3.1 Characteristics of surface water flows out of the wetland unit ☐ Unit is a depression with no surface water leaving it (no outlet) points = 4 ☐ Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 ☐ Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) ☑ Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 0	0
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* ☐ Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 ☐ The wetland is a "headwater" wetland" points = 5 ☐ Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 ☑ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 ☐ Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 ☐ Marks of ponding less than 0.5 ft points = 0	3
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of unit points = 5 ☐ The area of the basin is 10 to 100 times the area of the unit points = 3 ☑ The area of the basin is more than 100 times the area of the unit points = 0 ☐ Entire unit is in the FLATS class points = 5	0
D	**Total for D 3** *Add the points in the boxes above*	3
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☑ Wetland drains to a river or stream that has flooding problems ☐ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other_____ ☑ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	***(see p. 49)*** multiplier 2
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	6

Wetland name or number Wetland A

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ☐ Aquatic bed ☑ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☑ Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ☐ The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* ☐ 4 structures or more points = 4 ☐ 3 structures points = 2 ☑ 2 structures points = 1 ☐ 1 structure points = 0 Map of Cowardin vegetation classes	**Figure ___** 1
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* ☑ Permanently flooded or inundated ☑ Seasonally flooded or inundated ☐ Occasionally flooded or inundated ☑ Saturated only ☑ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points** ☑ 4 or more types present points = 3 ☐ 3 types present points = 2 ☐ 2 types present point = 1 ☐ 1 type present points = 0 Map of hydroperiods	**Figure ___** 3
H 1.3. Richness of Plant Species ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: ☑ > 19 species points = 2 ☐ 5 - 19 species points = 1 ☐ < 5 species points = 0 *List species below if you want to:*	2

Total for page 6

Wetland name or number Wetland A

H 1.4. Interspersion of habitats ***(see p. 76)*** Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  ☐ None = 0 points ☐ Low = 1 point ☐ Moderate = 2 points  [riparian braided channels] ☑ High = 3 points NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	**Figure ___** 3
H 1.5. Special Habitat Features: ***(see p. 77)*** *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ☑ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ☑ Standing snags (diameter at the bottom > 4 inches) in the wetland ☐ Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ☑ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ☑ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated.*(structures for egg-laying by amphibians)* ☐ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	4
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	13

Comments

Wetland name or number Wetland A

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers ***(see p. 80)*** *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* ☐ 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer**.** (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** ☐ 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** ☐ 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** ☐ 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** ☑ 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** ☐ No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** ☐ No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** ☐ Heavy grazing in buffer. **Points = 1** ☐ Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**. ☐ Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	**Figure ___** 3
H 2.2 Corridors and Connections ***(see p. 81)*** H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). ☐ YES = **4 points** (*go to H 2.3*) ☑ NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? ☑ YES = **2 points** (*go to H 2.3*) ☐ NO = H 2.2.3 H 2.2.3 Is the wetland: ☐ within 5 mi (8km) of a brackish or salt water estuary OR ☐ within 3 mi of a large field or pasture (>40 acres) OR ☐ within 1 mi of a lake greater than 20 acres? ☐ YES = **1 point** ☐ NO = **0 points**	2

Total for page 5

Wetland name or number Wetland A

H 2.3 Near or adjacent to other priority habitats listed by WDFW ***(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)*** Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☑ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*). ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock. ☑ **Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. **(**Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest. ☐ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*). ☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*). ☑ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).* ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☑ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. ☑ If wetland has **3 or more** priority habitats **= 4 points** ☐ If wetland has **2** priority habitats = **3 points** ☐ If wetland has **1** priority habitat **= 1 point** ☐ No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	4

Wetland name or number Wetland A

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** ☐ There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 ☐ The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 ☑ There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 ☐ The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 ☐ There is at least 1 wetland within ½ mile. points = 2 ☐ There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	12
TOTAL for H 1 from page 14	13
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	25

Wetland name or number Wetland A

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands ***(see p. 86)*** Does the wetland unit meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt. ☐ YES = Go to SC 1.1 NO ☐	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ YES = Category I ☐ NO go to SC 1.2	**Cat. I** ☐
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? ☐ YES = Category I ☐ NO = Category II ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	☐ **Cat. I** ☐ **Cat. II** ☐ **Dual rating I/II**

Wetland name or number Wetland A

SC 2.0 Natural Heritage Wetlands ***(see p. 87)*** Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ☐ or accessed from WNHP/DNR web site ☐ YES ☐ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ☐ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? ☐ YES = Category I NO ☐ not a Heritage Wetland	☐ **Cat. I**
SC 3.0 Bogs ***(see p. 87)*** Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 ☐ ☐ No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? ☐ Yes - go to Q. 3 ☐ No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? ☐ Yes – Is a bog for purpose of rating ☐ No - go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. ☐ YES = Category I No ☐ Is not a bog for purpose of rating	☐ **Cat. I**

Wetland name or number Wetland A

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.* ☐ **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. ☐ **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ YES = Category I NO ☐ not a forested wetland with special characteristics	**Cat. I** ☐
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* ☐ YES = Go to SC 5.1 NO ☐ not a wetland in a coastal lagoon SC 5.1 Does the wetland meets all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland is larger than 1/10 acre (4350 square feet) ☐ YES = Category I ☐ NO = Category II	☐ **Cat. I** ☐ **Cat. II**

Wetland name or number Wetland A

SC 6.0 Interdunal Wetlands ***(see p. 93)*** Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ☐ YES - go to SC 6.1 NO ☐ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: ☐ Long Beach Peninsula- lands west of SR 103 ☐ Grayland-Westport- lands west of SR 105 ☐ Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? ☐ YES = Category II ☐ NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? ☐ YES = Category III	**Cat. II** ☐ **Cat. III** ☐
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	☐ ☐ ☐ ☐

Wetland name or number Wetland B

WETLAND RATING FORM – WESTERN WASHINGTON
Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): Wetland B Date of site visit: 6/6/2013

Rated by NP, MK Trained by Ecology? Yes ☑ No ☐ Date of training 4/2013

SEC: 05 TWNSHP: 27 RNGE: 07E Is S/T/R in Appendix D? Yes ☐ No ☐

Map of wetland unit: Figure ____ Estimated size ~0.75 acres

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ **II** ___ **III** ✔ **IV** ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	12
Score for Hydrologic Functions	10
Score for Habitat Functions	16
TOTAL score for Functions	38

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ **II** ___ **Does not Apply** ___

Final Category (choose the "highest" category from above) III

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		**Depressional**	
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above		Check if unit has multiple HGM classes present	☐

Wetland name or number Wetland B

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		
SP4. *Does the wetland unit have a local significance in addition to its functions*? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number Wetland B

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
☑ NO – go to 2 ☐ **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe** ☐ **NO – Saltwater Tidal Fringe (Estuarine)** ☐

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
☑ NO – go to 3 ☐ **YES** – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
☑ NO – go to 4 ☐ **YES –** The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
_✔_The wetland is on a slope (*slope can be very gradual*),
_✔_The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
_✔_The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
☐ NO - go to 5 ☑ **YES –** The wetland class is **Slope**

Wetland name or number Wetland B

5. Does the entire wetland unit **meet all** of the following criteria?

____ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river

____ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

☐ NO - go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO – go to 7 ☐ **YES –** The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine ☐	Riverine ☐
Slope + Depressional ☐	Depressional ☐
Slope + Lake-fringe ☐	Lake-fringe ☐
Depressional + Riverine along stream within boundary ☐	Depressional ☐
Depressional + Lake-fringe ☐	Depressional ☐
Salt Water Tidal Fringe and any other class of freshwater wetland ☐	Treat as ESTUARINE under wetlands with special characteristics ☐

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number Wetland B

S	**Slope Wetlands** WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
S	**S 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	***(see p.64)***
S	S 1.1 Characteristics of average slope of unit: ☐ Slope is1% or less *(a 1% slope has a 1 foot vertical drop in elevation for every 100 ft horizontal distance*) points = 3 ☐ Slope is 1% - 2% points = 2 ☐ Slope is 2% - 5% points = 1 ☑ Slope is greater than 5% points = 0	0
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* ☐ YES = 3 points ☑ NO = 0 points	0
S	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* ☑ Dense, uncut, herbaceous vegetation > 90% of the wetland area points = 6 ☐ Dense, uncut, herbaceous vegetation > 1/2 of area points = 3 ☐ Dense, woody, vegetation > ½ of area points = 2 ☐ Dense, uncut, herbaceous vegetation > 1/4 of area points = 1 ☐ Does not meet any of the criteria above for vegetation points = 0 Aerial photo or map with vegetation polygons	**Figure** ___ 6
S	**Total for S 1** *Add the points in the boxes above*	6
S	**S 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging, or orchards within 150 feet of wetland ☑ Residential, urban areas, or golf courses are within 150 ft upslope of wetland ☐ Other_____ ☑ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	***(see p.67)*** multiplier 2
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 ***Add score to table on p. 1***	12

Comments

Wetland name or number Wetland B

S	**Slope Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	**Points** (only 1 score per box)
	S 3. Does the wetland unit have the <u>potential</u> to reduce flooding and stream erosion?	***(see p.68)***
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit conditions in the wetland. (stems of plants should be thick enough (usually > 1/8in), or dense enough, to remain erect during surface flows)* ☐ Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland. points = 6 ☑ Dense, uncut, **rigid** vegetation > 1/2 area of wetland points = 3 ☐ Dense, uncut, **rigid** vegetation > 1/4 area points = 1 ☐ More than 1/4 of area is grazed, mowed, tilled or vegetation is not rigid points = 0	3
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. ☑ YES points = 2 ☐ NO points = 0	2
S	*Add the points in the boxes above*	5
S	**S 4. Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☑ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other_____ *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* ☑ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	***(see p. 70)*** multiplier 2
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	10

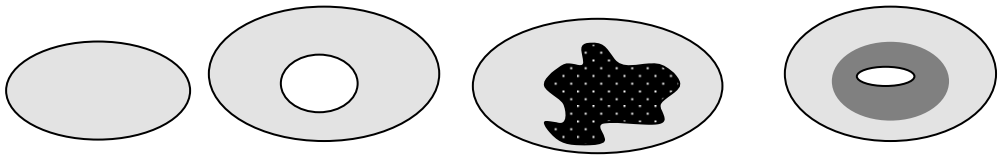
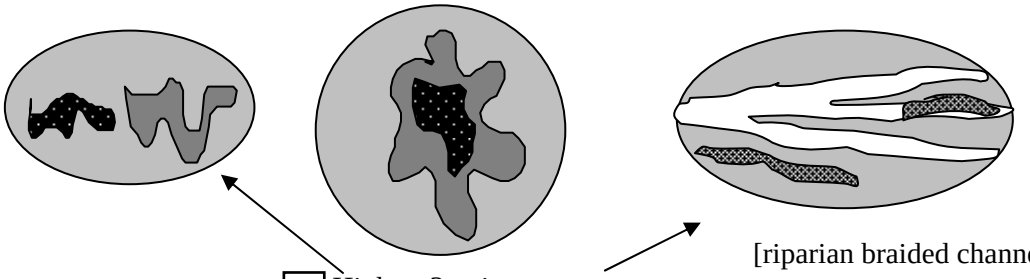
Comments

Wetland name or number Wetland B

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ☐ Aquatic bed ☑ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ☐ The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* ☐ 4 structures or more points = 4 ☐ 3 structures points = 2 ☐ 2 structures points = 1 ☑ 1 structure points = 0 Map of Cowardin vegetation classes	**Figure** ___ 0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* ☐ Permanently flooded or inundated ☑ Seasonally flooded or inundated ☐ Occasionally flooded or inundated ☑ Saturated only ☐ 4 or more types present points = 3 ☑ 3 types present points = 2 ☐ 2 types present point = 1 ☐ 1 type present points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☑ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points** Map of hydroperiods	**Figure** ___ 2
H 1.3. Richness of Plant Species ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: ☐ > 19 species points = 2 ☑ 5 - 19 species points = 1 ☐ < 5 species points = 0 *List species below if you want to:*	1

Total for page 3

Wetland name or number WetlaB

H 1.4. Interspersion of habitats ***(see p. 76)*** Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  ☐ None = 0 points ☑ Low = 1 point ☐ Moderate = 2 points  [riparian braided channels] ☐ High = 3 points NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	**Figure ___** 1
H 1.5. Special Habitat Features: ***(see p. 77)*** *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ☑ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ☑ Standing snags (diameter at the bottom > 4 inches) in the wetland ☐ Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ☐ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated.*(structures for egg-laying by amphibians)* ☐ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	4

Comments

Wetland name or number Wetland B

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers ***(see p. 80)*** *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* ☐ 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer**.** (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** ☐ 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** ☐ 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** ☐ 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** ☑ 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** ☐ No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** ☐ No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** ☐ Heavy grazing in buffer. **Points = 1** ☐ Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**. ☐ Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	**Figure ___** 3
H 2.2 Corridors and Connections ***(see p. 81)*** H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). ☐ YES = **4 points** (*go to H 2.3*) ☐ NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? ☑ YES = **2 points** (*go to H 2.3*) ☐ NO = H 2.2.3 H 2.2.3 Is the wetland: ☐ within 5 mi (8km) of a brackish or salt water estuary OR ☐ within 3 mi of a large field or pasture (>40 acres) OR ☐ within 1 mi of a lake greater than 20 acres? ☐ YES = **1 point** ☐ NO = **0 points**	2

Total for page 5

Wetland name or number Wetland B

H 2.3 Near or adjacent to other priority habitats listed by WDFW ***(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)*** Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☑ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*). ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock. ☑ **Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. **(**Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest. ☐ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*). ☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*). ☑ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).* ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☑ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. ☑ If wetland has **3 or more** priority habitats **= 4 points** ☐ If wetland has **2** priority habitats = **3 points** ☐ If wetland has **1** priority habitat **= 1 point** ☐ No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	4

Wetland name or number Wetland B

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** ☐ There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 ☐ The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 ☑ There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 ☐ The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 ☐ There is at least 1 wetland within ½ mile. points = 2 ☐ There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	12
TOTAL for H 1 from page 14	4
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	16

Wetland name or number Wetland B

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands ***(see p. 86)*** Does the wetland unit meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt. ☐ YES = Go to SC 1.1 NO ☐	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ YES = Category I ☐ NO go to SC 1.2	**Cat. I** ☐
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? ☐ YES = Category I ☐ NO = Category II ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	☐ **Cat. I** ☐ **Cat. II** ☐ **Dual rating I/II**

Wetland name or number Wetland B

SC 2.0 Natural Heritage Wetlands ***(see p. 87)*** Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ☐ or accessed from WNHP/DNR web site ☐ YES ☐ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ☐ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? ☐ YES = Category I NO ☐ not a Heritage Wetland	☐ **Cat. I**
SC 3.0 Bogs ***(see p. 87)*** Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 ☐ ☐ No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? ☐ Yes - go to Q. 3 ☐ No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? ☐ Yes – Is a bog for purpose of rating ☐ No - go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. ☐ YES = Category I No ☐ Is not a bog for purpose of rating	☐ **Cat. I**

Wetland name or number Wetland B

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.* ☐ **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. ☐ **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ YES = Category I NO ☐ not a forested wetland with special characteristics	**Cat. I** ☐
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* ☐ YES = Go to SC 5.1 NO ☐ not a wetland in a coastal lagoon SC 5.1 Does the wetland meets all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland is larger than 1/10 acre (4350 square feet) ☐ YES = Category I ☐ NO = Category II	☐ **Cat. I** ☐ **Cat. II**

Wetland name or number Wetland B

SC 6.0 Interdunal Wetlands ***(see p. 93)*** Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ☐ YES - go to SC 6.1 NO ☐ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: ☐ Long Beach Peninsula- lands west of SR 103 ☐ Grayland-Westport- lands west of SR 105 ☐ Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? ☐ YES = Category II ☐ NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? ☐ YES = Category III	**Cat. II** ☐ **Cat. III** ☐
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	☐ ☐ ☐ ☐

Wetland name or number Wetland C

WETLAND RATING FORM – WESTERN WASHINGTON
Version 2 - Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): Wetland C Date of site visit: 6/6/2013

Rated by NP, JR Trained by Ecology? Yes ☑ No ☐ Date of training 4/2013

SEC: 05 TWNSHP: 27 RNGE: 05E Is S/T/R in Appendix D? Yes ☐ No ☐

Map of wetland unit: Figure ____ Estimated size 1,210 square feet

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ **II** ___ **III** ___ **IV** ___

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	10
Score for Hydrologic Functions	14
Score for Habitat Functions	12
TOTAL score for Functions	36

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ **II** ___ **Does not Apply** ___

Final Category (choose the "highest" category from above) III

Summary of basic information about the wetland unit

Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine		**Depressional**	✔
Natural Heritage Wetland		**Riverine**	
Bog		**Lake-fringe**	
Mature Forest		**Slope**	
Old Growth Forest		**Flats**	
Coastal Lagoon		**Freshwater Tidal**	
Interdunal			
None of the above		Check if unit has multiple HGM classes present	☐

Wetland name or number Wetland C

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered* ***animal or plant*** *species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.		✔
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered* ***animal*** *species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands (see p. 19 of data form).		✔
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*		✔
SP4. *Does the wetland unit have a local significance in addition to its functions*? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.		✔

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number Wetland C

Classification of Wetland Units in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
☑ NO – go to 2 ☐ **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe** ☐ **NO – Saltwater Tidal Fringe (Estuarine)** ☐

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
☑ NO – go to 3 ☐ **YES** – The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
☑ NO – go to 4 ☐ **YES –** The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
____The wetland is on a slope (*slope can be very gradual*),
____The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
____The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
☑ NO - go to 5 ☐ **YES –** The wetland class is **Slope**

Wetland name or number Wetland C

5. Does the entire wetland unit **meet all** of the following criteria?

____ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river

____ The overbank flooding occurs at least once every two years.

NOTE: The riverine unit can contain depressions that are filled with water when the river is not flooding.

☑ NO - go to 6 ☐ **YES** – The wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

☐ NO – go to 7 ☑ **YES –** The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding. The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

☐ NO – go to 8 ☐ **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated		*HGM Class to Use in Rating*	
Slope + Riverine	☐	Riverine	☐
Slope + Depressional	☐	Depressional	☐
Slope + Lake-fringe	☐	Lake-fringe	☐
Depressional + Riverine along stream within boundary	☐	Depressional	☐
Depressional + Lake-fringe	☐	Depressional	☐
Salt Water Tidal Fringe and any other class of freshwater wetland	☐	Treat as ESTUARINE under wetlands with special characteristics	☐

If you are unable still to determine which of the above criteria apply to your wetland, or if you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

Wetland name or number Wetland C

D	**Depressional and Flats Wetlands** **WATER QUALITY FUNCTIONS** - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
D	**D 1. Does the wetland unit have the <u>potential</u> to improve water quality?**	***(see p.38)***
D	D 1.1 Characteristics of surface water flows out of the wetland: ☑ Unit is a depression with no surface water leaving it (no outlet) points = 3 ☐ Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 ☐ Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 1 ☐ Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) Provide photo or drawing	**Figure** ___ 3
D	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* ☐ YES points = 4 ☑ NO points = 0	0
D	D 1.3 Characteristics of persistent vegetation (emergent, shrub, and/or forest Cowardin class) ☑ Wetland has persistent, ungrazed, vegetation > = 95% of area points = 5 ☐ Wetland has persistent, ungrazed, vegetation > = 1/2 of area points = 3 ☐ Wetland has persistent, ungrazed vegetation > = 1/10 of area points = 1 ☐ Wetland has persistent, ungrazed vegetation <1/10 of area points = 0 Map of Cowardin vegetation classes	**Figure** ___ 5
D	D1.4 Characteristics of seasonal ponding or inundation. *This is the area of the wetland unit that is ponded for at least 2 months, but dries out sometime during the year. Do not count the area that is permanently ponded. Estimate area as the average condition 5 out of 10 yrs.* ☐ Area seasonally ponded is > ½ total area of wetland points = 4 ☑ Area seasonally ponded is > ¼ total area of wetland points = 2 ☐ Area seasonally ponded is < ¼ total area of wetland points = 0 Map of Hydroperiods	**Figure** ___ 2
D	**Total for D 1** *Add the points in the boxes above*	10
D	**D 2. Does the wetland unit have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland. *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields or orchards within 150 ft of wetland ☐ A stream or culvert discharges into wetland that drains developed areas, residential areas, farmed fields, roads, or clear-cut logging ☐ Residential, urban areas, golf courses are within 150 ft of wetland ☐ Wetland is fed by groundwater high in phosphorus or nitrogen ☐ Other_____ ☐ **YES** multiplier is **2** ☑ **NO** multiplier is **1**	***(see p. 44)*** multiplier 1
D	**<u>TOTAL</u> - Water Quality Functions** Multiply the score from D1 by D2 ***Add score to table on p. 1***	10

Wetland name or number Wetland C

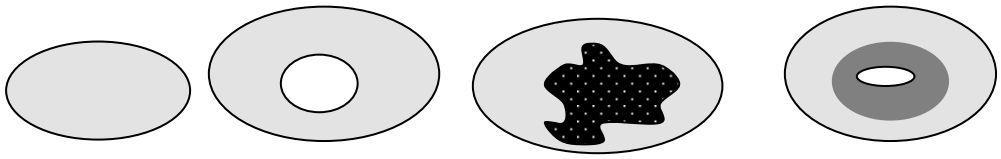
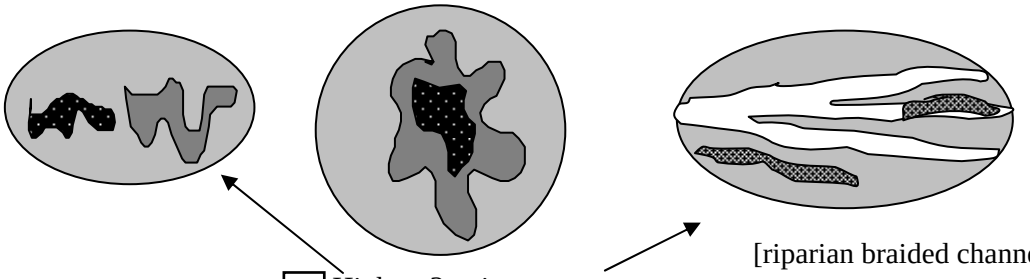
D	**Depressional and Flats Wetlands** HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream degradation	**Points** (only 1 score per box)
	D 3. Does the wetland unit have the <u>potential</u> to reduce flooding and erosion?	***(see p.46)***
D	D 3.1 Characteristics of surface water flows out of the wetland unit ☑ Unit is a depression with no surface water leaving it (no outlet) points = 4 ☐ Unit has an intermittently flowing, OR highly constricted permanently flowing outlet points = 2 ☐ Unit is a "flat" depression (Q. 7 on key), or in the Flats class, with permanent surface outflow **and no obvious natural outlet** and/or outlet is a man-made ditch points = 1 (*If ditch is not permanently flowing treat unit as "intermittently flowing"*) ☐ Unit has an unconstricted, or slightly constricted, surface outlet (*permanently flowing*) points = 0	4
D	D 3.2 Depth of storage during wet periods *Estimate the height of ponding above the bottom of the outlet. For units with no outlet measure from the surface of permanent water or deepest part (if dry).* ☐ Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 ☐ The wetland is a "headwater" wetland" points = 5 ☐ Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 ☐ Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 ☐ Unit is flat (yes to Q. 2 or Q. 7 on key) but has small depressions on the surface that trap water points = 1 ☑ Marks of ponding less than 0.5 ft points = 0	0
D	D 3.3 Contribution of wetland unit to storage in the watershed *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* ☐ The area of the basin is less than 10 times the area of unit points = 5 ☑ The area of the basin is 10 to 100 times the area of the unit points = 3 ☐ The area of the basin is more than 100 times the area of the unit points = 0 ☐ Entire unit is in the FLATS class points = 5	3
D	**Total for D 3** *Add the points in the boxes above*	7
D	**D 4. Does the wetland unit have the <u>opportunity</u> to reduce flooding and erosion?** Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows. Answer NO if the water coming into the wetland is controlled by a structure such as flood gate, tide gate, flap valve, reservoir etc. OR you estimate that more than 90% of the water in the wetland is from groundwater in areas where damaging groundwater flooding does not occur. *Note which of the following indicators of opportunity apply.* ☐ Wetland is in a headwater of a river or stream that has flooding problems ☐ Wetland drains to a river or stream that has flooding problems ☑ Wetland has no outlet and impounds surface runoff water that might otherwise flow into a river or stream that has flooding problems ☐ Other_____ ☑ **YES** multiplier is **2** ☐ **NO** multiplier is **1**	***(see p. 49)*** multiplier 2
D	**TOTAL - Hydrologic Functions** Multiply the score from D 3 by D 4 ***Add score to table on p. 1***	14

Wetland name or number Wetland C

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)*** *Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ acre or more than 10% of the area if unit is smaller than 2.5 acres.* ☐ Aquatic bed ☑ Emergent plants ☐ Scrub/shrub (areas where shrubs have >30% cover) ☐ Forested (areas where trees have >30% cover) *If the unit has a forested class check if:* ☐ The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon *Add the number of vegetation structures that qualify. If you have:* ☐ 4 structures or more points = 4 ☐ 3 structures points = 2 ☐ 2 structures points = 1 ☑ 1 structure points = 0 Map of Cowardin vegetation classes	**Figure** ___ 0
H 1.2. Hydroperiods ***(see p. 73)*** *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)* ☐ Permanently flooded or inundated ☑ Seasonally flooded or inundated ☐ Occasionally flooded or inundated ☑ Saturated only ☐ 4 or more types present points = 3 ☐ 3 types present points = 2 ☑ 2 types present point = 1 ☐ 1 type present points = 0 ☐ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ ***Lake-fringe wetland* = 2 points** ☐ ***Freshwater tidal wetland* = 2 points** Map of hydroperiods	**Figure** ___ 1
H 1.3. Richness of Plant Species ***(see p. 75)*** Count the number of plant species in the wetland that cover at least 10 ft^2. (*different patches of the same species can be combined to meet the size threshold)* *You do not have to name the species.* *Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle* If you counted: ☐ > 19 species points = 2 ☑ 5 - 19 species points = 1 ☐ < 5 species points = 0 *List species below if you want to:*	1

Total for page 2

Wetland name or number Wetland 6

H 1.4. Interspersion of habitats ***(see p. 76)*** Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  ☑ None = 0 points ☐ Low = 1 point ☐ Moderate = 2 points  [riparian braided channels] ☐ High = 3 points NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes	**Figure ___** 0
H 1.5. Special Habitat Features: ***(see p. 77)*** *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ☐ Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland ☐ Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft (10m) ☐ Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)* ☐ At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated.*(structures for egg-laying by amphibians)* ☐ Invasive plants cover less than 25% of the wetland area in each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	0
H 1. TOTAL Score - potential for providing habitat *Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5*	2

Comments

Wetland name or number Wetland C

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers ***(see p. 80)*** *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."* ☐ 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within the undisturbed part of buffer**.** (relatively undisturbed also means no-grazing, no landscaping, no daily human use) **Points = 5** ☐ 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** ☐ 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** ☐ 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** ☐ 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. **Points = 3** **If buffer does not meet any of the criteria above** ☑ No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** ☐ No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** ☐ Heavy grazing in buffer. **Points = 1** ☐ Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland **Points = 0**. ☐ Buffer does not meet any of the criteria above. **Points = 1** Aerial photo showing buffers	**Figure ___** 2
H 2.2 Corridors and Connections ***(see p. 81)*** H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (*dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor*). ☐ YES = **4 points** (*go to H 2.3*) ☑ NO = go to H 2.2.2 H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR** a **Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? ☐ YES = **2 points** (*go to H 2.3*) ☐ NO = H 2.2.3 H 2.2.3 Is the wetland: ☐ within 5 mi (8km) of a brackish or salt water estuary OR ☑ within 3 mi of a large field or pasture (>40 acres) OR ☐ within 1 mi of a lake greater than 20 acres? ☑ YES = **1 point** ☐ NO = **0 points**	1

Total for page 3

Wetland name or number Wetland C

H 2.3 Near or adjacent to other priority habitats listed by WDFW ***(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)*** Which of the following priority habitats are within 330ft (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☑ **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report p. 152*). ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock. ☐ **Old-growth/Mature forests:** (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. **(**Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 100%; crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest. ☐ **Oregon white Oak:** Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158*). ☑ **Riparian**: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161*). ☑ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. ☐ **Nearshore**: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report: pp. 167-169 and glossary in Appendix A).* ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. ☐ **Cliffs:** Greater than 7.6 m (25 ft) high and occurring below 5000 ft. ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. ☑ If wetland has **3 or more** priority habitats **= 4 points** ☐ If wetland has **2** priority habitats = **3 points** ☐ If wetland has **1** priority habitat **= 1 point** ☐ No habitats = 0 points *Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)*	4

Wetland name or number Wetland C

H 2.4 Wetland Landscape *(choose the **one** description of the landscape around the wetland that best fits)* ***(see p. 84)*** ☐ There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5 ☐ The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5 ☑ There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 ☐ The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 ☐ There is at least 1 wetland within ½ mile. points = 2 ☐ There are no wetlands within ½ mile. points = 0	3
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	10
TOTAL for H 1 from page 14	2
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	12

Wetland name or number Wetland C

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands ***(see p. 86)*** Does the wetland unit meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ With a salinity greater than 0.5 ppt. ☐ YES = Go to SC 1.1 NO ☐	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? ☐ YES = Category I ☐ NO go to SC 1.2	**Cat. I** ☐
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? ☐ YES = Category I ☐ NO = Category II ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	☐ **Cat. I** ☐ **Cat. II** ☐ **Dual rating I/II**

Wetland name or number Wetland C

SC 2.0 Natural Heritage Wetlands ***(see p. 87)*** Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ☐ or accessed from WNHP/DNR web site ☐ YES ☐ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ☐ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? ☐ YES = Category I NO ☐ not a Heritage Wetland	☐ **Cat. I**
SC 3.0 Bogs ***(see p. 87)*** Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 ☐ ☐ No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? ☐ Yes - go to Q. 3 ☐ No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? ☐ Yes – Is a bog for purpose of rating ☐ No - go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. ☐ YES = Category I No ☐ Is not a bog for purpose of rating	☐ **Cat. I**

Wetland name or number Wetland C

SC 4.0 Forested Wetlands *(see p. 90)* Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.* ☐ **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. ☐ **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less that 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. ☐ YES = Category I NO ☐ not a forested wetland with special characteristics	**Cat. I** ☐
SC 5.0 Wetlands in Coastal Lagoons *(see p. 91)* Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? ☐ The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks ☐ The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* ☐ YES = Go to SC 5.1 NO ☐ not a wetland in a coastal lagoon SC 5.1 Does the wetland meets all of the following three conditions? ☐ The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ The wetland is larger than 1/10 acre (4350 square feet) ☐ YES = Category I ☐ NO = Category II	☐ **Cat. I** ☐ **Cat. II**

Wetland name or number Wetland C

SC 6.0 Interdunal Wetlands ***(see p. 93)*** Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ☐ YES - go to SC 6.1 NO ☐ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: ☐ Long Beach Peninsula- lands west of SR 103 ☐ Grayland-Westport- lands west of SR 105 ☐ Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? ☐ YES = Category II ☐ NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? ☐ YES = Category III	**Cat. II** ☐ **Cat. III** ☐
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	☐ ☐ ☐ ☐

Appendix B: Wetland Field Determination Forms

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/4/2013

Applicant/Owner: Pace Engineers, Inc. State: WA Sampling Point: S1 (Wetland A)

Investigator(s): JR Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): _____ Slope (%): 1%

Subregion (LRR): A Lat: 47.86 Long: -121.95 Datum: _____

Soil Map Unit Name: Sultan silt loam NWI classification: PFOC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	25%	Yes	FAC
2. Frangula purshiana	5%		FAC
3. Salix lasiandra	5%		FACW
4.			
	35%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30')			
1. Rubus spectabilis	10%	Yes	FAC
2. Cornus alba	15%	Yes	FACW
3. Rubus armeniacus	25%	Yes	FACU
4.			
5.			
	50%	= Total Cover	
Herb Stratum (Plot size: 10')			
1. Glyceria elata	40%	Yes	FACW
2. Lysichiton americanus	35%	Yes	OBL
3. Equisetum telmateia	25%		FACW
4. Impatiens noli-tangere	5%		FACW
5. Tiarella trifoliata	10%		FAC
6. Athyrium filix-femina	15%		FAC
7.			
8.			
9.			
10.			
11.			
	130%	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOIL

Sampling Point: S1 (Wet. A)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5"	10YR 2/2	100%					Muck	
5-10"	7.5YR 2.5/2	100%					Muck	
10-20"	10YR 2/2	100%					Muck	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☒ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): _____
Water Table Present?	Yes ☒	No ☐	Depth (inches): Six inches
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): Surface

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/4/2013

Applicant/Owner: Pace Engineering, Inc. State: WA Sampling Point: S2 (Wetland A)

Investigator(s): JR Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): _____ Slope (%): 3%

Subregion (LRR): A Lat: 47.86 Long: -121.95 Datum: _____

Soil Map Unit Name: Sultan silt loam NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☐ Hydric Soil Present? Yes ☐ No ☐ Wetland Hydrology Present? Yes ☐ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	20%	Yes	FAC
2. Frangula purshiana	10%	Yes	FAC
3. Salix lasiandra	5%		FACW
4.			
	35%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30')			
1. Rubus armeniacus	65%	Yes	FACU
2. Cornus alba	10%		FACW
3. Sambucus racemosa	5%		FACU
4.			
5.			
	80%	= Total Cover	
Herb Stratum (Plot size: 10')			
1. Equisetum telmateia	20%	Yes	FACW
2. Athyrium filix femina	1%		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	21%	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 79%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOIL

Sampling Point: S2 (Wet. A)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7"	7.5YR 2.5/2	100%					Loam	
7-20"	10YR 3/3	100%					Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineering, Inc. State: WA Sampling Point: S3 (Wetland A)

Investigator(s): JR Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Peninsula (w/in slough) Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Sultan silt loam NWI classification: PEMC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot size: 20')			
1. Rubus armeniacus	5%	Yes	FACU
2.			
3.			
4.			
5.			
	_____	= Total Cover	
Herb Stratum (Plot size: 20')			
1. Phalaris arundinaceae	100%	Yes	FACW
2. Athyrium filix-femina	2%		FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	102%	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____	= Total Cover	
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒ No ☐**

Remarks: The Rubus armeniacus shrub appears to be extending from a small upland area to the northeast. Cover is negligible; it is being disregarded for this sample plot.

SOIL

Sampling Point: S3(peninsula)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3.5"	10YR 3/3						Silt loam	
3.5-18"	5Y 4/1	78%	5YR 3/4	5%	C	PL	Silt loam	
			2.5Y 3/3	10%	C	M		
			7.5YR 3/4	7%	C	PL		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Live ORZ's were observed in the upper 12" of the soil profile.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineering, Inc. State: WA Sampling Point: S4 (Wetland A)

Investigator(s): JR Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Sultan silt loam NWI classification: PEMC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot size: 20')			
1. Salix sitchensis	10%	Yes	FACW
2. Rubus armeniacus	2%		FACU
3.			
4.			
5.			
	12%	= Total Cover	
Herb Stratum (Plot size: 10')			
1. Phalaris arundinacea	90%	Yes	FACW
2. Typha latifolia	2%		OBL
3. Scirpus microcarpus	5%		OBL
4. Carex stipata	2%		OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	99%	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOIL

Sampling Point: S4(Wet A)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7"	2.5Y 3/2	95%	10YR 3/6	5%	C	M	Si. Cl. Lo.	
7-20"	10YR 4/2	76%	10YR 3/6	10%	C	M	Si. Cl. Lo.	
			7.5YR 3/4	7%	C	PL		
			5YR 3/4	7%	C	PL		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 12 inches

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineers, Inc. State: WA Sampling Point: S5 (Wetland A)

Investigator(s): MK Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Sultan Silt Loam NWI classification: PFOC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15x15 ft)			
1. Salix sitchensis	30	Y	FACW
2. Rubus spectabilis	30	Y	FAC
3. Rubus armeniacus	15	Y	FACU
4.			
5.			
	90	= Total Cover	
Herb Stratum (Plot size: 15x15)			
1. Athyrium felix-femina	10	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOIL

Sampling Point: S5 (Wet A)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 2/2	100					mu mi	
10-15	10YR 2/1	100					sa cl lo	
15-18	5Y 4/1	100					sa lo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☒ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☒ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): _____
Water Table Present?	Yes ☒	No ☐	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): surface

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineers, Inc. State: WA Sampling Point: S6 (near Wet A)

Investigator(s): MK Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): _____ Slope (%): 3%

Subregion (LRR): LRR A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Sultan Silt Loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15x15 ft)			
1. Rubus armeniacus	90	Y	FACU
2.			
3.			
4.			
5.			
	90 = Total Cover		
Herb Stratum (Plot size: 15x15)			
1. Agrostis capliaris	5	Y	FAC
2. Festuca arundinacea	5	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOIL

Sampling Point: S6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/3	100					si lo	
10-18	10YR 4/3	100					si lo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineers, Inc. State: WA Sampling Point: S7 (Wetland B)

Investigator(s): NP Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Alderwood-Everett Gravelly Sandy Loam 25-70% slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15x15 ft)			
1. Rubus armeniacus	20	Y	FACU
2.			
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 15x15 ft)			
1. Phallaris arundinacea	75	Y	FACW
2. Athryrium felix-femina	5	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks:

SOIL

Sampling Point: S7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	90	10YR 5/6	10	C	M	sa si lo	
12-18	5Y 5/2	10	10YR 5/6	2	C	M	sa si lo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks: mottles from 9-18

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineers, Inc. State: WA Sampling Point: S8 (Wetland B)

Investigator(s): NP Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Alderwood-Everett Gravelly Sandy Loam 25-70% slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15x15 ft)			
1. Phallaris arundinacea	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒ No ☐**

Remarks:

SOIL

Sampling Point: S8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/1	90	10YR 3/6	10	C	M	sa si lo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☒ No ☐ Depth (inches): 2

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): surface

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineering, Inc. State: WA Sampling Point: S9(Wetland C)

Investigator(s): JR Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Sultan silt loam NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____	= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____	= Total Cover	
Herb Stratum (Plot size: 10')			
1. Juncus effusus	35%	Yes	FACW
2. Agrostis capillaris	50%	Yes	FAC
3. Holcus lanatus	15%		FAC
4. Ranunculus repens	5%		FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	105%	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOIL

Sampling Point: S9 (Wet. C)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16"	2.5Y 3/2	90%	7.5YR 3/4	5%	C	M	Loam	
			7.5YR 3/4	5%	C	PL		
16-20"	2.5Y 4/1	93%	10YR 3/4	7%	C	M	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☒ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☒ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☒ No ☐ Depth (inches): 9 inches

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineers, Inc. State: WA Sampling Point: S 10

Investigator(s): MK Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): _____ Slope (%): 1%

Subregion (LRR): LRR A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Sultan Silt Loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☐ No ☒	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15x15)			
1. Festuca arundinacea	40	Y	FAC
2. Ranunculus repens	40	Y	FAC
3. Cirsium vulgare	10	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOIL

Sampling Point: S10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	2.5Y 4/3	100					si lo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineers, Inc. State: WA Sampling Point: S 11 (Field)

Investigator(s): MK Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Sultan Silt Loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15x15)			
1. Ranunculus repens	40	Y	FAC
2. Holcus lanatus	40	Y	FAC
3. Festuca arundinacea	10	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks:

SOIL

Sampling Point: S11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-15	5Y 4/2	100					si lo	
15-18	5Y 5/3	100					si lo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineers, Inc. State: WA Sampling Point: S12

Investigator(s): NP Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Sultan Silt Loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 15x15)			
1. Juncus effusus	30	Y	FACW
2. Holcus lanatus	25	Y	FAC
3. Cirsium vulgare	15	N	FACU
4. Agrosits capilaris	10	N	FAC
5. Phallaris arundinacea	10	N	FACW
6.			
7.			
8.			
9.			
10.			
11.			
	90 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒ No ☐**

Remarks:

SOIL

Sampling Point: S12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/2	96	7.5YR 4/6	4	C	PL	si lo	
8-18	10YR 5/1	90	10YR 4/6	10	C	M	lo si	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☒ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☒ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Pace - East Monroe City/County: Monroe/Snohomish Sampling Date: 6/6/2013

Applicant/Owner: Pace Engineers, Inc. State: WA Sampling Point: S 13

Investigator(s): NP Section, Township, Range: S5, T27, R07E

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR A Lat: 47.85 Long: -121.94 Datum: _____

Soil Map Unit Name: Sultan Silt Loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15x15)			
1. Rubus armeniacus	50	Y	FACU
2.			
3.			
4.			
5.			
	50 = Total Cover		
Herb Stratum (Plot size: 15x15)			
1. Holcus lanatus	20	Y	FAC
2. Cirisium vulgare	15	Y	FACU
3. Agrostis capilaris	15	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☒

Remarks:

SOIL

Sampling Point: S13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 4/3	100					sa si lo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:_____

Depth (inches):_____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____

Water Table Present? Yes ☐ No ☒ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): _____

Wetland Hydrology Present? **Yes** ☐ **No** ☒

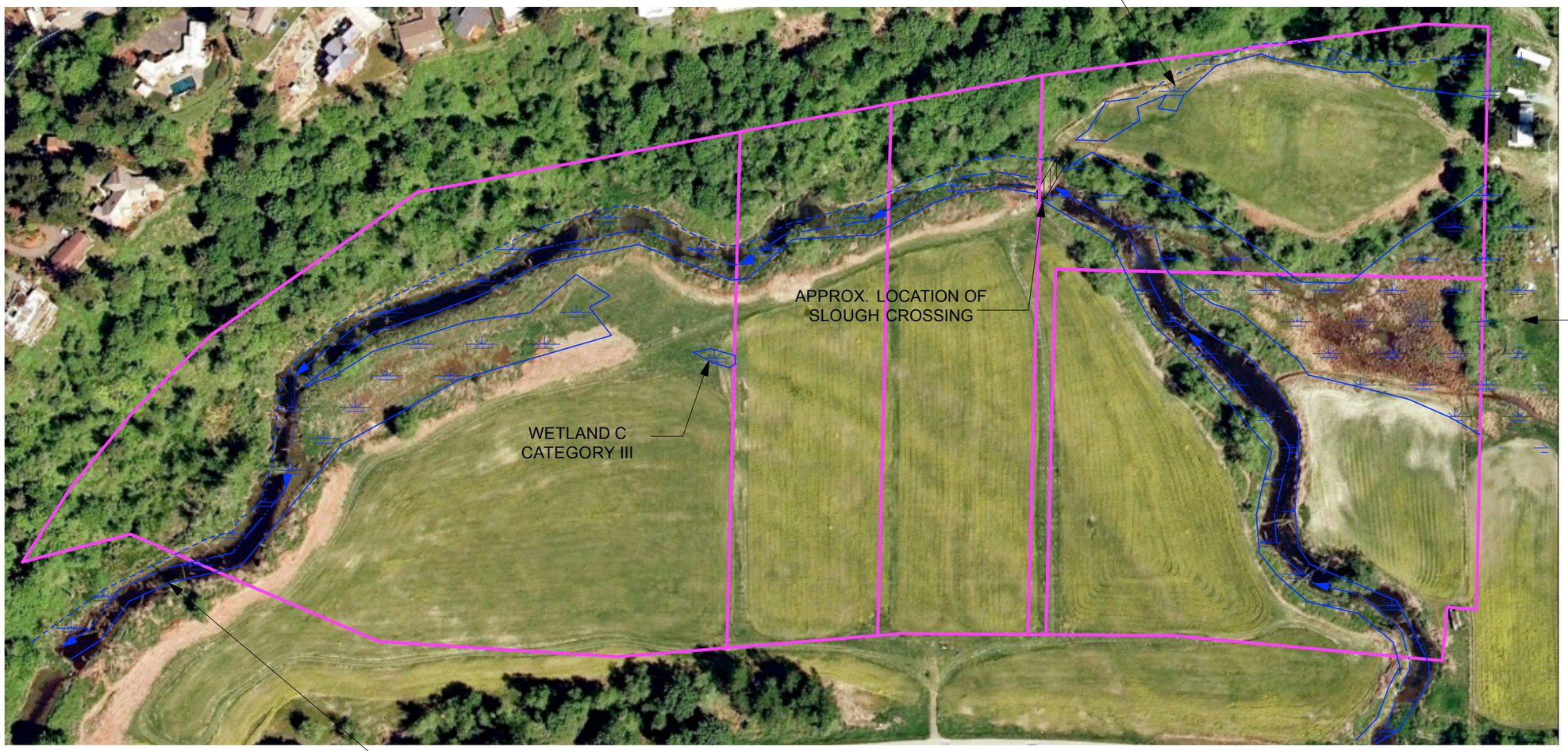
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

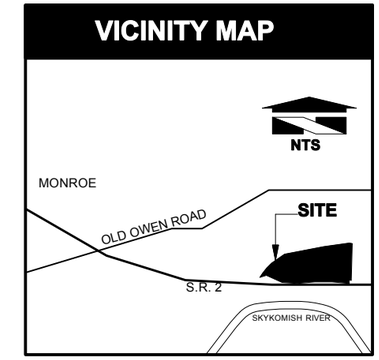
Remarks:

CRITICAL AREAS AND EXISTING CONDITIONS MAP

EAST MONROE REZONE

PORTION OF SECTIONS 5 AND 6, TOWNSHIP 27, RANGE O7E, WM.





LEGEND

DELINEATED WETLAND

APPROXIMATE NORTH WETLAND AND STREAM BOUNDARY

SCALE 1" = 200'

0 100 200 300 400

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett,Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

CRITICAL AREAS AND EXISTING CONDITIONS MAP
EAST MONROE REZONE

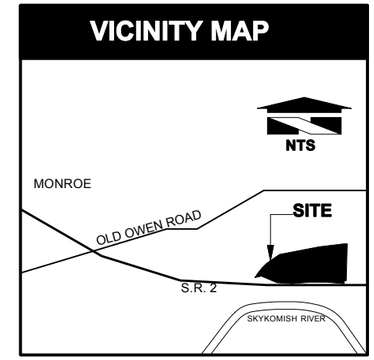
PACE Engineers, Inc.
Attn: Susan Boyd
11255 Kirkland Way #300
Kirkland WA 98033

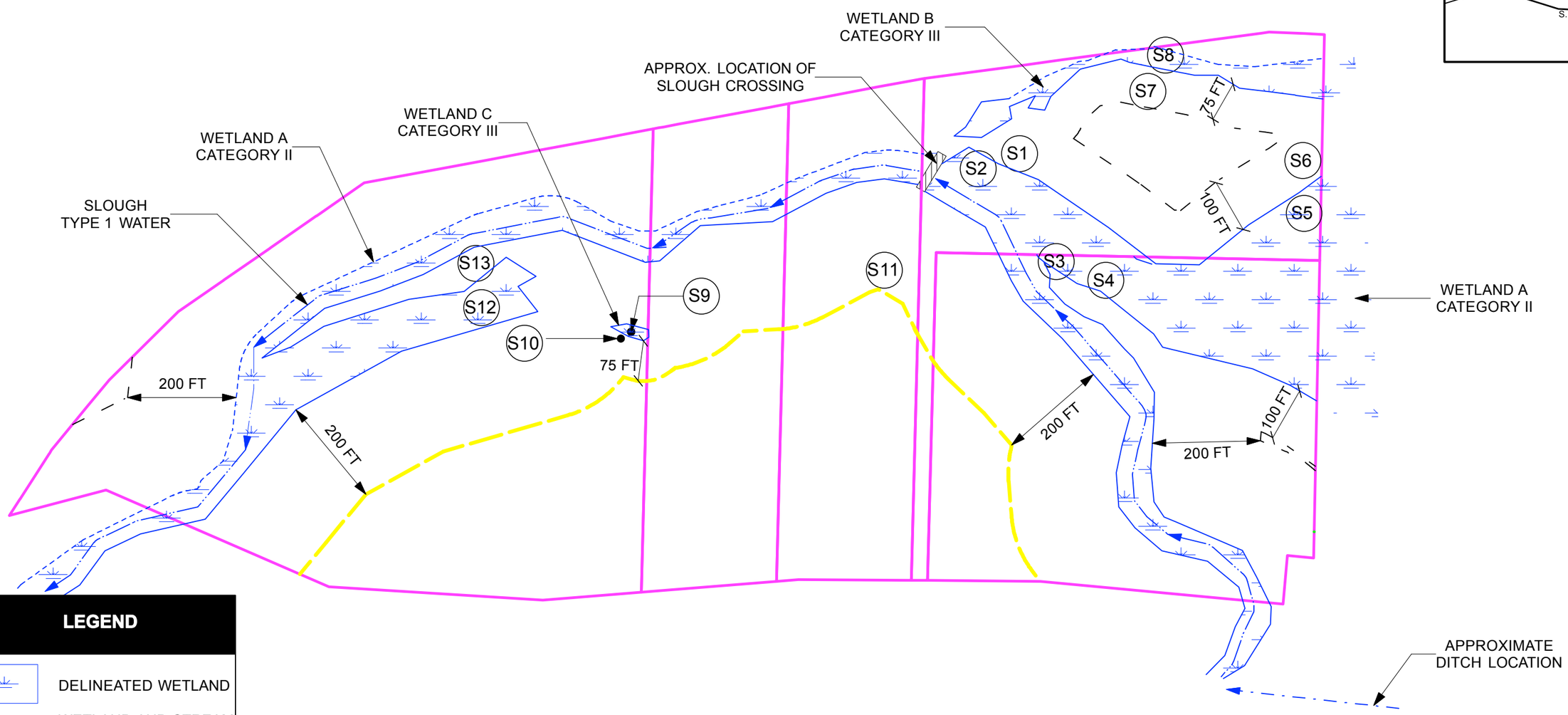
Sheet 1/4
WRI Job # 13133
Drawn by: MK
Date: 07.16.2013

WETLAND, STREAM, AND BUFFER MAP

EAST MONROE REZONE

PORTION OF SECTIONS 5 AND 6, TOWNSHIP 27, RANGE O7E, WM.





LEGEND

- DELINEATED WETLAND
- WETLAND AND STREAM BUFFER*
- APPROXIMATE NORTH WETLAND AND STREAM BOUNDARY
- (S1) - (S13) DATA SITES

* WHERE WETLAND AND STREAM BUFFERS OVERLAP, THE MORERESTRICTIVE BUFFER IS DEPICTED ON THIS MAP.

SCALE 1" = 200'

0 100 200 300 400

NOTE: THE SHORELINE DESIGNATION AREA IS NOT SHOWN ON THIS MAP. SEE SHEET 3 FOR THE SHORELINE DESIGNATION AREA.

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett,Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND, STREAM AND BUFFER MAP
EAST MONROE REZONE

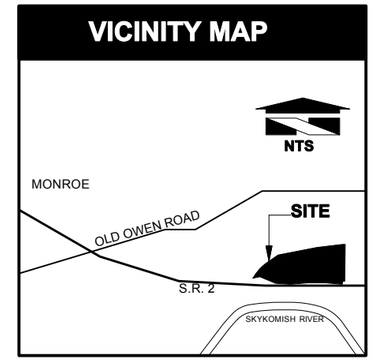
PACE Engineers, Inc.
Attn: Susan Boyd
11255 Kirkland Way #300
Kirkland WA 98033

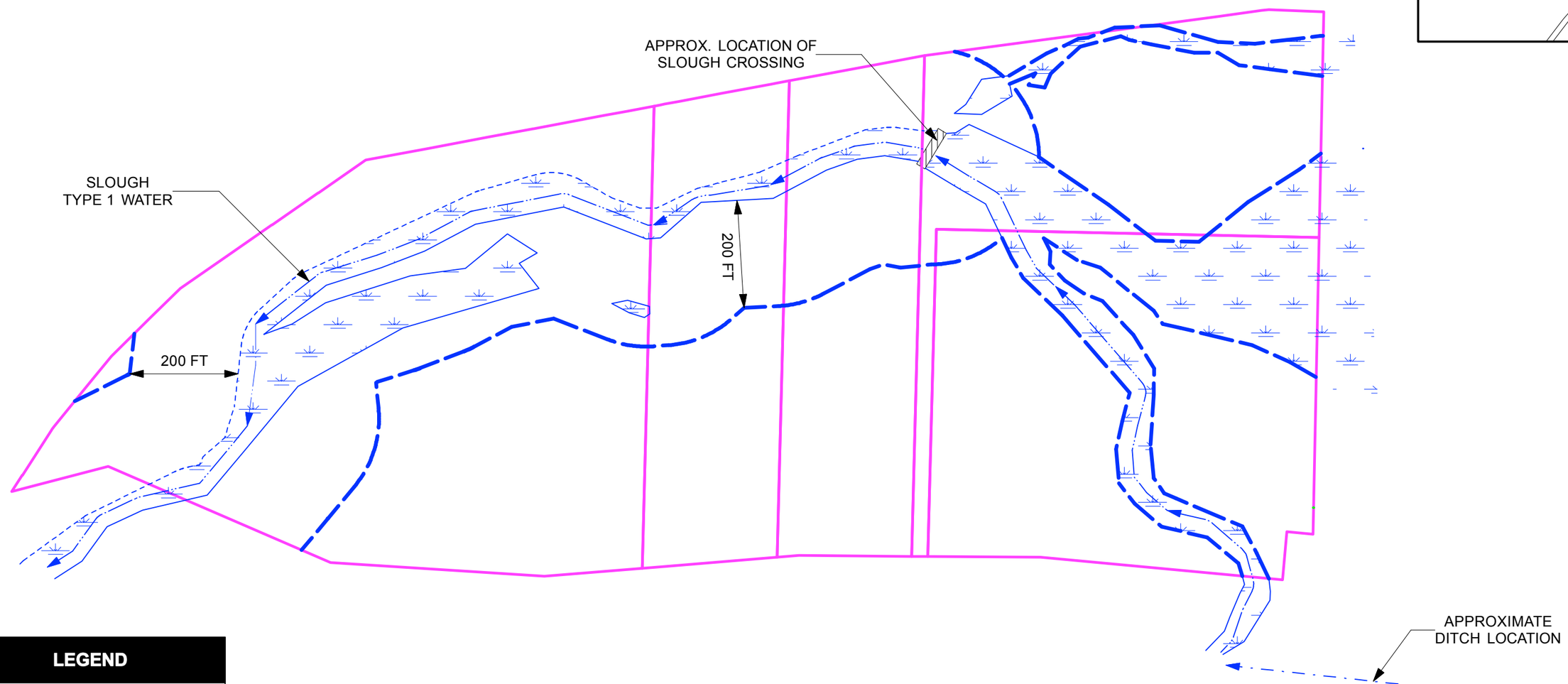
Sheet 2/4
WRI Job # 13133
Drawn by: MK
Date: 07.16.2013

SHORELINE DESIGNATION MAP

EAST MONROE REZONE

PORTION OF SECTIONS 5 AND 6, TOWNSHIP 27, RANGE O7E, WM.





LEGEND

- WETLAND
- SHORELINE DESIGNATION LIMIT
- APPROXIMATE NORTH WETLAND AND STREAM BOUNDARY

SCALE 1" = 200'

0 100 200 300 400

NOTE: LIMIT OF SHORELINE DESIGNATION IS BASED ON THE CITY OF MONROE SHORELINE MASTER PROGRAM WITH THE EXCEPTION OF THE ASSOCIATED WETLANDS. STANDARD WETLAND BUFFERS ARE NOT DEPICTED ON THIS MAP. SEE SHEET 2 FOR STANDARD WETLAND BUFFERS.

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett,Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

SHORELINE DESIGNATION MAP
EAST MONROE REZONE

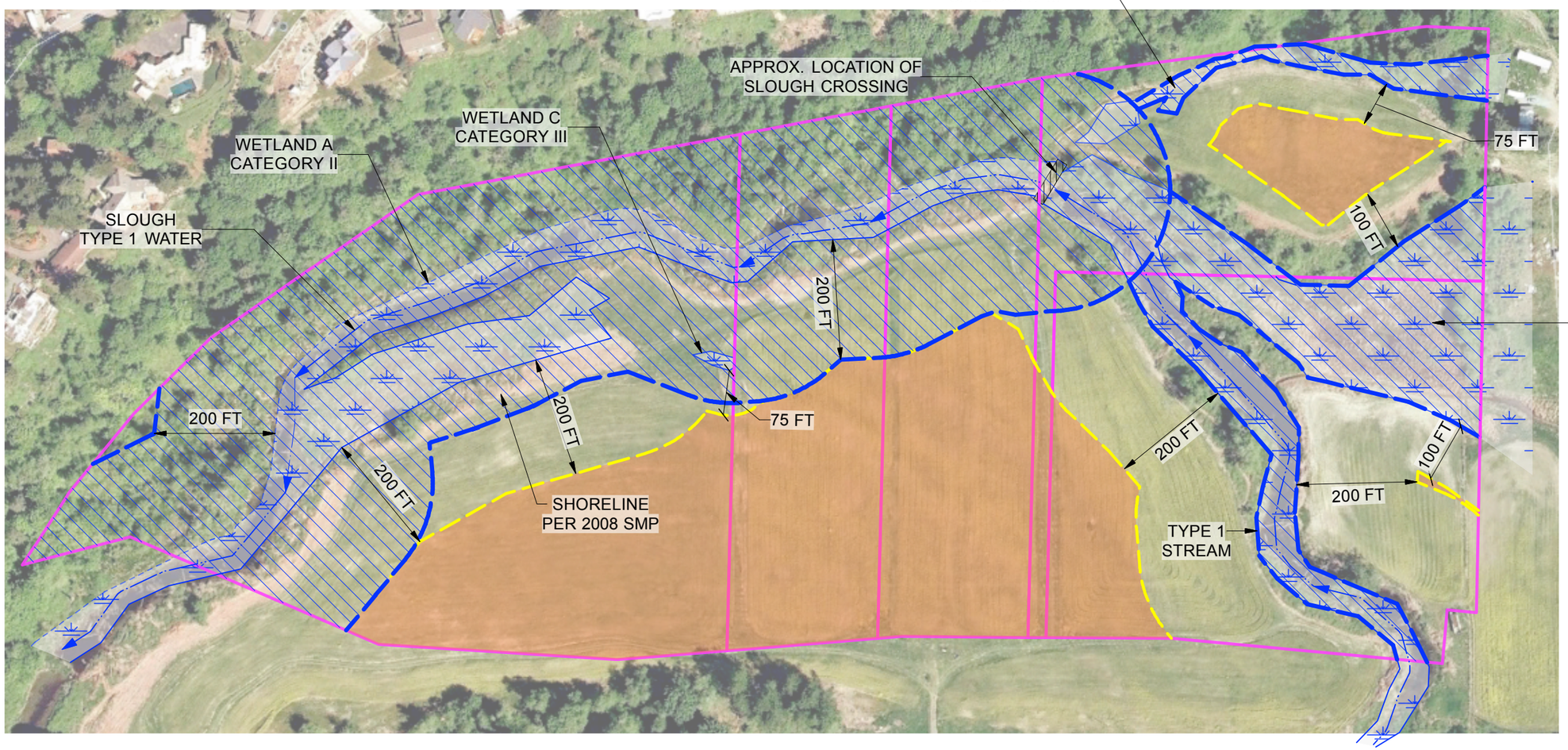
PACE Engineers, Inc.
Attn: Susan Boyd
11255 Kirkland Way #300
Kirkland WA 98033

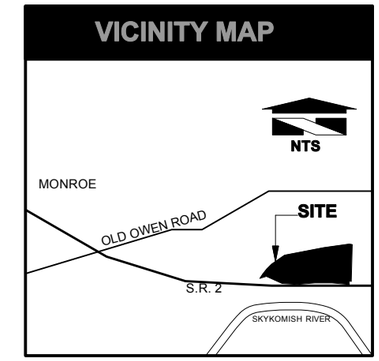
Sheet 3/4
WRI Job # 13133
Drawn by: MK
Date: 7.16.2013

WETLAND, STREAM, BUFFERS, AND SHORELINE DESIGNATION COMPOSITE MAP

EAST MONROE REZONE

PORTION OF SECTIONS 5 AND 6, TOWNSHIP 27, RANGE O7E, WM.





LEGEND

- DELINEATED WETLAND
- WETLAND AND STREAM BUFFER*
- APPROXIMATE NORTH WETLAND AND STREAM BOUNDARY
- SHORELINES
- DEVELOPABLE AREA

* WHERE WETLAND AND STREAM BUFFERS OVERLAP, THE MORE RESTRICTIVE BUFFER IS DEPICTED ON THIS MAP.

SCALE 1" = 200'

0 100 200 300 400

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett,Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

WETLAND, STREAM, BUFFERS, AND SHORELINE DESIGNATION COMPOSITE MAP
EAST MONROE REZONE

PACE Engineers, Inc.
Attn: Susan Boyd
11255 Kirkland Way #300
Kirkland WA 98033

Sheet 4/4
WRI Job # 13133
Drawn by: MK
Date: 08.09.2013

Appendix E
Preliminary FEMA Map 53061c1377g

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Washington State Plane north zone (FIPSZONE 4601), The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this panel was provided by the U.S. Geological Survey and Snohomish County. Digital Orthophoto Quadrangles were produced at a scale of 1:12,000 from photography dated 1989 or later. Snohomish County orthophotos were produced at a one foot pixel resolution and dated 2001 or later.

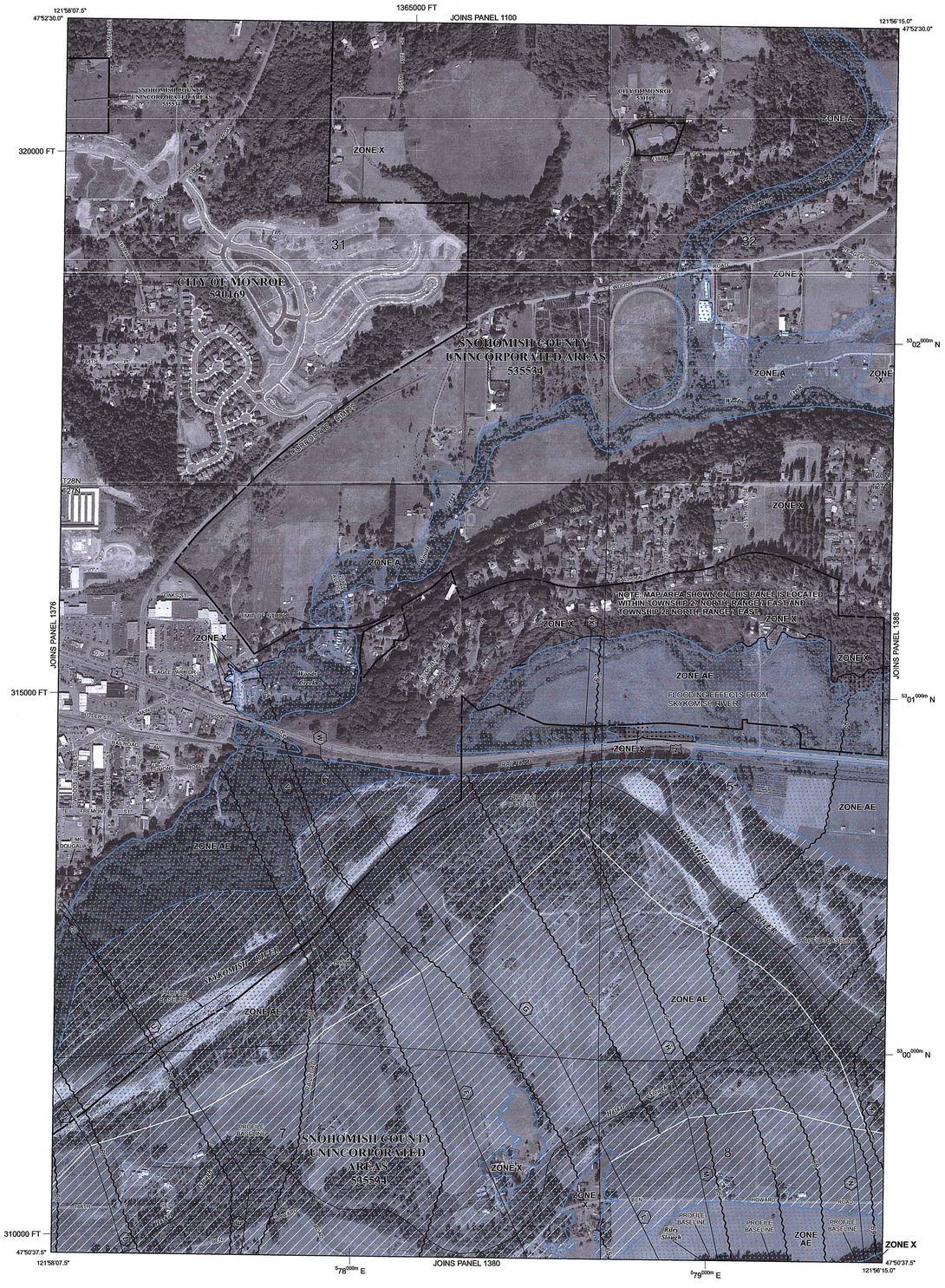
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report*, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

A — A	Cross section line
23 - - - - 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
4278000mN	1000-meter Universal Transverse Mercator grid ticks, zone 10
6000000 FT	5000-foot grid ticks: Washington State Plane coordinate system, north zone (FIPSZONE 4601), Lambert Conformal Conic
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
November 8, 1999
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
_____ -to update road names, to reflect updated topographic information, and to update corporate limits.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1377G

FIRM
FLOOD INSURANCE RATE MAP
SNOHOMISH COUNTY, WASHINGTON
AND INCORPORATED AREAS

PANEL 1377 OF 1575

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SNOHOMISH COUNTY	535534	1377	G
MONROE, CITY OF	530169	1377	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
53061C1377G

MAP REVISED
PRELIMINARY

Federal Emergency Management Agency

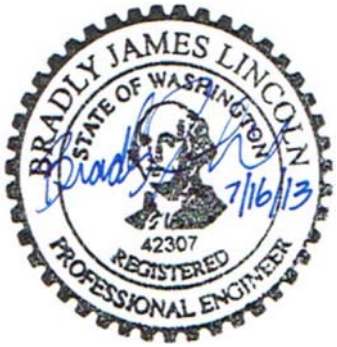
Appendix F
Gibson Traffic Consultants Traffic Analysis

Gibson Traffic Consultants, Inc.
2802 Wetmore Avenue
Suite 220
Everett, WA 98201
425.339.8266

Monroe EIS

Jurisdiction: City of Monroe

July 2013



GTC #13-048

TABLE OF CONTENTS

1. DEVELOPMENT IDENTIFICATION 1
2. METHODOLOGY 1
2.1 Zoning Alternatives 3
2.2 Intersection Analysis 3
3. TRIP GENERATION 5
3.1 Alternative 1 5
3.2 Alternative 2 5
3.3 Alternative 3 6
3.4 Trip Generation Summary 7
4. TRIP DISTRIBUTION 7
5. INTERSECTION LEVEL OF SERVICE ANALYSIS 11
5.1 Turning Movement Volumes 11
5.2 Off-Site Intersection Level of Service Results 17
5.2.1. 2013 Existing Conditions and 2023 Baseline Conditions 17
5.2.2. Alternative 1 17
5.2.3. Alternative 2 17
5.2.4. Alternative 3 17
5.2.5. Off-Site Intersection Level of Service Summary 18
5.3 Access Analysis 18
6. COLLISION ANALYSIS 20
7. CONCLUSION 21

LIST OF FIGURES

Figure 1: Site Vicinity Map 2
Figure 2: Alternative 1 Trip Distribution 8
Figure 3: Alternative 2 Trip Distribution 9
Figure 4: Alternative 3 Trip Distribution 10
Figure 5: 2013 Existing Turning Movements 12
Figure 6: 2023 Baseline Turning Movements 13
Figure 7: 2023 Future Turning Movements with Alternative 1 14
Figure 8: 2023 Future Turning Movements with Alternative 2 15
Figure 9: 2023 Future Turning Movements with Alternative 3 16

LIST OF TABLES

Table 1: Level of Service Criteria for Intersections 4
Table 2: Alternative 1 Trip Generation Summary 5
Table 3: Alternative 2 Trip Generation Summary 6
Table 4: Alternative 3 Trip Generation Summary 6
Table 5: Trip Generation Comparison 7
Table 6: Level of Service Summary 18
Table 7: Access Level of Service Analysis 19
Table 8: Collision Type Summary 20
Table 9: Collision Rate 20

ATTACHMENTS

Trip Generation Calculations ..... A
Turning Movement Calculations ..... B
PM Peak-Hour Level of Service Calculations C
Channelization Analysis ..... D

1. DEVELOPMENT IDENTIFICATION

Gibson Traffic Consultants, Inc. (GTC) has been retained to provide a traffic impact analysis for the Monroe EIS. The Monroe EIS has been analyzed to determine the trip generation and resulting impacts with a change in zoning. The site is located on the north side of US-2, east of Old Owen Road and west of Calhoun Road. A site vicinity map is included in Figure 1.

Brad Lincoln, responsible for this report and traffic analysis, is a licensed professional engineer (Civil) in the State of Washington and member of the Washington State section of ITE.

2. METHODOLOGY

The analysis for the Monroe EIS has been performed based on potential uses under the existing zoning and two zoning alternatives. Trip generation calculations for the Monroe EIS have been performed utilizing average trip generation rate data contained in the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, 9th Edition (2012)*. The distribution of trips generated by the site is based on surrounding uses.

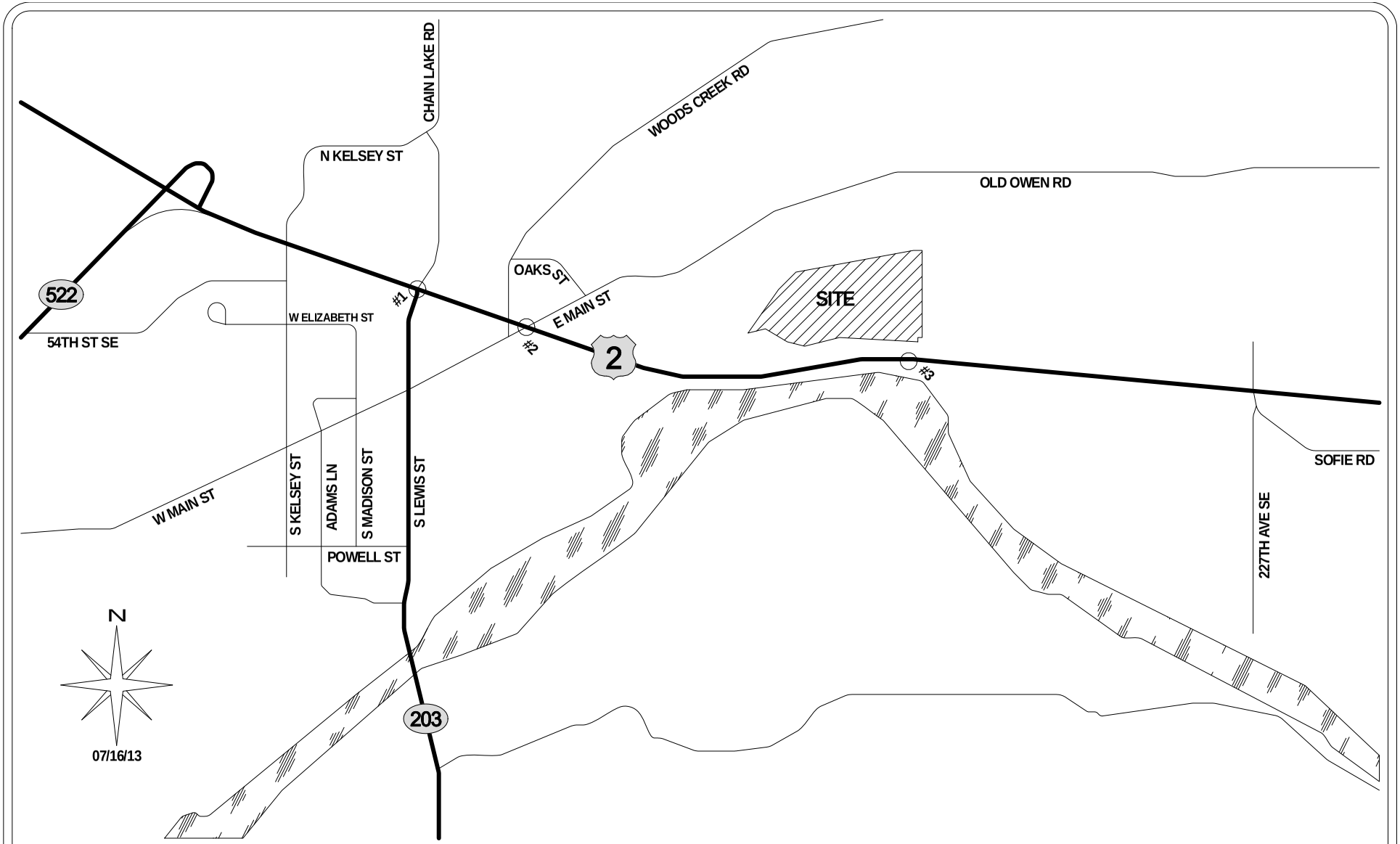
Intersection level of service analysis has been performed for the following intersections, based on scoping conversations with Brad Fielberg from the City of Monroe and previous comments from Washington State Department of Transportation (WSDOT) staff:

1. US-2 at Chain Lake Road – signalized
2. US-2 at Old Owen Road/E Main Street – signalized
3. US-2 at Site Access

Intersection level of service analysis has been performed for the PM peak-hours for the following conditions:

- 2013 Existing Conditions
- 2023 Baseline Conditions – includes local development
- 2023 Future Conditions with Alternative 1 (no action, existing zoning)
- 2023 Future Conditions with Alternative 2
- 2023 Future Conditions with Alternative 3

The PM peak-hour is based on the hour with the greatest volume between 4:00 PM and 6:00 PM.



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #13-048

MONROE EIS

CITY OF MONROE

LEGEND

DEVELOPMENT SITE

STUDY INTERSECTION

FIGURE 1
SITE VICINITY MAP

2.1 Zoning Alternatives

The existing zoning for the Monroe EIS site is currently zoned Limited Open Space, Alternative 1. There are several different acceptable uses that range from single-family housing to certain commercial uses. Several different uses were evaluated and it was determined that the following uses under Alternative 1 would represent the highest use of the site, from a trip generation standpoint:

- Health/Fitness Club – 55,000 square-feet (SF)
- Church – 55,000 SF
- Day Care – 15,000 SF

The potential rezone of the site has been analyzed for a rezone to General Commercial or Multi-Use. The General Commercial rezone, Alternative 2, is anticipated to include:

- Free-Standing Discount Store – 100,000 SF
- Specialty Retail – 40,000 SF

The Multi-Use rezone, Alternative 3, is anticipated to include:

- Condominium/Townhouse – 90 units
- General Office – 41,000 SF
- Medical Office – 41,000 SF
- Specialty Retail – 41,000 SF

It is important to note that these uses and sizes are currently estimates, but are anticipated to best represent what the final uses on the site could be.

2.2 Intersection Analysis

Congestion at intersections is generally measured in terms of level of service (LoS). In accordance with *Highway Capacity Manual: 2010 Edition (HCM)* by the Transportation Research Board, road facilities and intersections are rated between LoS A and LoS F, with LoS A being free flow and LoS F being forced flow or over-capacity conditions. The level of service at signalized, roundabout and all-way stop-controlled intersections is based on the average delay of all approaches. The level of service for two-way stop-controlled intersections is based on average delays for the stopped approach with the highest delay. Geometric characteristics and conflicting traffic movements are taken into consideration when determining level of service values. A summary of the intersection level of service criteria is included in Table 1.

Table 1: Level of Service Criteria for Intersections

Level of Service [1]	Expected Delay	Intersection Control Delay (Seconds per Vehicle)	
		Unsignalized Intersections	Signalized Intersections
A	Little/No Delay	≤10	≤10
B	Short Delays	>10 and ≤15	>10 and ≤20
C	Average Delays	>15 and ≤25	>20 and ≤35
D	Long Delays	>25 and ≤35	>35 and ≤55
E	Very Long Delays	>35 and ≤50	>55 and ≤80
F	Extreme Delays[2]	>50	>80

The City of Monroe has a level of service threshold of LoS C for collector road intersections and LoS D for arterial road intersections. The City of Monroe also has an interlocal agreement with WSDOT for intersections along US-2. The interlocal agreement states that the level of service needs to remain at LoS D for intersections operating at LoS D before development and LoS E for intersections that operate at LoS E before development. Intersections operating at LoS F before development will require mitigation.

[1] **Source:** *Highway Capacity Manual* 2010.

LoS A: Free-flow traffic conditions, with minimal delay to stopped vehicles (no vehicle is delayed longer than one cycle at signalized intersection).
LoS B: Generally stable traffic flow conditions.
LoS C: Occasional back-ups may develop, but delay to vehicles is short term and still tolerable.
LoS D: During short periods of the peak hour, delays to approaching vehicles may be substantial but are tolerable during times of less demand (i.e. vehicles delayed one cycle or less at signal).
LoS E: Intersections operate at or near capacity, with long queues developing on all approaches and long delays.
LoS F: Jammed conditions on all approaches with excessively long delays and vehicles unable to move at times.

[2] When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection.

3. TRIP GENERATION

The trip generation calculations for the Monroe EIS are based on the average trip generation rates published in the ITE *Trip Generation Manual, 9th Edition (2012).* Additionally, internal crossover and pass-by reductions from the ITE *Trip Generation Manual, User's Guide and Handbook* and industry standard assumptions. ITE does not publish a pass-by rate for the specialty retail use and therefore the industry standard reduction of 25% has been applied.

3.1 Alternative 1

Alternative 1 is the existing zoning of Limited Open Space and provides for several different land uses. The lowest trip generating use is 5 single-family residential units and the highest anticipated trip generator is a combination of health/fitness club, church and day care. The estimated sizes of the health/fitness club, church and day care are based on typical building sizes for these uses and the required parking, as compared to the available buildable space within the studyarea. The following ITE Land Use Codes have been utilized for Alternative 1 trip generation calculations:

- ITE Land Use Code 492 – Health/Fitness Center
- ITE Land Use Code 560 - Church
- ITE Land Use Code 565 – Day Care

The highest anticipated trip generation for Alternative 1 is summarized in Table 2.

Table 2: Alternative 1 Trip Generation Summary

Use	Size	Average Daily Trips	PM Peak-Hour		
			Inbound	Outbound	Total
Health/Fitness Club	55,000 SF	1,811	111	83	194
Church	55,000 SF	501	13	15	28
Day Care	15,000 SF	1,111	87	98	185
Internal Crossover Reduction	---	-856	-49	-45	-94
Pass-By Reduction	---	-965	-71	-73	-144
TOTAL	**---**	**1,602**	**91**	**78**	**169**

The trip generation calculations are included in the attachments.

3.2 Alternative 2

A General Commercial zoning has been utilized for Alternative 2. This alternative is anticipated to include 140,000 SF of retail space, with 100,000 SF being a big box discount store and 40,000 SF being mixed commercial and restaurant uses. The following ITE Land Use Codes have been utilized for the Alternative 2 analysis:

- ITE Land Use Code 815 – Free-Standing Discount Store
- ITE Land Use Code 826 – Specialty Retail

A summary of the Alternative 2 trip generation is included in Table 3.

Table 3: Alternative 2 Trip Generation Summary

Use	Size	Average Daily Trips	PM Peak-Hour		
			Inbound	Outbound	Total
Discount Store	100,000 SF	5,724	249	249	498
Specialty Retail	40,000 SF	1,773	48	60	108
Internal Crossover Reduction	---	-1,049	-21	-22	-43
Pass-By Reduction	---	-1,218	-51	-53	-104
TOTAL	**---**	**5,230**	**225**	**234**	**459**

It is important to note that the trip generation for Alternative 2 was also evaluated using ITE Land Use Code 220, Shopping Center. This land use code includes several different retail uses. However, the trip generation was found to be less than utilizing the individual uses and therefore it was not used for the Alternative 2 scenario. The shopping center land use code also resulted in a trip generation that was greater than Alternative 3, which is discussed later in the report, and therefore did not warrant further analysis since it did not result in the highest or lowest trip generation. The trip generation calculations are included in the attachments.

3.3 Alternative 3

Mixed Use zoning has been utilized for Alternative 3. This alternative includes residential, office and retail uses. The following ITE Land Use Codes and sizes have been used for the trip generation calculations:

- ITE Land Use Code 220 – Residential Condominium/Townhouse, 90 units
- ITE Land Use Code 710 – General Office, 41,000 SF
- ITE Land Use Code 720 – Medical/Dental office, 41,000 SF
- ITE Land Use Code 826 – Specialty Retail, 41,000 SF

A summary of the Alternative 3 trip generation is included in Table 4.

Table 4: Alternative 3 Trip Generation Summary

Use	Size	Average Daily Trips	PM Peak-Hour		
			Inbound	Outbound	Total
Condominium	90 units	599	36	20	56
General Office	41,000 SF	452	10	51	61
Medical Office	41,000 SF	1,481	41	105	146
Specialty Retail	41,000 SF	1,817	49	62	111
Internal Crossover Reduction	---	-522	-10	-20	-30
Pass-By Reduction	---	-400	-11	-15	-26
TOTAL	**---**	**3,427**	**115**	**203**	**318**

The trip generation calculations are included in the attachments.

3.4 Trip Generation Summary

The Alternative 2 and Alternative 3 scenarios result in higher trip generation than the existing zoning. The comparison of the trip generation for Alternative 2 and Alternative 3 is summarized in Table 5.

Table 5: Trip Generation Comparison

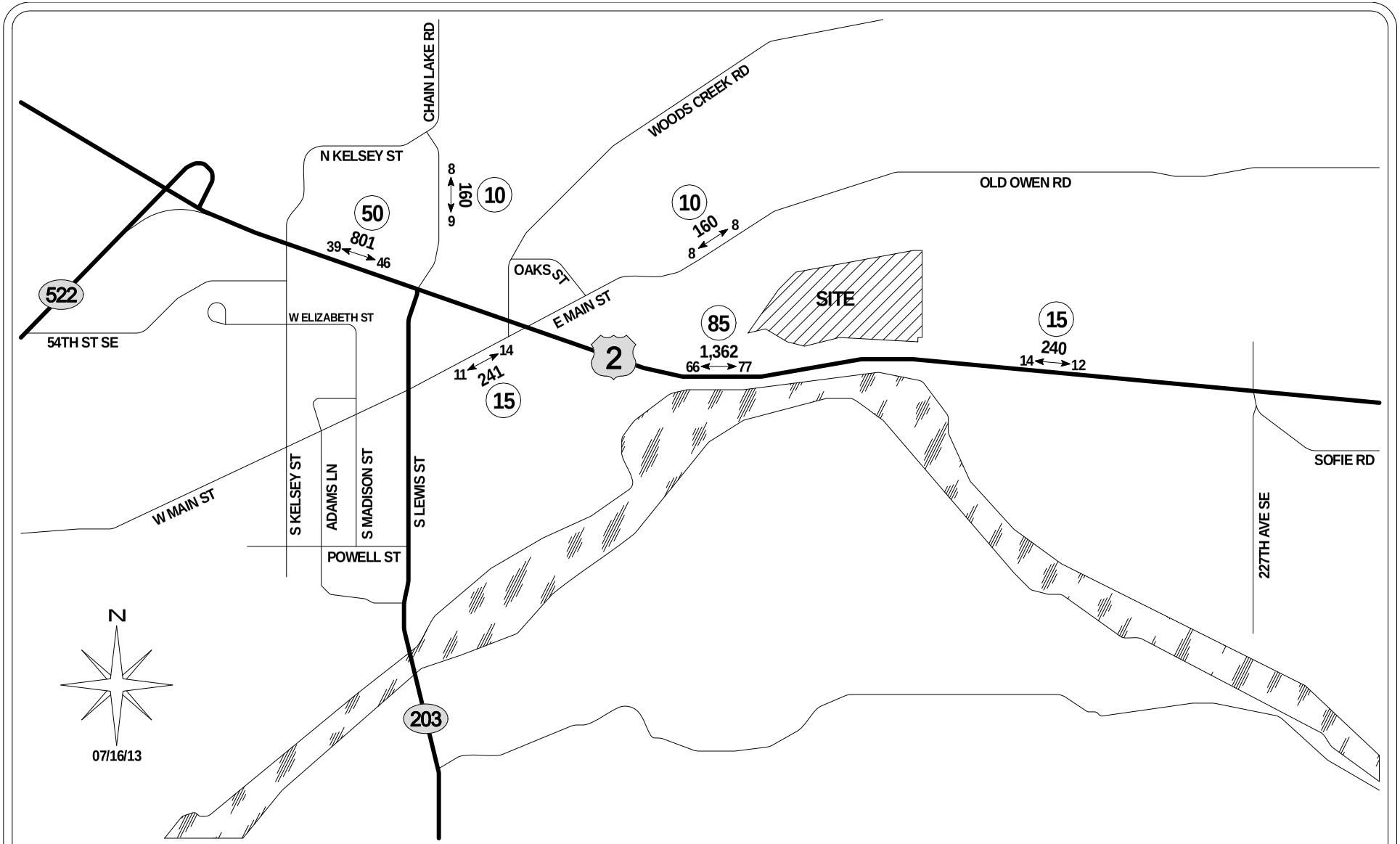
Scenario		New Average Daily Trips	PM Peak-Hour		
			Inbound	Outbound	Total
Alternative 1		1,602	91	78	169
Zoning Alternative 2	Total Trip Generation	5,230	225	234	459
	Increase from Existing Zoning	+3,628	+134	+156	+290
Zoning Alternative 3	Total Trip Generation	3,427	118	203	318
	Increase from Existing Zoning	+1,825	+27	+125	+149

The Zoning Alternatives 2 and 3 represent an increase in trip generation of between 88% and 226% above Alternative 1 trip generation.

4. TRIP DISTRIBUTION

The distribution of trips generated by the Monroe EIS site is based on surrounding uses and previously approved traffic studies conducted in the site vicinity. It has been assumed that the development area will only have one access to US-2 and there will be internal connectivity between the uses.

It is anticipated that 85% of the trips generated by the site will travel to and from the west along US-2, with twenty percent traveling to and from the north and fifteen percent traveling to and from the south. The remaining 15% of the development's trips are anticipated to travel to and from the east. Detailed trip distributions for the existing zoning, Alternative 2 and Alternative 3 are shown in Figure 2, Figure 3 and Figure 4, respectively.



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #13-048

MONROE EIS

CITY OF MONROE

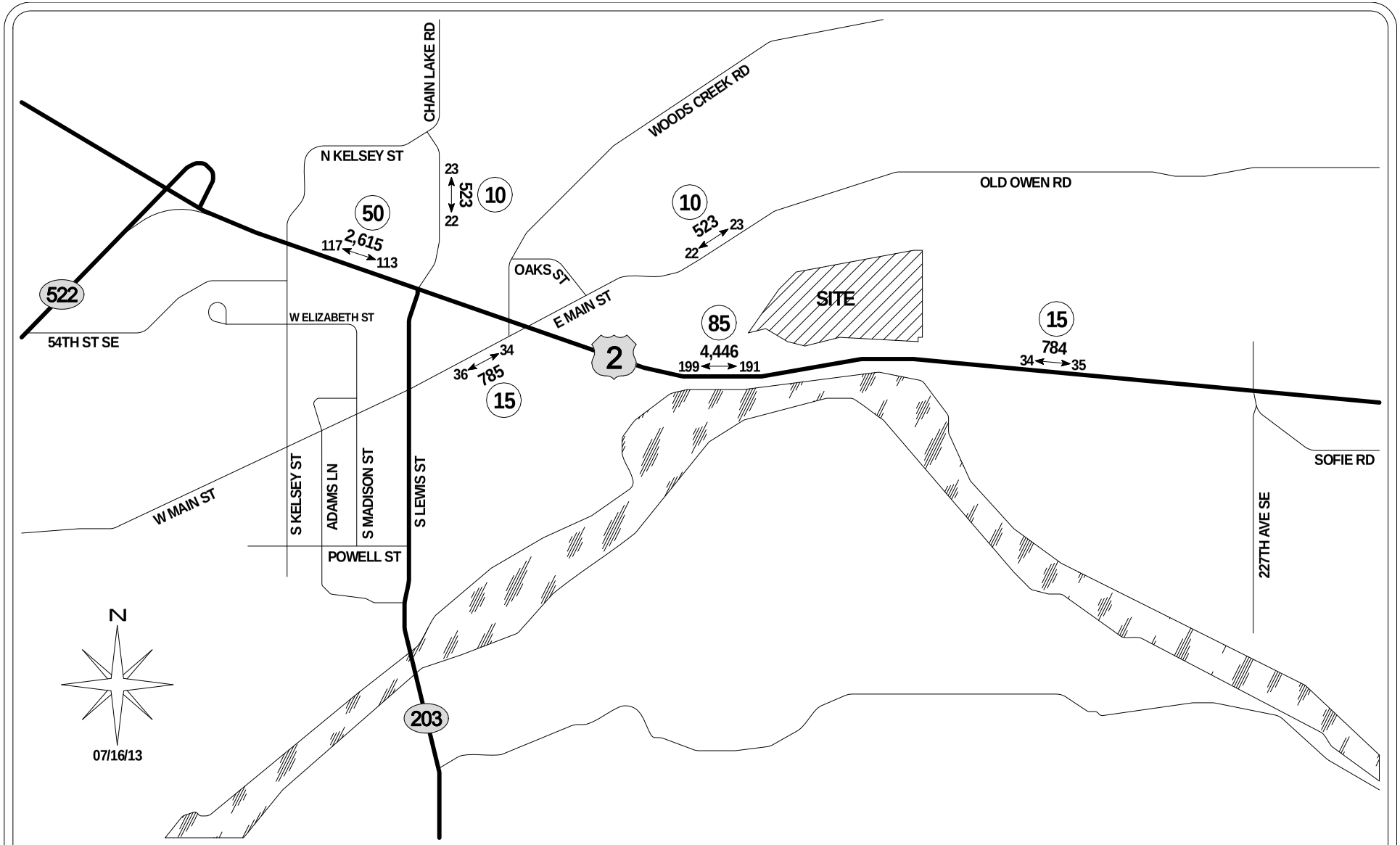
LEGEND

AWDT
AM ↔ PEAK — NEW DAILY TRIPS / NEW AM PEAK-HOUR TRIPS

XX — TRIP DISTRIBUTION %

FIGURE 2

ALTERNATIVE 1
TRIP DISTRIBUTION



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #13-048

MONROE EIS

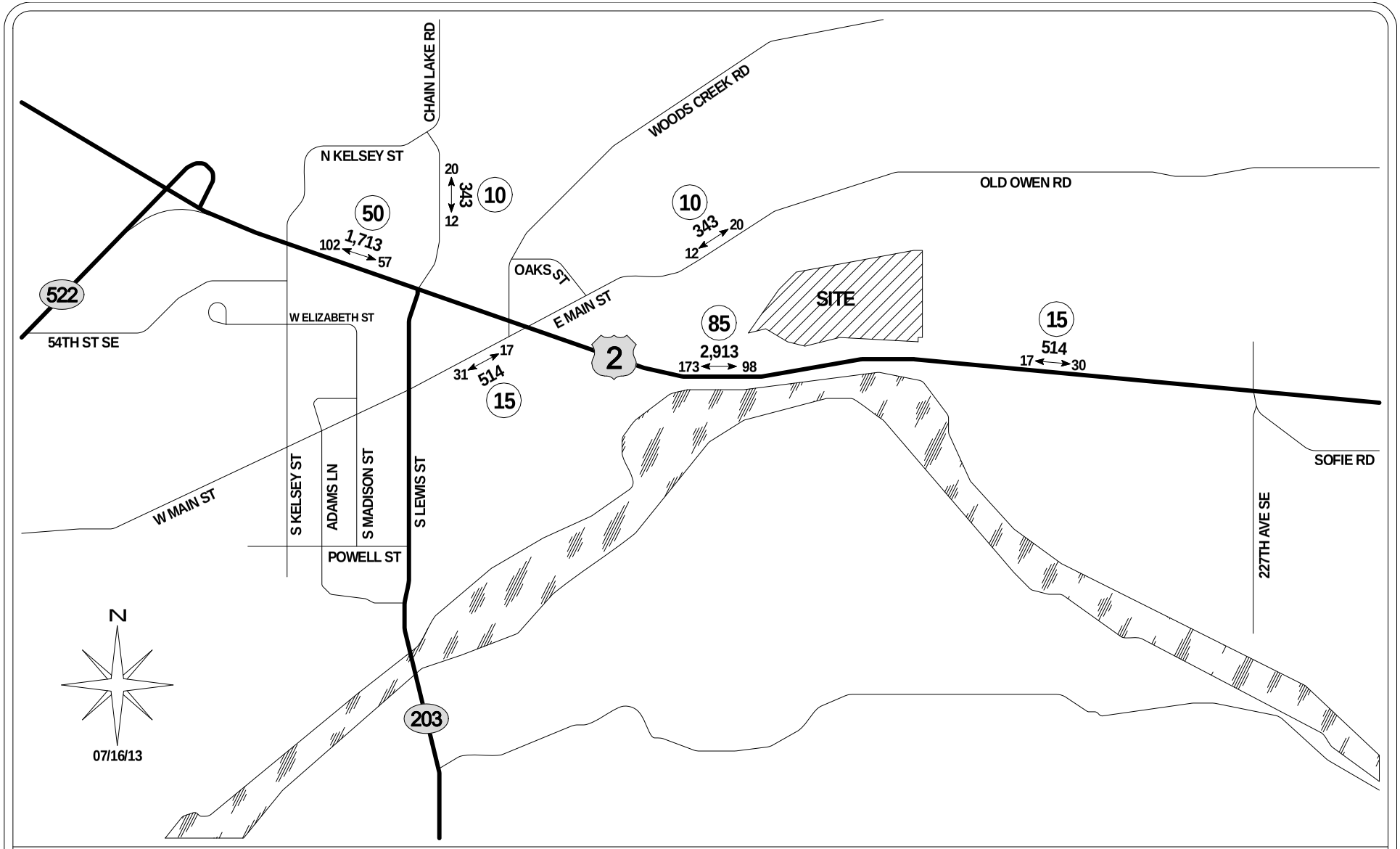
CITY OF MONROE

LEGEND

AWDT
PM ⟷ PEAK — NEW DAILY TRIPS / NEW PM PEAK-HOUR TRIPS

XX — TRIP DISTRIBUTION %

FIGURE 3
ALTERNATIVE 2
TRIP DISTRIBUTION



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #13-048

MONROE EIS

CITY OF MONROE

LEGEND

AWDT
PM ⟷ PEAK — NEW DAILY TRIPS; NEW PM PEAK-HOUR TRIPS

XX — TRIP DISTRIBUTION %

FIGURE 4
ALTERNATIVE 3
TRIP DISTRIBUTION

5. INTERSECTION LEVEL OF SERVICE ANALYSIS

The intersections that have been analyzed as part of this Monroe EIS analysis are based on scoping conversations with Brad Fielberg from the City of Monroe and previous WSDOT comments. Level of service analysis has been performed for the following intersections:

1. US-2 at Chain Lake Road – signalized
2. US-2 at Old Owen Road/E Main Street – signalized
3. US-2 at Site Access

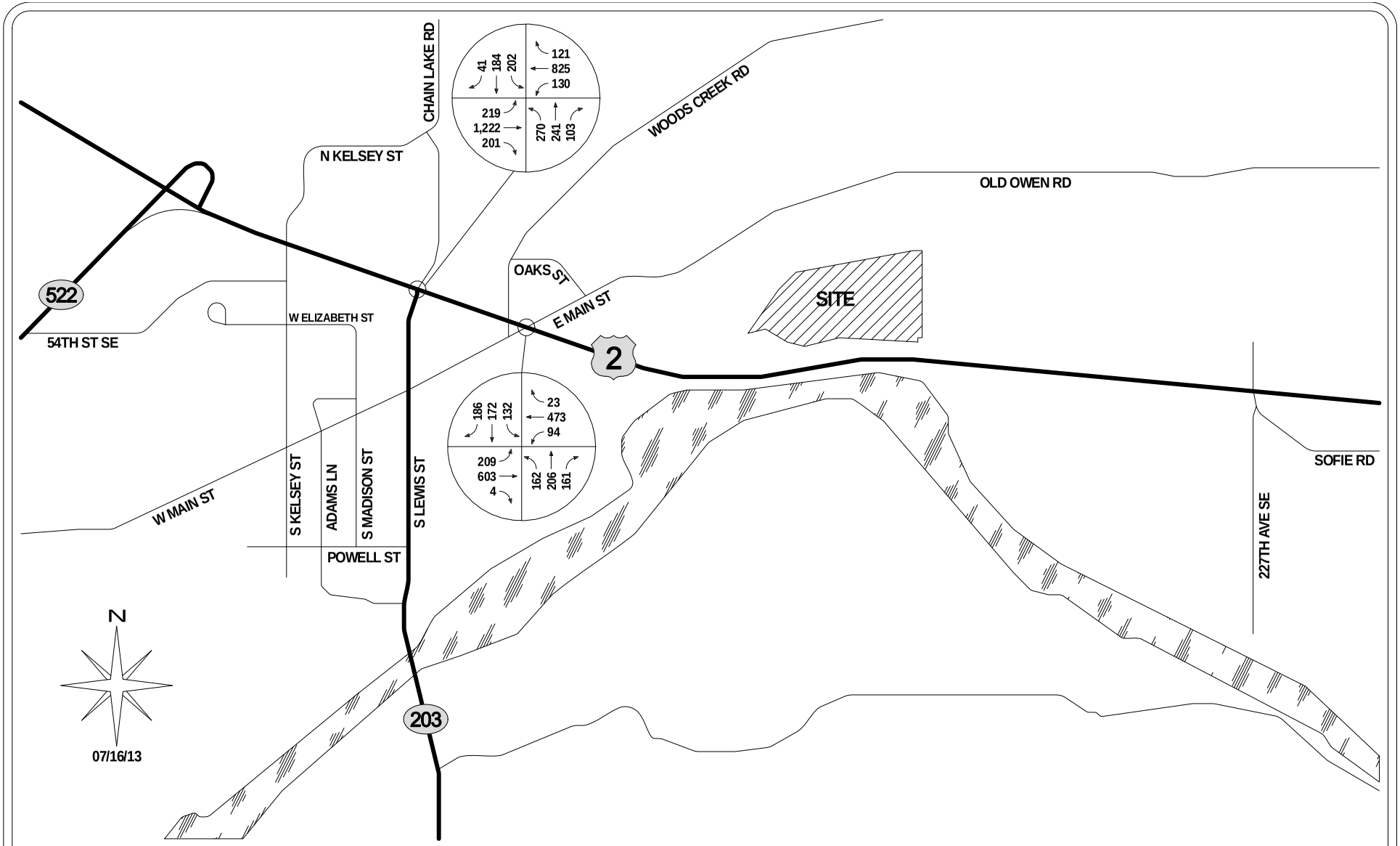
5.1 Turning Movement Volumes

The 2013 existing turning movements at the study intersections were counted by the independent count firm of Traffic Data Gathering (TDG). The counts were performed between 4:00 PM and 6:00 PM. The turning movement counts were collected in October of 2012 and June of 2013. The 2013 existing turning movements for the PM peak-hour at the study intersections are shown in Figure 5.

The future volumes have been calculated for the year 2023, which allows for a 10-year build-out of the site. The 2023 baseline turning movements have been calculated by applying a 2% annually compounding growth rate to the existing turning movements. Additionally, pipeline trips from the North Kelsey Retail development have been added. The 2023 baseline turning movements for the PM peak-hour at the study intersections are shown in Figure 6.

The 2023 future volumes with Alternative 1, Alternative 2 and Alternative 3 have been calculated by adding the trips generated by each alternative to the 2023 baseline turning movements. The 2023 future turning movements with Alternative 1 are shown in Figure 7. The 2023 future turning movements with Alternative 2 are shown in Figure 8 and the 2023 future turning movements with Alternative 3 are shown in Figure 9.

The existing turning movement counts and turning movement calculations are included in the attachments.



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #13-048

MONROE EIS

CITY OF MONROE

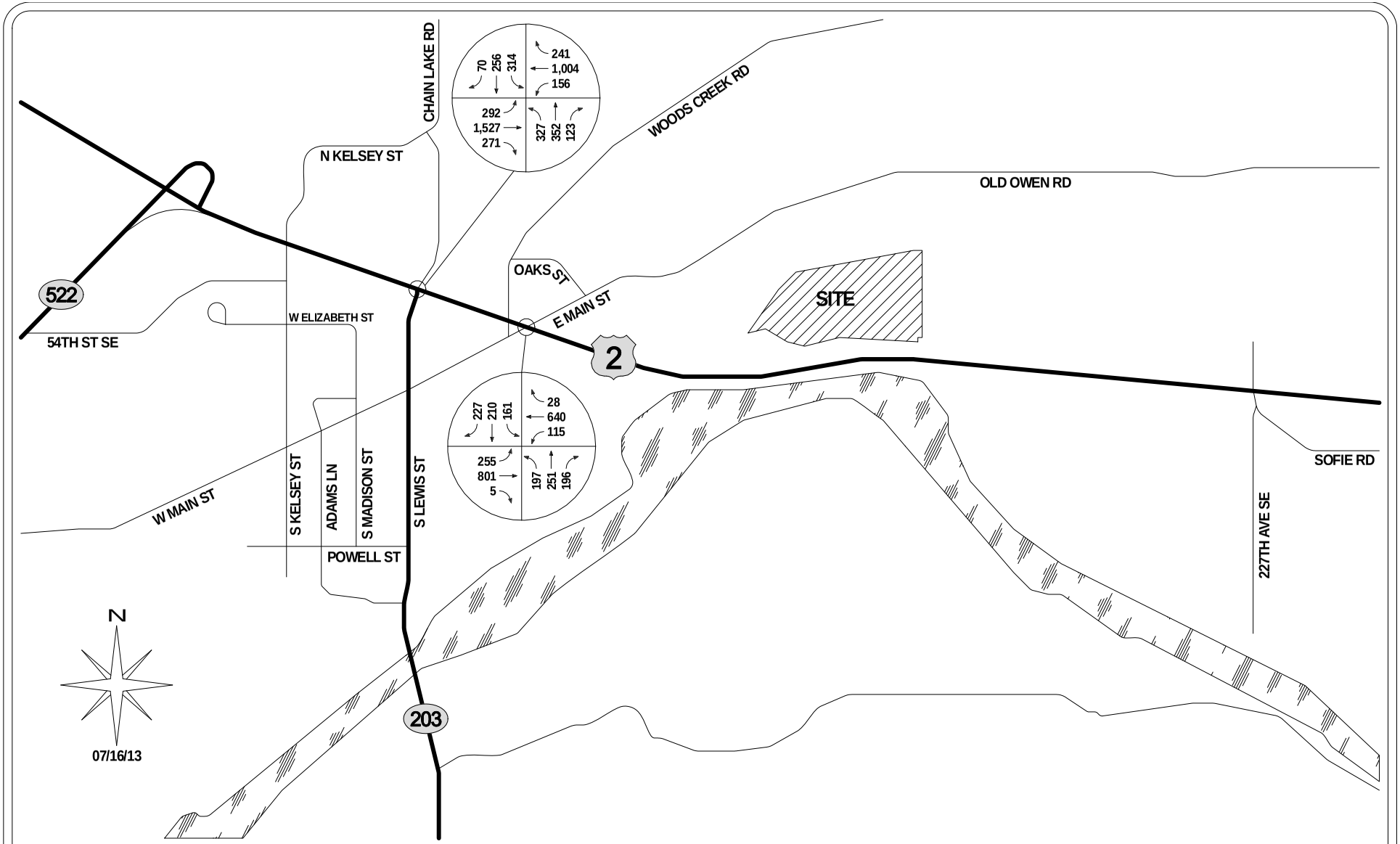
LEGEND

STUDY INTERSECTION

XXX → TURNING MOVEMENT VOLUMES

FIGURE 5

2013 EXISTING
TURNING MOVEMENTS



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #13-048

MONROE EIS

CITY OF MONROE

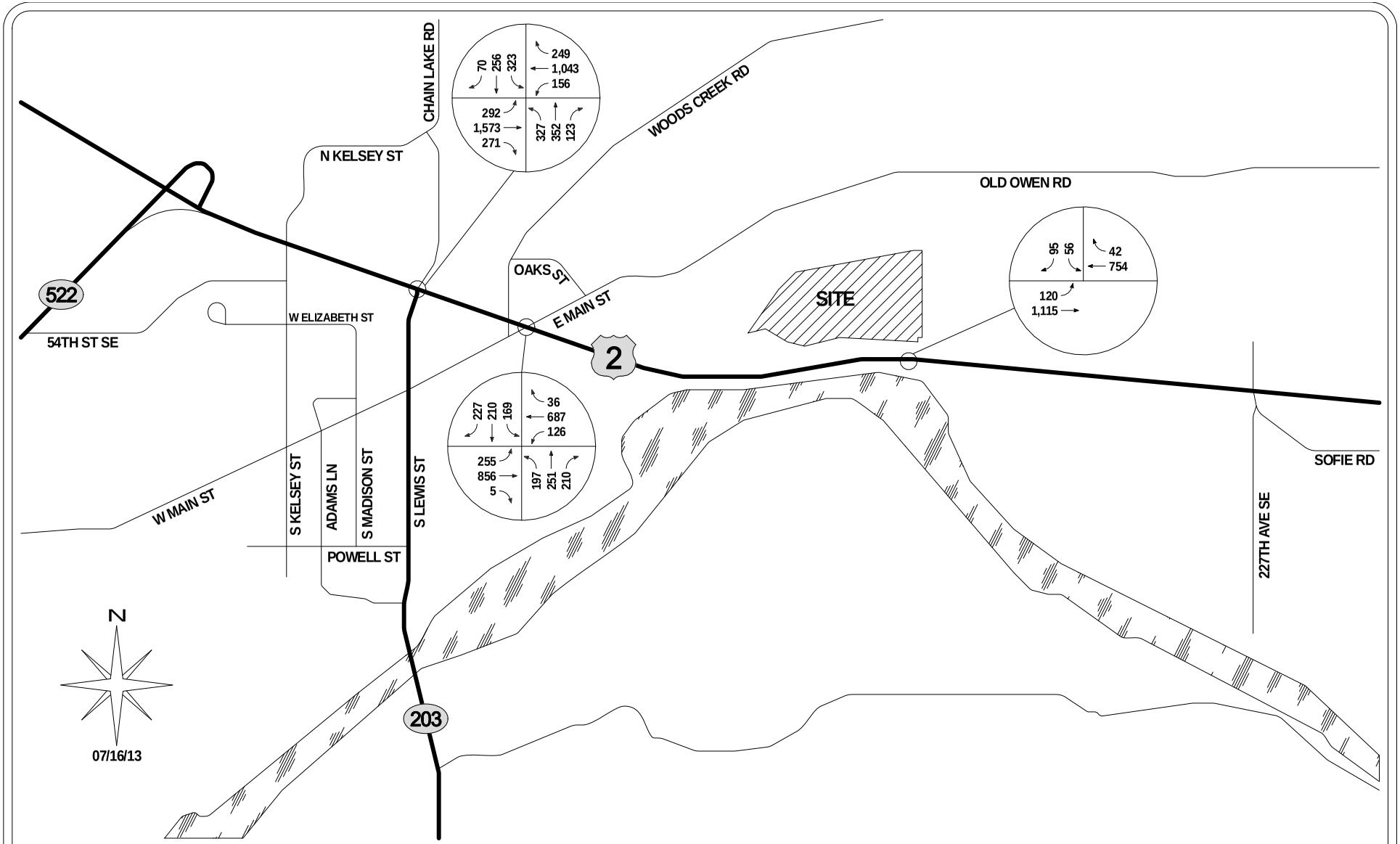
LEGEND

STUDY INTERSECTION

XXX → TURNING MOVEMENT VOLUMES

FIGURE 6

2023 BASELINE
TURNING MOVEMENTS



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #13-048

MONROE EIS

CITY OF MONROE

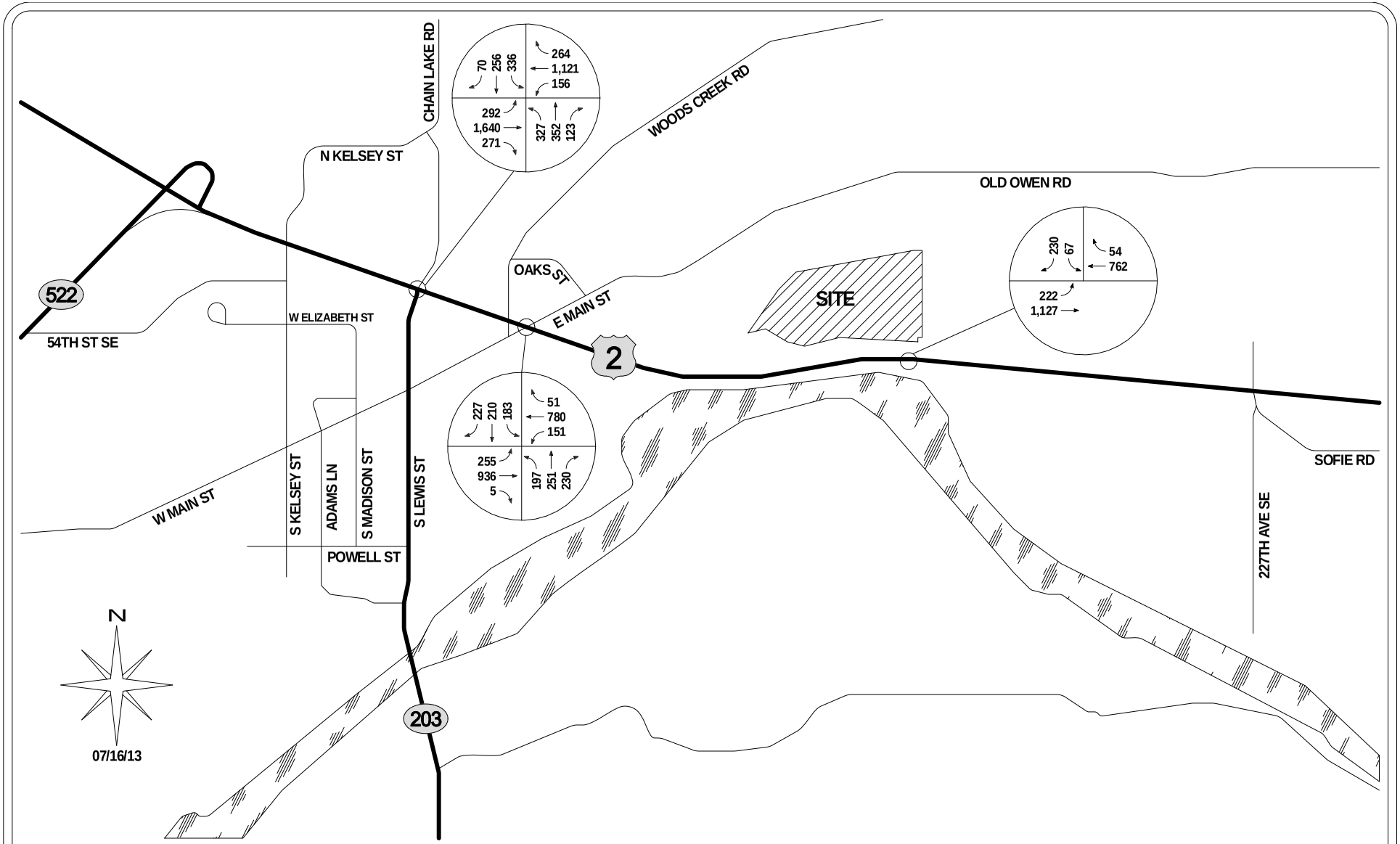
LEGEND

STUDY INTERSECTION

XXX → TURNING MOVEMENT VOLUMES

FIGURE 7

2032 FUTURE
TURNING MOVEMENTS
WITH ALTERNATIVE 1



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #13-048

MONROE EIS

CITY OF MONROE

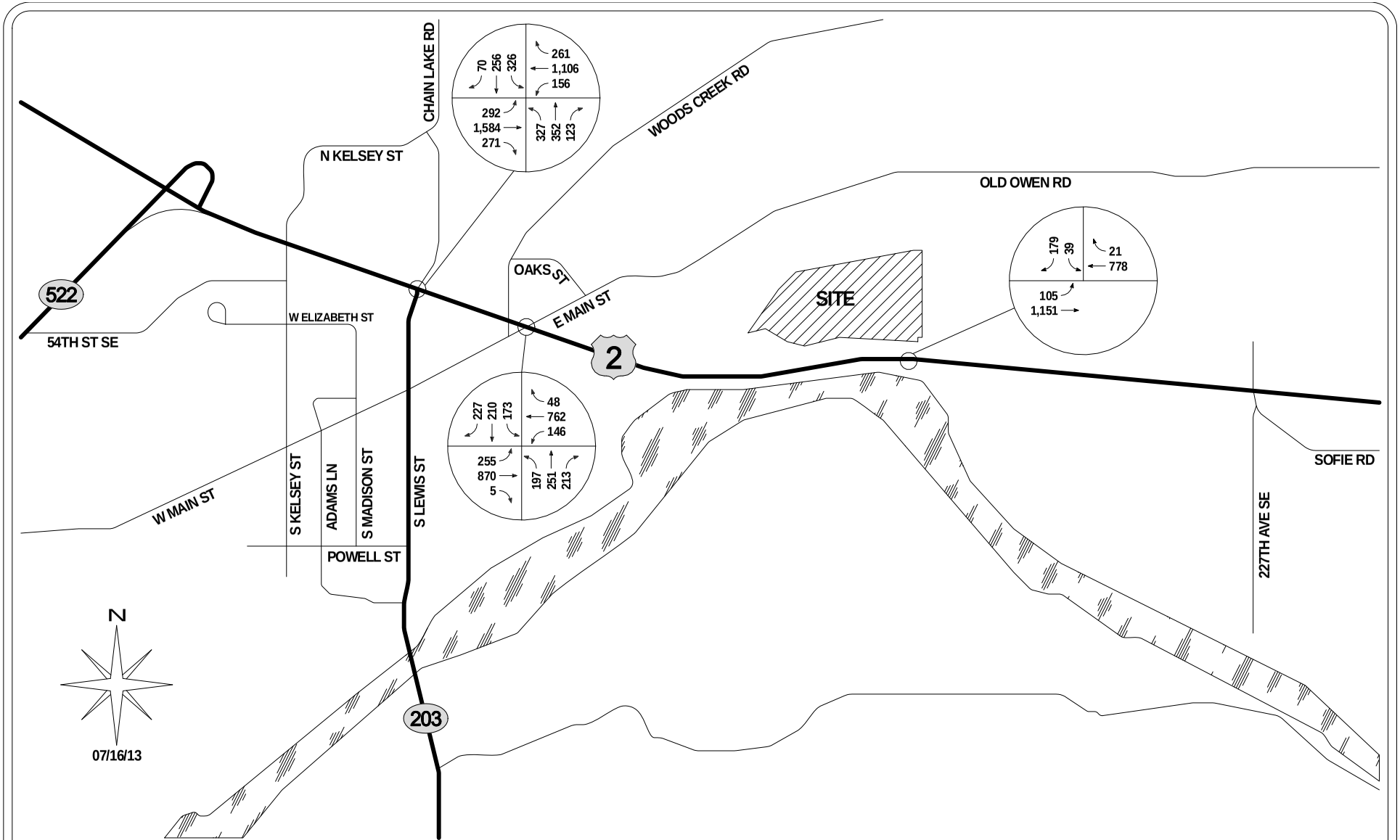
LEGEND

STUDY INTERSECTION

XXX → TURNING MOVEMENT VOLUMES

FIGURE 8

2032 FUTURE
TURNING MOVEMENTS
WITH ALTERNATIVE 2



GIBSON TRAFFIC CONSULTANTS

TRAFFIC IMPACT STUDY
GTC #13-048

MONROE EIS

CITY OF MONROE

LEGEND

STUDY INTERSECTION

XXX → TURNING MOVEMENT VOLUMES

FIGURE 9

2032 FUTURE
TURNING MOVEMENTS
WITH ALTERNATIVE 3

5.2 Off-Site Intersection Level of Service Results

The level of service analysis has been performed utilizing the existing control, channelization, peak-hour factors and heavy-vehicle factors. The future analysis does include signal optimization, based on WSDOT's typical review and adjustments to signal timings to account for changes in volumes. The intersection of US-2 at Old Owen Road/E Main Street is currently being improved by the City of Monroe to include a northbound right-turn lane. Although the WSDOT signal timing data for this intersection, the existing timing has been obtained and utilized as a basis for the analysis.

The acceptable levels of service for the signalized intersections of US-2 at Chain Lake Road and US-2 at Old Owen Road/E Main Street are based on the level of service before development of the site, regardless of the rezone or not. If the level of service is LoS D before development, LoS D must be maintained after development. If the level of service is LoS E before development, LoS E must be maintained after development.

5.2.1. 2013 Existing Conditions and 2023 Baseline Conditions

The level of service analysis shows that the study intersections currently operate at LoS D. However, the intersection of US-2 at Chain Lake Road is anticipated to degrade to LoS E under the 2023 baseline conditions. The intersection of US-2 at Old Owen Road/E Main Street is anticipated to remain at LoS D under the 2023 baseline conditions. The level of service results are summarized later in this section.

5.2.2. Alternative 1

The development of the site under the Alternative 1 is not anticipated to change the operation of the intersections along US-2. The intersection of US-2 at Chain Lake Road is anticipated to remain at LoS E and the intersection of US-2 at Old Owen Road/E Main Street is anticipated to remain at LoS D. The level of service results are summarized later in this section. The analysis of the site access intersection is discussed later in this report.

5.2.3. Alternative 2

The development of the site under the Alternative 2 is not anticipated to significantly affect the operations of the intersections along US-2. Alternative 2 increases the delay, but the intersection of US-2 at Chain Lake Road is anticipated to remain at LoS E and the intersection of US-2 at Old Owen Road/E Main Street is anticipated to remain at LoS D with Alternative 2. The level of service results are summarized later in this section. The analysis of the site access intersection is discussed later in this report.

5.2.4. Alternative 3

The development of the site under the Alternative 2 is not anticipated to significantly affect the operations of the intersections along US-2. Alternative 3 results in lower delays at the intersection than Alternative 3, but the intersection of US-2 at Chain Lake Road is anticipated to remain at LoS

E and the intersection of US-2 at Old Owen Road/E Main Street is anticipated to remain at LoS D with Alternative 2. The level of service results are summarized later in this section. The analysis of the site access intersection is discussed later in this report.

5.2.5. Off-Site Intersection Level of Service Summary

The level of service analysis shows that the intersection of US-2 at Chain Lake Road is anticipated to operate at LoS E and the intersection of US-2 at Old Owen Road/E Main Street is anticipated to operate at LoS D, regardless of the development scenario. The level of service results are summarized in Table 6.

Table 6: Level of Service Summary

Intersection	2013 Existing Conditions		2023 Baseline Conditions		2023 Future Conditions					
					Alternative 1		Alternative 2		Alternative 3	
	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay	LoS	Delay
1. US-2 at Chain Lake Road	D	46.1 sec	E	67.3 sec	E	76.7 sec	E	75.6 sec	E	70.5 sec
2. US-2 at Old Owen Road	D	43.4 sec	D	51.0 sec	D	50.2 sec	D	51.5 sec	D	50.6 sec

The level of service calculations are included in the attachments.

5.3 Access Analysis

The exact location of the access to the site analyzed for the Monroe EIS is not currently known since WSDOT purchased the access rights as part of the planning for the Monroe Bypass for US-2. The site is likely to have access through an easement with the parcel to the east (Parcel F) in the southeast corner of the site. Alternatively, the Break-In-Access process with WSDOT could be utilized to have direct access to US-2. Even though the exact location of the access is not currently known, the analysis of the access should be consistent with the site's final access scenario since there are not accesses in the vicinity that would significantly change the future volumes on US-2.

The access to the site has been analyzed to determine what the operations will be and what level of improvement will be necessary. The volumes along US-2 show that there is currently nearly 1,500 PM peak-hour trips and there are anticipated to be over 1,800 PM peak-hour trips under the 2023 baseline conditions. These volumes will warrant left-turn channelization based on WSDOT *Design Manual, Left-Turn Storage Guidelines: Four-Lane, Unsignalized (Exhibit 1310-15b)*. The left-turn storage requirements for the alternatives are:

- Alternative 1 – 150 feet
- Alternative 2 – 300 feet
- Alternative 3 – 150 feet

The need for right-turn channelization was analyzed using WSDOT *Deisgn Manual, Right-Turn Lane Guidelines (Exhibit 1310-19)*. The analysis shows that Alternative 1 and Alternative 2 could require a right-turn taper or pocket; while Alternative 3 would not require any channelization. The access analysis has been performed without right-turn channelization since right-turn channelization would improve the operations of the intersection. However, WSDOT may ask for right-turn channelization at the time of development. WSDOT has also requested that any improvements to US-2 account for a future 4-lane section along US-2, two lanes in each direction.

The level of service analysis shows that the site access will operate at LoS F, even with an inbound left-turn lane and two lanes in each direction along US-2. The access has therefore been analyzed with separate outbound left and right-turn lanes and an acceleration lane for outbound left-turn lane. The inbound left-turn lane and lack of adjacent accesses would likely allow for an outbound left-turn acceleration lane to be constructed. The level of service without and with these improvements is summarized in Table 7.

Table 7: Access Level of Service Analysis

Intersection	2023 Future Conditions					
	Alternative 1		Alternative 2		Alternative 3	
	LoS	Delay	LoS	Delay	LoS	Delay
1. US-2 at[3] Access	F	153.8 sec	F	680.3 sec	F	87.9 sec
with acceleration lane	C	17.1 sec	C	22.1 sec	C	16.0 sec

The level of service for Alternative 3 shows lower delay since the inbound and outbound splits are different than Alternative 1 or Alternative 2 due to the presence of office space. The access level of service calculations are included in the attachments.

The improvement of separate outbound lanes and an outbound left-turn acceleration lane should be an acceptable improvement for WSDOT for level of service impacts per the interlocal agreement since there will not be any control along US-2. However, WSDOT may require a roundabout at the access to reduce the potential for collisions between inbound left-turning vehicles and westbound through vehicles due to the 55 mph posted speed limit along US-2.

[3] The analysis includes two lanes in each direction on US-2 and an inbound left-turn lane.

6. COLLISION ANALYSIS

Collision data was obtained from WSDOT for the section of US-2 from Old Owen Road/E Main Street, MP 15.22, to Calhoun Road, MP 16.98, to determine the collision history along US-2 in the vicinity of the site. Collision data for the period from January 1, 2008 through May 31, 2013, a period of 5.41 years.

The collision data shows that therefore have been a total of 90 collisions along the corridor in the time period. However, half of the collisions are related to the intersection of US-2 at Old Owen Road/E Main Street. The collision types that are not related to the US-2 at Old Owen road/E Main Street intersection are summarized in Table 8.

Table 8: Collision Type Summary

Rear-End	Sideswipe	At-Angle	Animal	Driveway/ Access	Object	Opposite Direction	Same Direction	Ped./ Bicycle	Other
8	9	1	5	1	8	7	2	1	3

The collision rate along this corridor has been calculated utilizing annual average daily traffic volumes documented in the WSDOT *2012 Annual Traffic Report*. The collision rate for the corridor is summarized in Table 9.

Table 9: Collision Rate

Collisions	Length per mile	Daily Volume	Years	Collisions per year	Collision Rate per million vehicle mile
45	1.76	19,000	5.41	8.3	0.68

The collision data shows that the collision rate along the section of US-2 in the vicinity of the site, with intersection related collisions removed, is less than 1.0 collision per million vehicle miles. This is below the typically acceptable rate and below the average rate for roadways similar to US-2.

7. CONCLUSION

The Monroe EIS area has been analyzed for three scenarios, the existing zoning, Alternative 2 and Alternative 3. The Alternative 1 represents the anticipated trip generation for the site and Alternative 2 represents the highest anticipated trip generation from the site with a rezone. Alternative 1 is anticipated to generate approximately 1,602 new average daily trips with 169 new PM peak-hour trips. Alternative 2 would increase this trip generation to 5,230 average daily trips with 459 PM peak-hour trips, an increase of 3,628 average daily trips and 290 PM peak-hour trips over the existing zoning. Alternative 3 would increase this trip generation to 3,427 average daily trips with 318 PM peak-hour trips, an increase of 1,825 average daily trips and 149 PM peak-hour trips over the existing zoning.

The analysis shows that the impacts of trips from Alternative 1, Alternative 2 or Alternative 3 are not significantly different. The conclusions are:

- The off-site intersections will operate at acceptable levels of service
- The access will required inbound left-turn channelization, at the minimum
- Separate outbound lanes and an outbound left-turn acceleration lane will be required
- The access will operate at LoS C with these improvements, regardless of the alternative
- Due to WSDOT limited access control, the access will be required to be in the same acceptable location to WSDOT, regardless of the alternative

Based on these results the change in zoning is not anticipated to result in a significant impact to the access or the surrounding off-site intersections.

Trip Generation Calculations

Trip Generation for: Weekday
(a.k.a.): Average Weekday Daily Trips (AWDT)

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
Alternative 1	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Health/Fitness Club	55.000 ksf	492	32.93	50%	50%	1811	25%	453	1358	25%	340	0%	0	1018	170	170	0	0	509	509
Church	55.000 ksf	560	9.11	50%	50%	501	25%	125	376	0%	0	0%	0	376	0	0	0	0	188	188
Day Care	15.000 ksf	565	74.06	50%	50%	1111	25%	278	833	75%	625	0%	0	208	313	312	0	0	104	104
Totals						3423		856	2567		965		0	1602	483	482	0	0	801	801

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
Alternative 2	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Free-Standing Discount	100.000 ksf	815	57.24	50%	50%	5724	14%	801	4923	17%	837	0%	0	4086	419	418	0	0	2043	2043
Specialty Retail	40.000 ksf	826	44.32	50%	50%	1773	14%	248	1525	25%	381	0%	0	1144	191	190	0	0	572	572
Totals						7497		1049	6448		1218		0	5230	610	608	0	0	2615	2615

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
Alternative 2A	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Shopping Center	140.000 ksf	820	42.70	50%	50%	5978	0%	0	5978	34%	2033	0%	0	3945	1017	1016	0	0	1973	1972
Totals						5978		0	5978		2033		0	3945	1017	1016	0	0	1973	1972

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
Alternative 3	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out
Condominium/Townhome	90 units	220	6.65	50%	50%	599	12%	72	527	0%	0	0%	0	527	0	0	0	0	264	263
General Office	41.000 ksf	710	11.03	50%	50%	452	12%	54	398	0%	0	0%	0	398	0	0	0	0	199	199
Medical Office	41.000 ksf	720	36.13	50%	50%	1481	12%	178	1303	0%	0	0%	0	1303	0	0	0	0	652	651
Specialty Retail	41.000 ksf	826	44.32	50%	50%	1817	12%	218	1599	25%	400	0%	0	1199	200	200	0	0	600	599
Totals						4349		522	3827		400		0	3427	200	200	0	0	1715	1712

Trip Generation for: Weekday, Peak Hour of Adjacent Street Traffic, One Hour between 4 and 6 PM
(a.k.a.): Weekday PM Peak Hour

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
Alternative 1	**VARIABLE**	**ITE LU code**	**Trip Rate**	**% IN**	**% OUT**	**In+Out (Total)**	**% of Gross Trips**	**Trips In+Out (Total)**	**In+Out (Total)**	**% of Ext. Trips**	**In+Out (Total)**	**% of Ext. Trips**	**In+Out (Total)**	**In+Out (Total)**	**In**	**Out**	**In**	**Out**	**In**	**Out**
Health/Fitness Club	55.000 ksf	492	3.53	57%	43%	194	23%	45	149	25%	37	0%	0	112	21	16	0	0	64	48
Church	55.000 ksf	560	0.50	48%	52%	28	23%	6	22	0%	0	0%	0	22	0	0	0	0	11	11
Day Care	15.000 ksf	565	12.34	47%	53%	185	23%	43	142	75%	107	0%	0	35	50	57	0	0	16	19
Totals						407		94	313		144		0	169	71	73	0	0	91	78

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
Alternative 2	**VARIABLE**	**ITE LU code**	**Trip Rate**	**% IN**	**% OUT**	**In+Out (Total)**	**% of Gross Trips**	**Trips In+Out (Total)**	**In+Out (Total)**	**% of Ext. Trips**	**In+Out (Total)**	**% of Ext. Trips**	**In+Out (Total)**	**In+Out (Total)**	**In**	**Out**	**In**	**Out**	**In**	**Out**
Free-Standing Discount	100.000 ksf	815	4.98	50%	50%	498	7%	35	463	17%	79	0%	0	384	40	39	0	0	192	192
Specialty Retail	40.000 ksf	826	2.71	44%	56%	108	7%	8	100	25%	25	0%	0	75	11	14	0	0	33	42
Totals						606		43	563		104		0	459	51	53	0	0	225	234

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
Alternative 2A	**VARIABLE**	**ITE LU code**	**Trip Rate**	**% IN**	**% OUT**	**In+Out (Total)**	**% of Gross Trips**	**Trips In+Out (Total)**	**In+Out (Total)**	**% of Ext. Trips**	**In+Out (Total)**	**% of Ext. Trips**	**In+Out (Total)**	**In+Out (Total)**	**In**	**Out**	**In**	**Out**	**In**	**Out**
Shopping Center	140.000 ksf	820	3.71	48%	52%	519	0%	0	519	34%	176	0%	0	343	84	92	0	0	165	178
Totals						519		0	519		176		0	343	84	92	0	0	165	178

									NET EXTERNAL TRIPS BY TYPE											
									IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW	
Alternative 3	**VARIABLE**	**ITE LU code**	**Trip Rate**	**% IN**	**% OUT**	**In+Out (Total)**	**% of Gross Trips**	**Trips In+Out (Total)**	**In+Out (Total)**	**% of Ext. Trips**	**In+Out (Total)**	**% of Ext. Trips**	**In+Out (Total)**	**In+Out (Total)**	**In**	**Out**	**In**	**Out**	**In**	**Out**
Condominium/Townhome	90 units	220	0.62	65%	35%	56	8%	4	52	0%	0	0%	0	52	0	0	0	0	34	18
General Office	41.000 ksf	710	1.49	17%	83%	61	8%	5	56	0%	0	0%	0	56	0	0	0	0	10	46
Medical Office	41.000 ksf	720	3.57	28%	72%	146	8%	12	134	0%	0	0%	0	134	0	0	0	0	38	96
Specialty Retail	41.000 ksf	826	2.71	44%	56%	111	8%	9	102	25%	26	0%	0	76	11	15	0	0	33	43
Totals						374		30	344		26		0	318	11	15	0	0	115	203

MULTI-USE DEVELOPMENT
TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Analyst: BJL
Date: 6/20/2013
Project: Monroe EIS - Alt 1
Time Period: Daily

		Land Use A	Office	
		ITE LU Code	Church	
		Size	55,000	
Exit to Ext		Total	Internal	External
192.5	Enter	250.50	44	206.5
Ent from Ext	Exit	250.5	58	192.5
206.5	Total	501	102	399
	%	100%	20%	80%

			22%	55	15%	38	55	22%	38	15%
				Demand		Demand	Demand		Demand	
			36		27			22		17
			Balanced		Balanced			Balanced		Balanced
4%	36	3%	27						22	4%	17	3%
	Demand		Demand						Demand		Demand	

		Land Use B	Retail								Land Use C	Retail			
		ITE LU Code	Health/Fitness Club								ITE LU Code	Day Care			
		Size	55,000								Size	15,000			
Exit to Ext		Total	Internal	External		Demand	Balanced	Demand			Total	Internal	External	Ent from Ext
722.5	Enter	905.50	203	702.5	28%	254	167	167	30%	Enter	555.50	178	377.5	377.5
Ent from Ext	Exit	905.50	183	722.5	30%	272	156	156	28%	Exit	555.5	184	371.5	Exit to Ext
702.5	Total	1811	386	1425		Demand	Balanced	Demand		Total	1111	362	749	371.5
	%	100%	21%	79%						%	100%	33%	67%	

Net External Trips for Multi-Use Development					
	Land Use A	Land Use B	Land Use C	Total	
Enter	206.5	702.5	377.5	1286.5	
Exit	192.5	722.5	371.5	1286.5	
Total	399	1425	749	2573	Internal Capture
Single-Use Trip Gen. Est.	501	1811	1111	3423	25%

MULTI-USE DEVELOPMENT
TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Analyst: BJL
Date: 6/20/2013
Project: Monroe EIS - Alt 1

Time Period: PM Peak Hour of Adj St

		Land Use A	Office	
		ITE LU Code	Church	
		Size	55,000	
Exit to Ext		Total	Internal	External
10.56	Enter	13.44	6	7.44
Ent from Ext	Exit	14.56	4	10.56
7.44	Total	28	10	18
	%	100%	36%	64%

23%	3	31%	4	3	23%	4	31%	
	Demand		Demand	Demand		Demand		
2		3			2		3	
Balanced		Balanced			Balanced		Balanced	
2%	2	3%	3			2	2%	3	3%
	Demand		Demand			Demand		Demand	

		Land Use B	Retail								Land Use C	Retail			
		ITE LU Code	Health/Fitness Club								ITE LU Code	Day Care			
		Size	55,000								Size	15,000			
Exit to Ext		Total	Internal	External		Demand	Balanced	Demand			Total	Internal	External	Ent from Ext
63.42	Enter	110.58	22	88.58	20%	22	20	20	20%	Enter	86.95	19	67.95	67.95
Ent from Ext	Exit	83.42	20	63.42	20%	17	17	17	20%	Exit	98.05	23	75.05	Exit to Ext
88.58	Total	194	42	152		Demand	Balanced	Demand		Total	185	42	143	75.05
	%	100%	22%	78%						%	100%	23%	77%	

Net External Trips for Multi-Use Development					
	Land Use A	Land Use B	Land Use C	Total	
Enter	7.44	88.58	67.95	163.97	
Exit	10.56	63.42	75.05	149.03	
Total	18	152	143	313	Internal Capture
Single-Use Trip Gen. Est.	28	194	185	407	23%

MULTI-USE DEVELOPMENT
TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Analyst: BJL Time Period: Daily
Date: 6/20/2013
Project: Monroe EIS - Alt 2

		Land Use A	Retail	
		ITE LU Code		
		Size		
Exit to Ext		Total	Internal	External
0	Enter	0.00	0	0
Ent from Ext	Exit	0.00	0	0
0	Total	0	0	0
	%	100%	#DIV/0!	#DIV/0!

30%	0	28%	0	0	30%	0	28%	
	Demand		Demand	Demand		Demand		
0		0			0		0	
Balanced		Balanced			Balanced		Balanced	
28% 801	30%	859				248	28%	266 30%
Demand		Demand				Demand		Demand

		Land Use B	Retail								Land Use C	Retail			
		ITE LU Code	Free-Standing								ITE LU Code	Specialty Retail			
		Size	100,000								Size	40,000			
Exit to Ext		Total	Internal	External		Demand	Balanced	Demand				Total	Internal	External	Ent from Ext
2614	Enter	2862.00	266	2596	28%	801	266	266	30%	Enter	886.50	248	638.5	638.5
Ent from Ext	Exit	2862.00	248	2614	30%	859	248	248	28%	Exit	886.50	266	620.5	Exit to Ext
2596	Total	5724	514	5210		Demand	Balanced	Demand		Total	1773	514	1259	620.5
	%	100%	9%	91%						%	100%	29%	71%	

Net External Trips for Multi-Use Development					
	Land Use A	Land Use B	Land Use C	Total	
Enter	0	2596	638.5	3234.5	
Exit	0	2614	620.5	3234.5	
Total	0	5210	1259	6469	Internal Capture
Single-Use Trip Gen. Est.	0	5724	1773	7497	14%

MULTI-USE DEVELOPMENT
TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Analyst: BJL
Date: 6/20/2013
Project: Monroe EIS - Alt 2

Time Period: PM Peak Hour of Adj St

		Land Use A	Retail	
		ITE LU Code		
		Size		
Exit to Ext		Total	Internal	External
0	Enter	0.00	0	0
Ent from Ext	Exit	0.00	0	0
0	Total	0	0	0
	%	100%	#DIV/0!	#DIV/0!

20%	0	20%	0	0	20%	0	20%	
	Demand		Demand	Demand		Demand		
0		0			0		0	
Balanced		Balanced			Balanced		Balanced	
20% 50	20%	50				10	20%	12 20%
Demand		Demand				Demand		Demand

		Land Use B	Retail								Land Use C	Retail			
		ITE LU Code	Free-Standing								ITE LU Code	Specialty Retail			
		Size	100,000								Size	40,000			
Exit to Ext		Total	Internal	External		Demand	Balanced	Demand			Total	Internal	External	Ent from Ext
239	Enter	249.00	12	237	20%	50	12	12	20%	Enter	47.52	10	37.52	37.52
Ent from Ext	Exit	249.00	10	239	20%	50	10	10	20%	Exit	60.48	12	48.48	Exit to Ext
237	Total	498	22	476		Demand	Balanced	Demand		Total	108	22	86	48.48
	%	100%	4%	96%						%	100%	20%	80%	

Net External Trips for Multi-Use Development					
	Land Use A	Land Use B	Land Use C	Total	
Enter	0	237	37.52	274.52	
Exit	0	239	48.48	287.48	
Total	0	476	86	562	Internal Capture
Single-Use Trip Gen. Est.	0	498	108	606	7%

MULTI-USE DEVELOPMENT
TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Analyst: BJL
Date: 6/20/2013
Project: Monroe EIS - Alt 2

Time Period: Daily

		Land Use A	Residential	
		ITE LU Code	Condo/Townhouse	
		Size	90	
Exit to Ext		Total	Internal	External
217.5	Enter	299.50	108	191.5
Ent from Ext	Exit	299.50	82	217.5
191.5	Total	599	190	409
	%	100%	32%	68%

0%	0	3%	9	114	38%	99	33%	
	Demand		Demand	Demand		Demand		
	0		9		82		99	
	Balanced		Balanced		Balanced		Balanced	
0%	0	2%	19			82	9%	100	11%
	Demand		Demand			Demand		Demand	

		Land Use B	Office								Land Use C	Retail			
		ITE LU Code	Gen/Med Office								ITE LU Code	Specialty Retail			
		Size	82,000								Size	41,000			
Exit to Ext		Total	Internal	External		Demand	Balanced	Demand				Total	Internal	External	Ent from Ext
921.5	Enter	966.50	27	939.5	15%	145	27	27	3%	Enter	908.50	118	790.5	790.5
Ent from Ext	Exit	966.50	45	921.5	22%	213	36	36	4%	Exit	908.50	126	782.5	Exit to Ext
939.5	Total	1933	72	1861		Demand	Balanced	Demand		Total	1817	244	1573	782.5
	%	100%	4%	96%						%	100%	13%	87%	

Net External Trips for Multi-Use Development					
	Land Use A	Land Use B	Land Use C	Total	
Enter	191.5	939.5	790.5	1921.5	
Exit	217.5	921.5	782.5	1921.5	
Total	409	1861	1573	3843	Internal Capture
Single-Use Trip Gen. Est.	599	1933	1817	4349	12%

MULTI-USE DEVELOPMENT
TRIP GENERATION AND INTERNAL CAPTURE SUMMARY

Analyst: BJL
Date: 6/20/2013
Project: Monroe EIS - Alt 2

Time Period: PM Peak Hour of Adj St

		Land Use A	Residential	
		ITE LU Code	Condo/Townhouse	
		Size	90	
Exit to Ext		Total	Internal	External
15.6	Enter	36.40	8	28.4
Ent from Ext	Exit	19.60	4	15.6
28.4	Total	56	12	44
	%	100%	21%	79%

0%	0	2%	1	10	53%	11	31%	
		Demand	Demand	Demand		Demand		
	0		1		4		7	
	Balanced		Balanced		Balanced		Balanced	
0%	0	2%	3			4	9%	7	12%
	Demand		Demand			Demand		Demand	

		Land Use B	Office								Land Use C	Retail			
		ITE LU Code	Gen/Med Office								ITE LU Code	Specialty Retail			
		Size	82,000								Size	41,000			
Exit to Ext		Total	Internal	External		Demand	Balanced	Demand			Total	Internal	External	Ent from Ext
153.75	Enter	51.25	2	49.25	31%	16	2	2	3%	Enter	48.84	5	43.84	43.84
Ent from Ext	Exit	155.75	2	153.75	23%	36	1	1	2%	Exit	62.16	9	53.16	Exit to Ext
49.25	Total	207	4	203		Demand	Balanced	Demand		Total	111	14	97	53.16
	%	100%	2%	98%						%	100%	13%	87%	

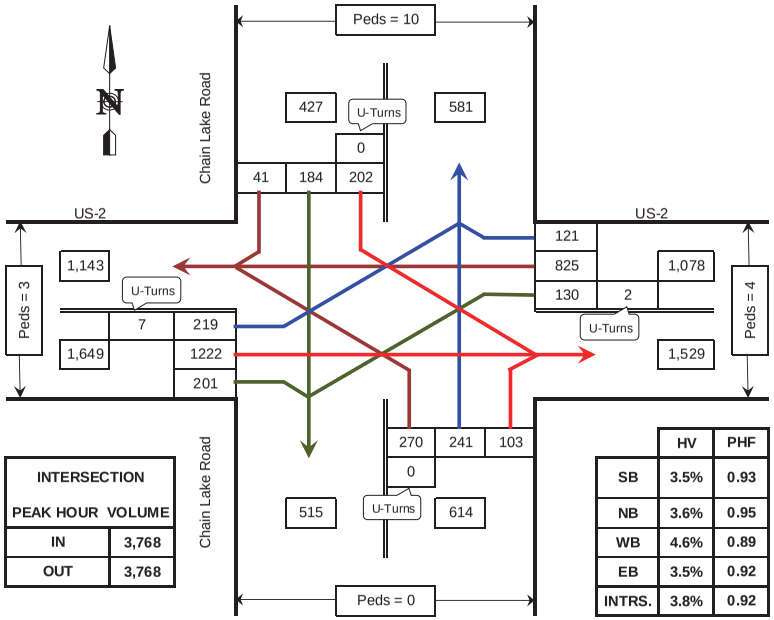
Net External Trips for Multi-Use Development					
	Land Use A	Land Use B	Land Use C	Total	
Enter	28.4	49.25	43.84	121.49	
Exit	15.6	153.75	53.16	222.51	
Total	44	203	97	344	Internal Capture
Single-Use Trip Gen. Est.	56	207	111	374	8%

Turning Movement Calculations

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

4:00 - 6:00 PM PEAK HOUR: 4:15 PM TO 5:15 PM



INTERSECTION PEAK HOUR VOLUME	
IN	3,768
OUT	3,768

	HV	PHF
SB	3.5%	0.93
NB	3.6%	0.95
WB	4.6%	0.89
EB	3.5%	0.92
INTRS.	3.8%	0.92

PHF = Peak Hour Factor
HV = Heavy Vehicles

Chain Lake Road @ US-2

Monroe, WA

COUNTED BY: JH

DATE OF COUNT: Tue. 10/2/12

REDUCED BY: CN

TIME OF COUNT: 4:00 - 6:00 PM

REDUCTION DATE: Tue. 10/2/12

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: Chain Lake Road @ US-2, Monroe, WA

DATE OF COUNT: Tue. 10/2/12

TIME OF COUNT: 4:00 - 6:00 PM

COUNTED BY: JH

WEATHER: Sunny

TIME INTERVAL ENDING AT	FROM NORTH ON Chain Lake Road						FROM SOUTH ON Chain Lake Road						FROM EAST ON US-2						FROM WEST ON US-2						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	50	30	3	1	9	0	60	53	30	0	15	1	25	173	38	1	17	3	69	226	46	807
04:30 PM	1	1	0	52	35	9	0	9	0	62	54	27	0	16	0	29	217	32	0	20	1	50	255	54	877
04:45 PM	3	3	0	49	50	6	0	6	0	72	64	16	1	16	0	28	210	33	1	13	2	53	313	49	945
05:00 PM	5	5	0	43	63	9	0	6	0	62	68	27	3	6	0	40	158	29	1	18	2	54	316	53	924
05:15 PM	1	6	0	58	36	17	0	1	0	74	55	33	0	12	2	33	240	27	1	7	2	62	338	45	1022
05:30 PM	1	2	0	42	47	13	0	7	0	68	58	24	0	9	0	33	201	23	1	8	0	45	240	48	842
05:45 PM	1	1	0	50	42	12	0	9	0	62	80	28	1	8	3	42	167	13	0	12	1	66	272	44	882
06:00 PM	0	1	0	55	35	16	0	14	0	66	42	29	0	8	0	41	190	25	0	6	0	55	237	54	845
PEAK HOUR TOTALS	10	15	0	202	184	41	0	22	0	270	241	103	4	50	2	130	825	121	3	58	7	219	1222	201	INTERSECTION
ALL MOVEMENTS	427						614						1078						1649						3768
% HV	3.5%						3.6%						4.6%						3.5%						3.8%
PEAK HOUR FACTOR	0.93						0.95						0.89						0.92						0.92

PHF = Peak Hour Factor

4:00 - 6:00 PM PEAK HOUR: 4:15 PM TO 5:15 PM

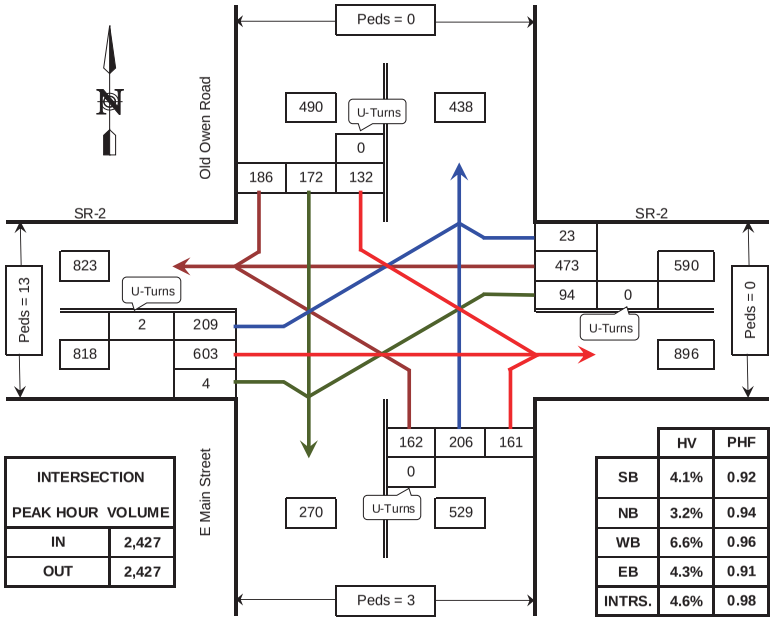
REDUCED BY: CN

DATE OF REDUCTION: 10/2/2012

TRAFFIC DATA GATHERING

TURNING MOVEMENTS DIAGRAM

4:00 - 6:00 PM PEAK HOUR: 4:00 PM TO 5:00 PM



INTERSECTION PEAK HOUR VOLUME	
IN	2,427
OUT	2,427

	HV	PHF
SB	4.1%	0.92
NB	3.2%	0.94
WB	6.6%	0.96
EB	4.3%	0.91
INTRS.	4.6%	0.98

PHF = Peak Hour Factor
HV = Heavy Vehicles

SR-2 @ E Main Street/Old Owen Road

Monroe, WA

COUNTED BY: CN

DATE OF COUNT: Wed. 6/5/13

REDUCED BY: CN

TIME OF COUNT: 4:00 - 6:00 PM

REDUCTION DATE: Wed. 6/5/13

WEATHER: Sunny

TRAFFIC DATA GATHERING

INTERSECTION TURNING MOVEMENTS REDUCTION SHEET

LOCATION: SR-2 @ E Main Street/Old Owen Road
Monroe, WA

DATE OF COUNT: Wed. 6/5/13
TIME OF COUNT: 4:00 - 6:00 PM

COUNTED BY: CN
WEATHER: Sunny

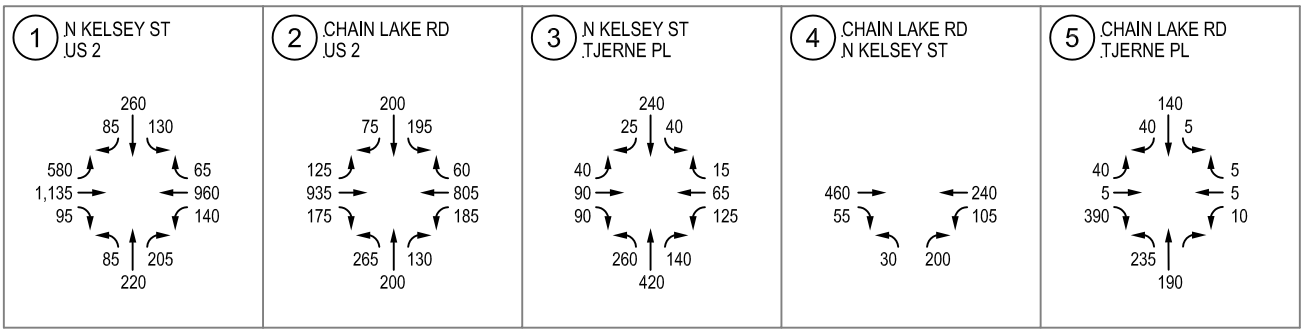
TIME INTERVAL ENDING AT	FROM NORTH ON Old Owen Road						FROM SOUTH ON E Main Street						FROM EAST ON SR-2						FROM WEST ON SR-2						INTERVAL TOTALS
	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	Peds	HV	UTurn	Left	Thru	Right	
02:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
02:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
03:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	10	0	28	51	54	0	7	0	36	43	41	0	14	0	18	117	6	2	4	1	44	131	0	570
04:30 PM	0	4	0	34	39	57	2	3	0	49	49	42	0	11	0	28	119	4	3	13	0	60	136	3	620
04:45 PM	0	2	0	29	40	34	0	5	0	38	51	45	0	8	0	25	123	5	0	5	1	62	161	1	615
05:00 PM	0	4	0	41	42	41	1	2	0	39	63	33	0	6	0	23	114	8	8	13	0	43	175	0	622
05:15 PM	0	2	0	42	53	41	0	5	0	23	53	42	0	6	0	18	92	3	5	9	0	54	147	2	570
05:30 PM	0	3	0	42	33	43	2	1	0	17	46	46	0	1	0	16	130	8	0	9	1	63	149	1	595
05:45 PM	0	1	0	43	55	42	1	2	0	43	33	34	0	5	0	25	110	10	9	6	1	55	156	0	607
06:00 PM	0	1	0	27	41	46	1	2	0	30	17	29	0	6	0	15	120	6	0	8	2	60	138	2	533
PEAK HOUR TOTALS	0	20	0	132	172	186	3	17	0	162	206	161	0	39	0	94	473	23	13	35	2	209	603	4	INTERSECTION
ALL MOVEMENTS	490						529						590						818						2427
% HV	4.1%						3.2%						6.6%						4.3%						4.6%
PEAK HOUR FACTOR	0.92						0.94						0.96						0.91						0.98

PHF = Peak Hour Factor

4:00 - 6:00 PM PEAK HOUR: 4:00 PM TO 5:00 PM

REDUCED BY: CN

DATE OF REDUCTION: 6/5/2013



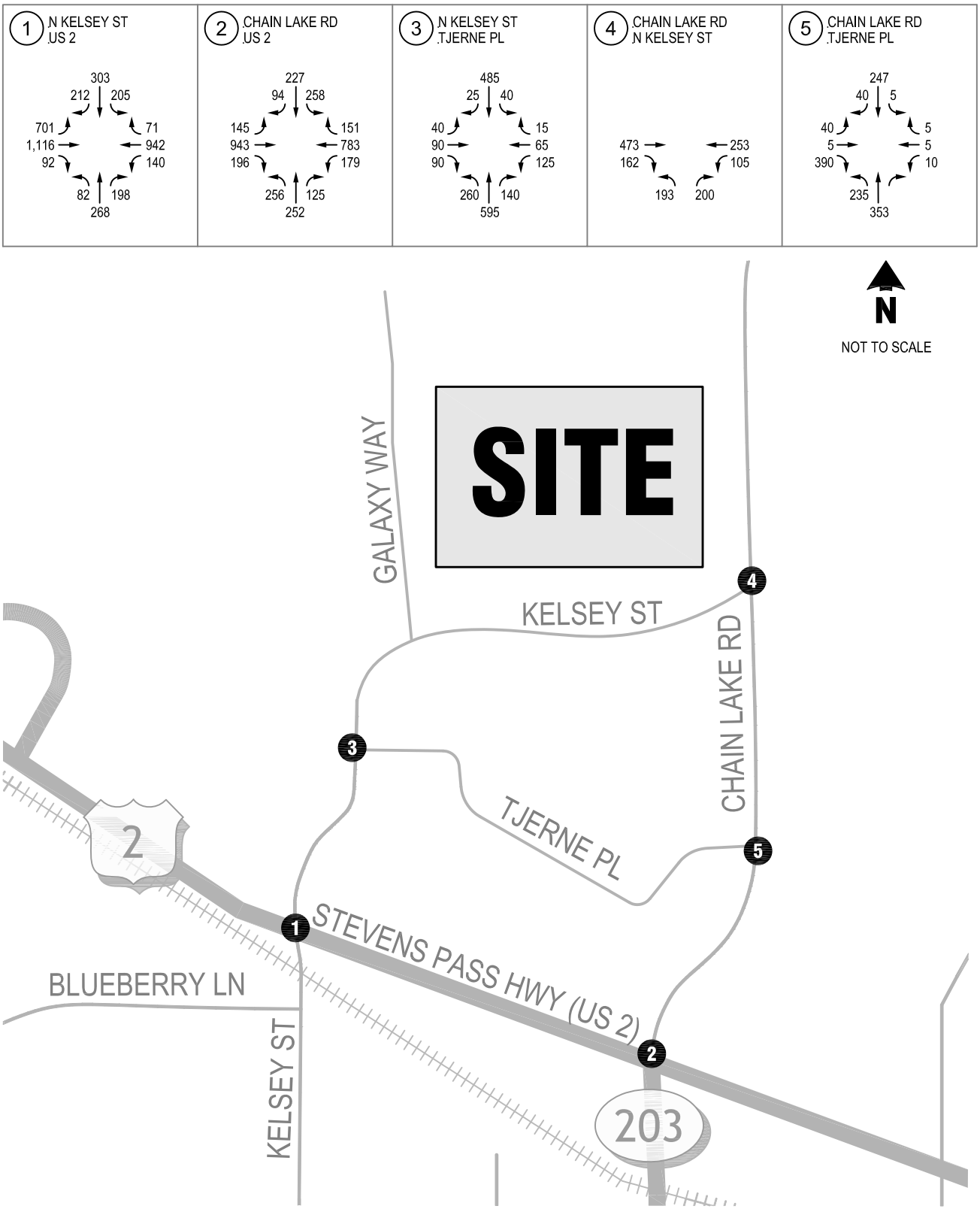
2014 Baseline Weekday PM Peak Hour Traffic Volumes

ATTACHMENT **2**

North Kelsey Retail

M:\10\10025 North Kelsey Retail\Graphics\CAD\NKelsey_Retail_graphic01 <Baseline> scottl 03/25/11 14:13

transpoGROUP



2014 With-Project Weekday PM Peak Hour Traffic Volumes

ATTACHMENT 4

North Kelsey Retail

transpoGROUP

Alternative 1

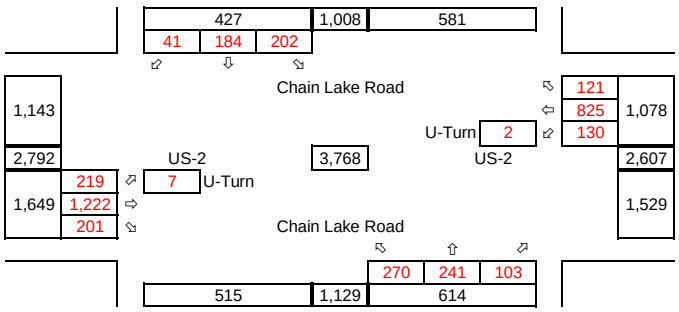
1 Chain Lake Rd @ US-2

Synchro ID: 1

Existing Volumes
Average Weekday
PM Peak-Hour

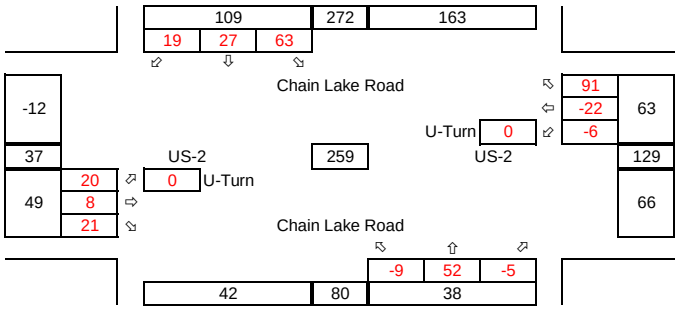
Year: **10/2/2012**

Data Source: **TDG**



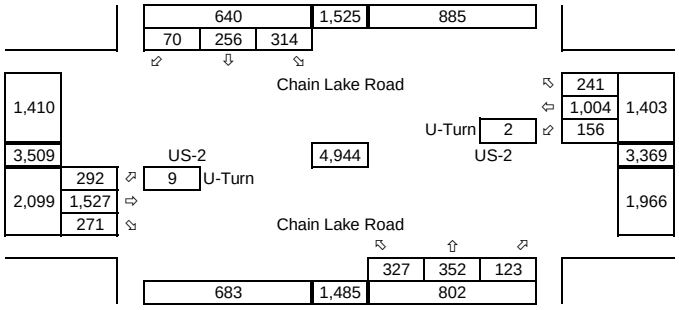
Pipeline Trips
Average Weekday
PM Peak-Hour

North Kelsey Retail
Transpogroup 3/25/2011

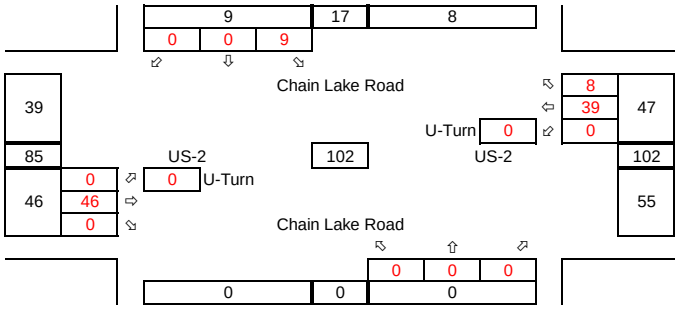


Baseline Volumes
Average Weekday
PM Peak-Hour

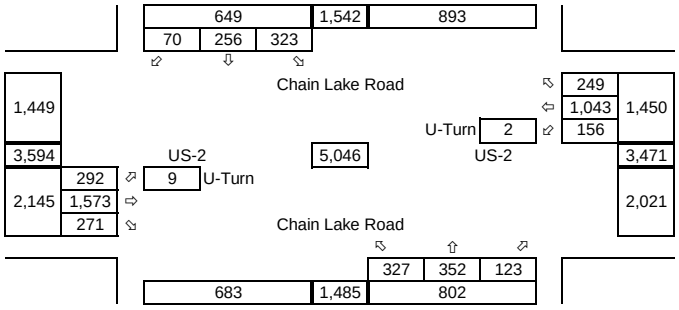
Year: 2023
Growth Rate = 2.0%
Years of Growth = 11
Total Growth = 1.2434



Development Trips
Average Weekday
PM Peak-Hour



Future with Dev. Volumes
Average Weekday
PM Peak-Hour



Alternative 1

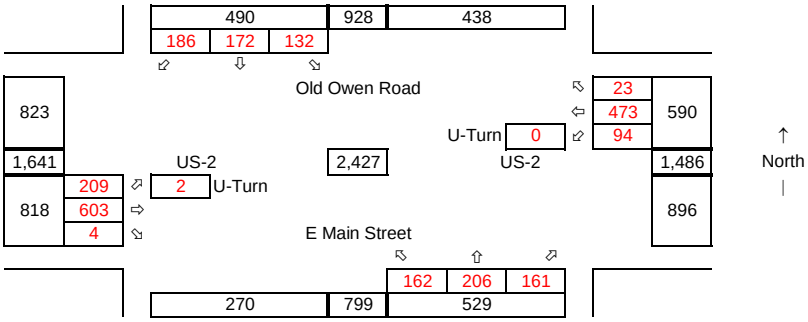
2 Old Owen Rd @ US-2

Synchro ID: 2

Existing Volumes
Average Weekday
PM Peak-Hour

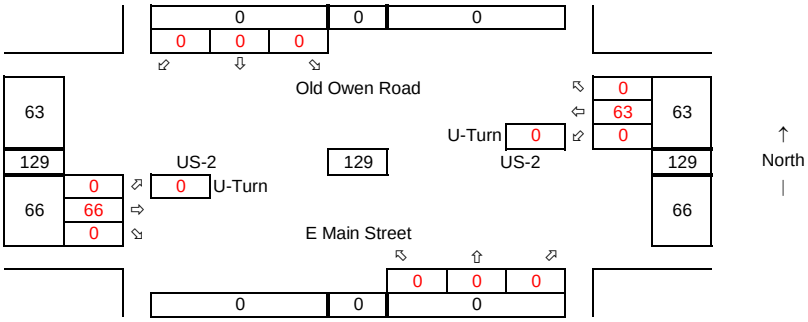
Year: **6/5/2013**

Data Source: **TDG**



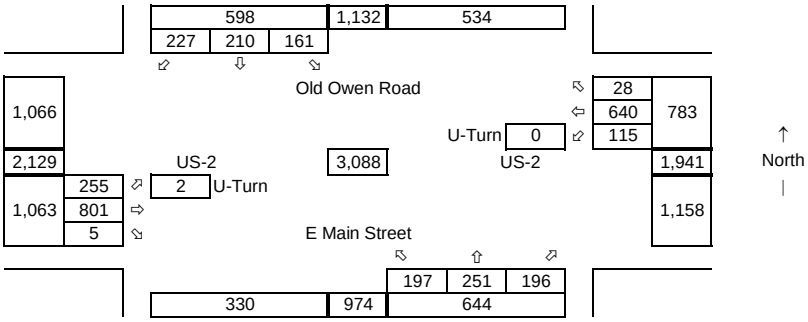
Pipeline Trips
Average Weekday
PM Peak-Hour

North Kelsey Retail
Transpogroup 3/25/2011

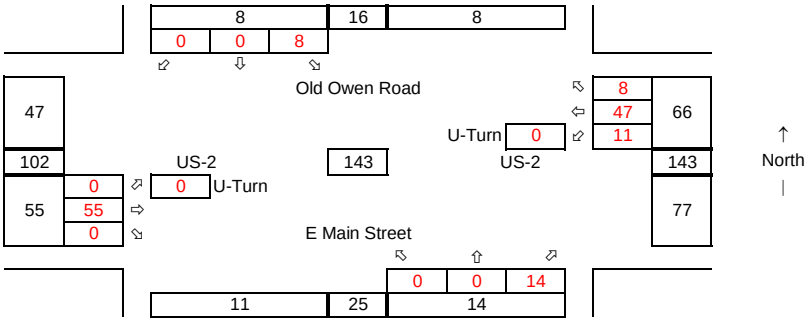


Baseline Volumes
Average Weekday
PM Peak-Hour

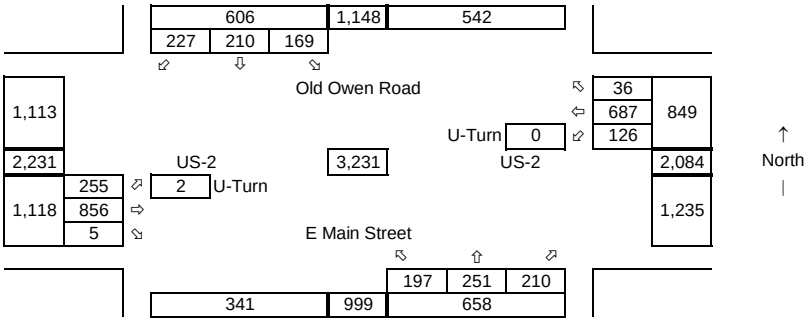
Year: 2023
Growth Rate = 2.0%
Years of Growth = 10
Total Growth = 1.2190



Development Trips
Average Weekday
PM Peak-Hour



Future with Dev. Volumes
Average Weekday
PM Peak-Hour



Alternative 1

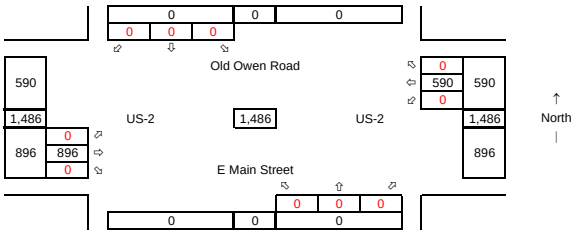
3 Site Access @ US-2

Synchro ID: 3

Existing Volumes
Average Weekday
PM Peak-Hour

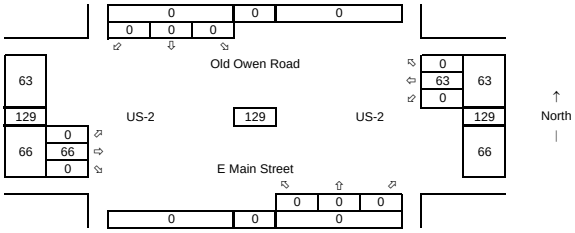
Year: **6/5/2013**

Data Source: **TDG**



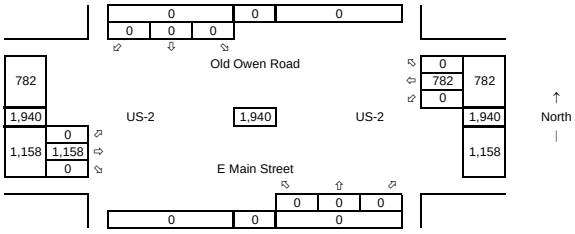
Pipeline Trips
Average Weekday
PM Peak-Hour

North Kelsey Retail
Transpogroup 3/25/2011

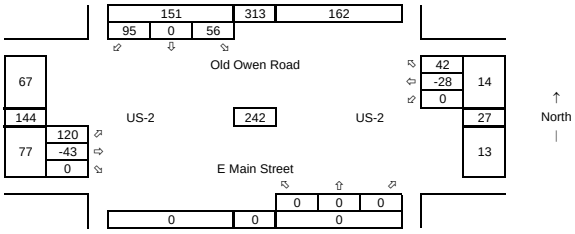


Baseline Volumes
Average Weekday
PM Peak-Hour

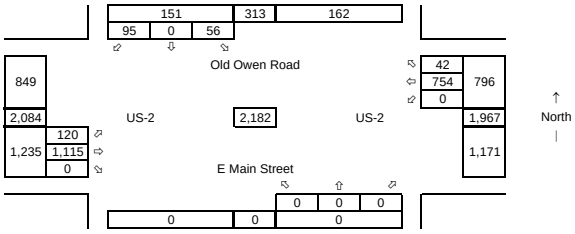
Year: 2023
Growth Rate = 2.0%
Years of Growth = 10
Total Growth = 1.2190



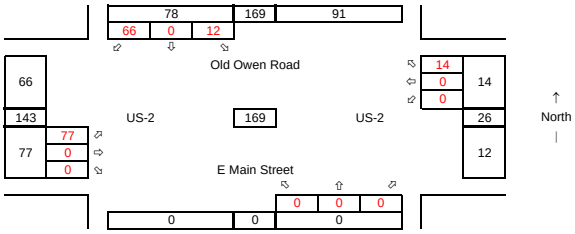
Total Development Trips
Average Weekday
PM Peak-Hour



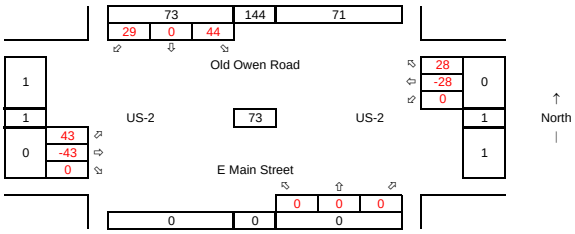
Future with Dev. Volumes
Average Weekday
PM Peak-Hour



New Development Trips
Average Weekday
PM Peak-Hour



Pass-By Development Trips
Average Weekday
PM Peak-Hour



Alternative 2

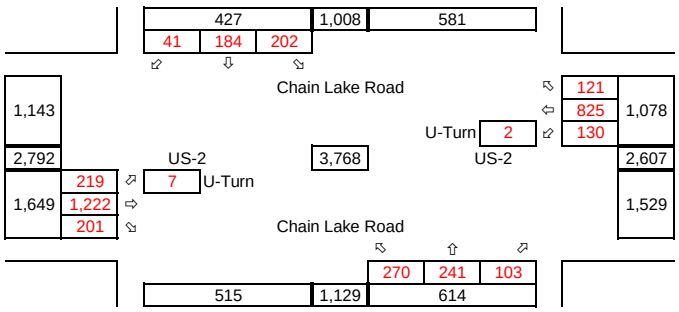
1 Chain Lake Rd @ US-2

Synchro ID: 1

Existing Volumes
Average Weekday
PM Peak-Hour

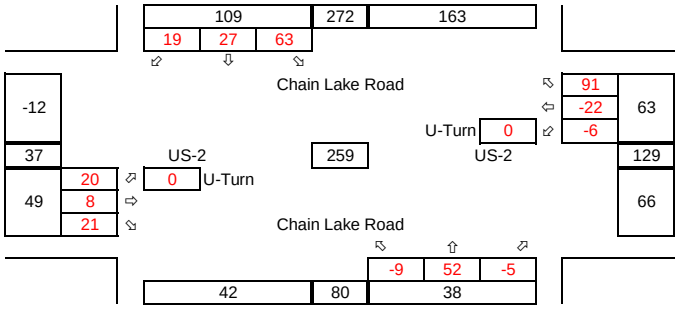
Year: **10/2/2012**

Data Source: **TDG**



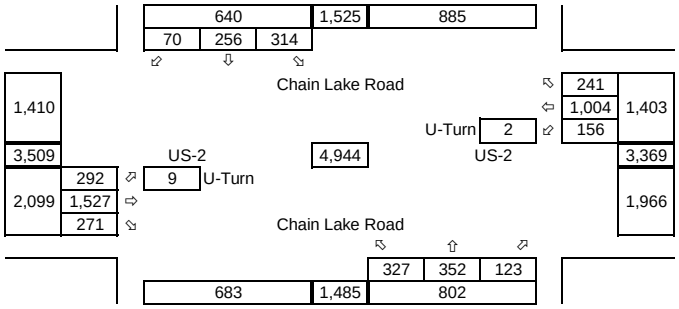
Pipeline Trips
Average Weekday
PM Peak-Hour

North Kelsey Retail
Transpogroup 3/25/2011

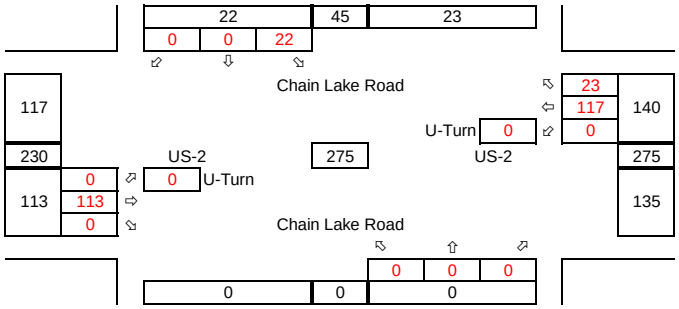


Baseline Volumes
Average Weekday
PM Peak-Hour

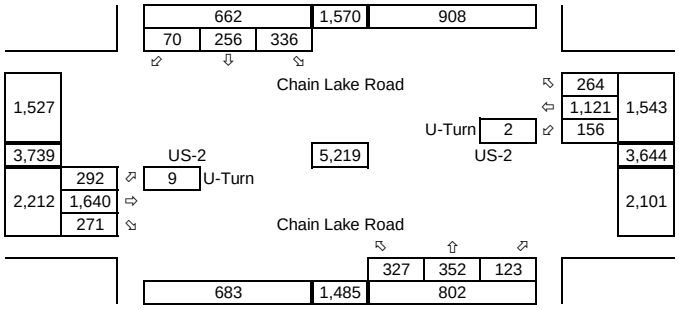
Year: 2023
Growth Rate = 2.0%
Years of Growth = 11
Total Growth = 1.2434



Development Trips
Average Weekday
PM Peak-Hour



Future with Dev. Volumes
Average Weekday
PM Peak-Hour



Alternative 2

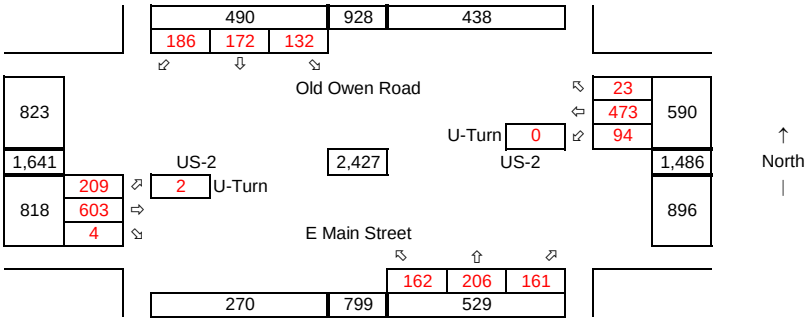
2 Old Owen Rd @ US-2

Synchro ID: 2

Existing Volumes
Average Weekday
PM Peak-Hour

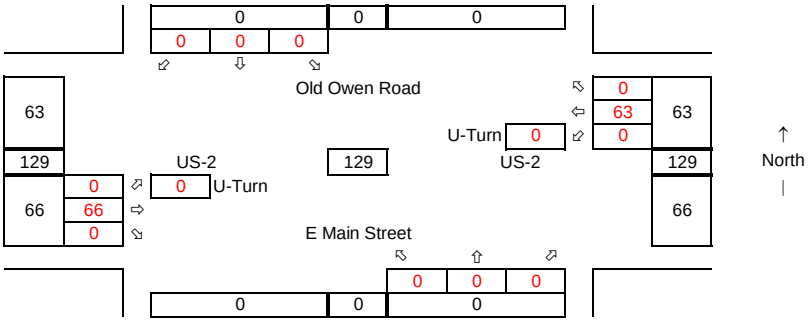
Year: **6/5/2013**

Data Source: **TDG**



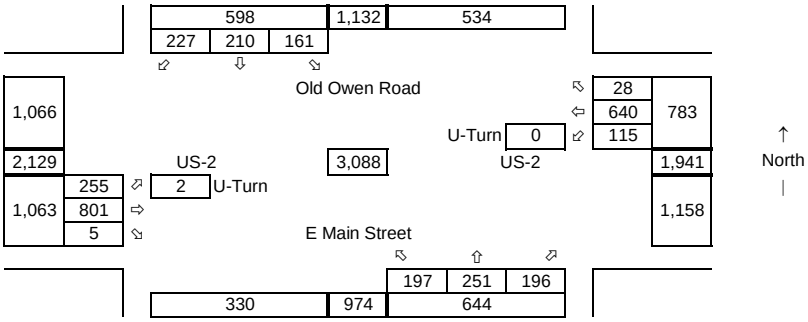
Pipeline Trips
Average Weekday
PM Peak-Hour

North Kelsey Retail
Transpogroup 3/25/2011

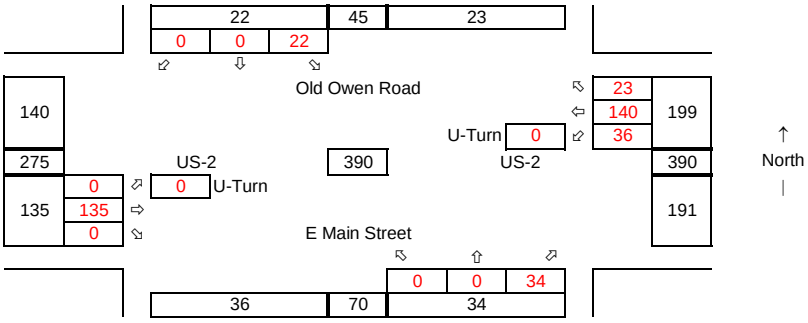


Baseline Volumes
Average Weekday
PM Peak-Hour

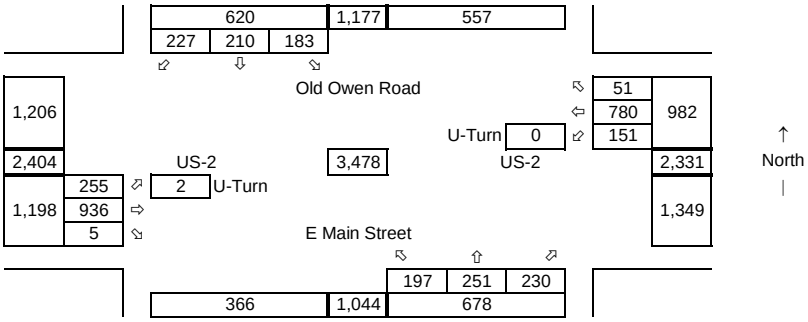
Year: 2023
Growth Rate = 2.0%
Years of Growth = 10
Total Growth = 1.2190



Development Trips
Average Weekday
PM Peak-Hour



Future with Dev. Volumes
Average Weekday
PM Peak-Hour

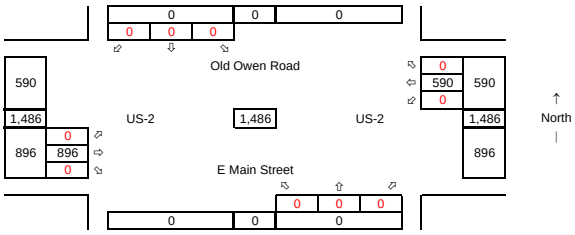


Synchro ID: 3

Existing Volumes
Average Weekday
PM Peak-Hour

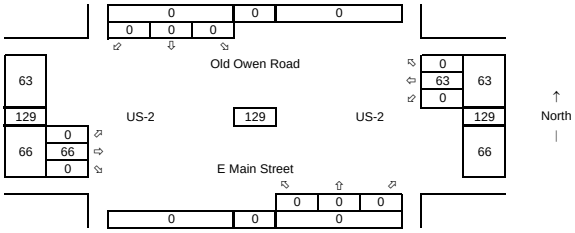
Year: **6/5/2013**

Data Source: **TDG**



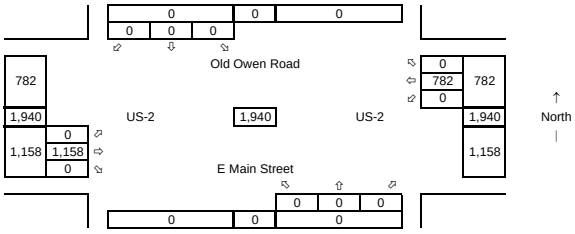
Pipeline Trips
Average Weekday
PM Peak-Hour

North Kelsey Retail
Transpogroup 3/25/2011

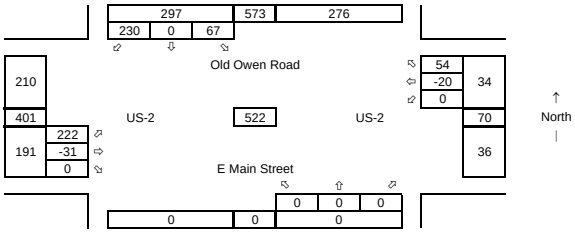


Baseline Volumes
Average Weekday
PM Peak-Hour

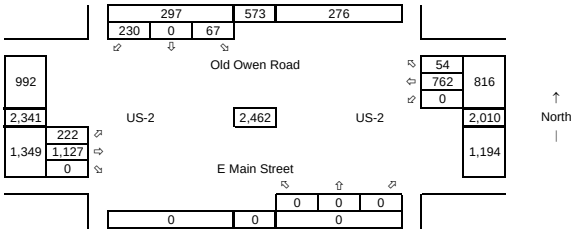
Year: 2023
Growth Rate = 2.0%
Years of Growth = 10
Total Growth = 1.2190



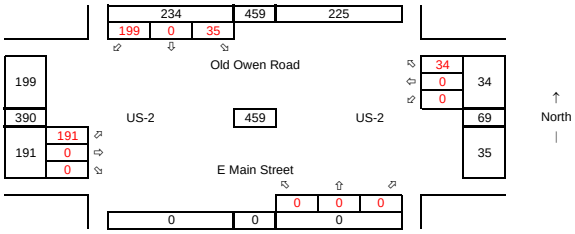
Total Development Trips
Average Weekday
PM Peak-Hour



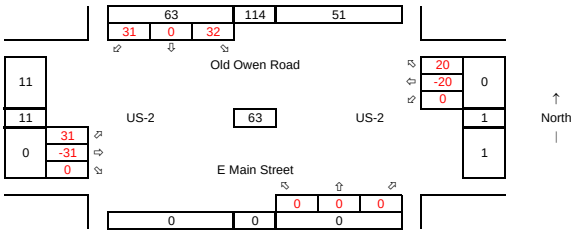
Future with Dev. Volumes
Average Weekday
PM Peak-Hour



New Development Trips
Average Weekday
PM Peak-Hour



Pass-By Development Trips
Average Weekday
PM Peak-Hour



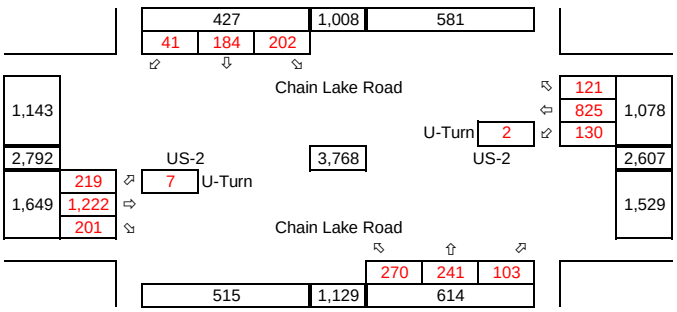
1 Chain Lake Rd @ US-2

Synchro ID: 1

Existing Volumes
Average Weekday
PM Peak-Hour

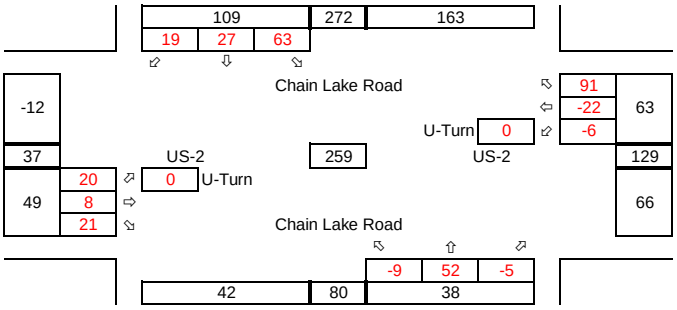
Year: **10/2/2012**

Data Source: **TDG**



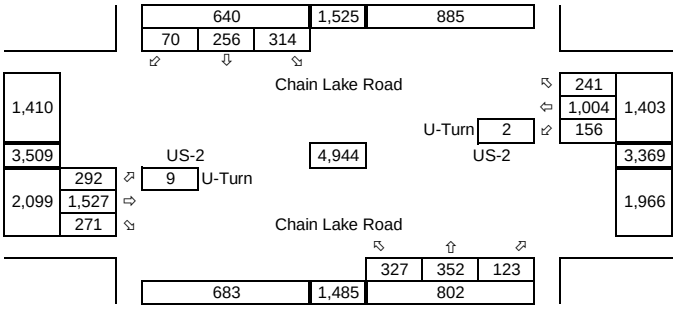
Pipeline Trips
Average Weekday
PM Peak-Hour

North Kelsey Retail
Transpogroup 3/25/2011

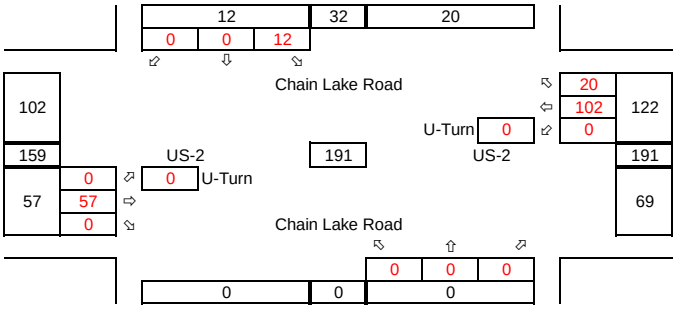


Baseline Volumes
Average Weekday
PM Peak-Hour

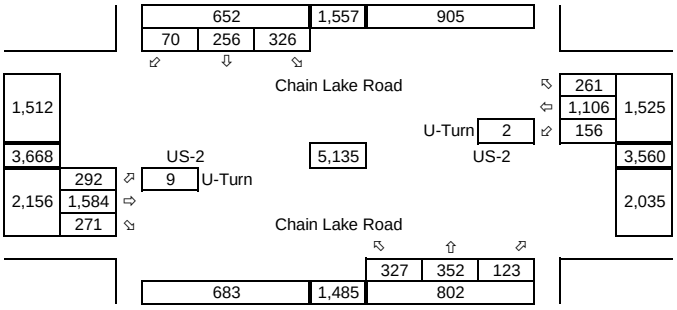
Year: 2023
Growth Rate = 2.0%
Years of Growth = 11
Total Growth = 1.2434



Development Trips
Average Weekday
PM Peak-Hour



Future with Dev. Volumes
Average Weekday
PM Peak-Hour



Alternative 3

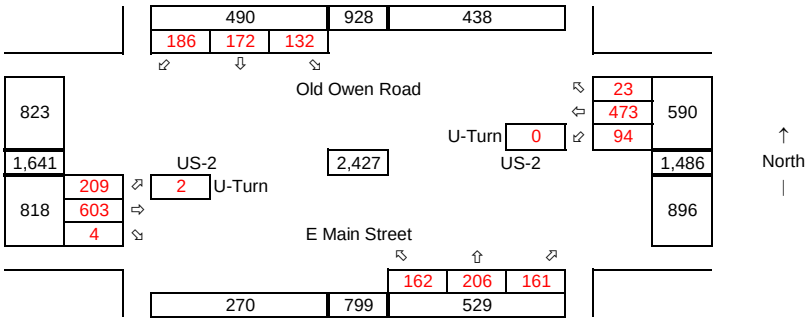
2 Old Owen Rd @ US-2

Synchro ID: 2

Existing Volumes
Average Weekday
PM Peak-Hour

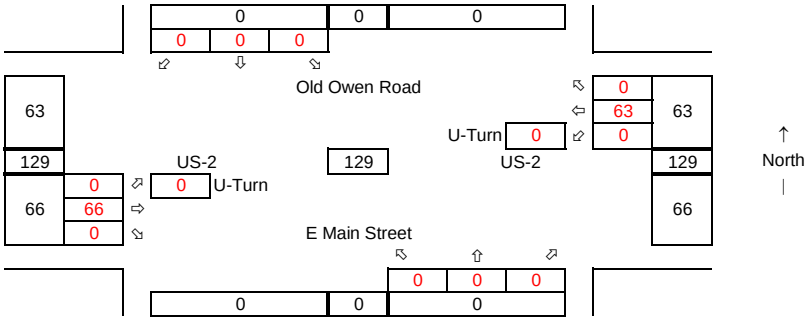
Year: **6/5/2013**

Data Source: **TDG**



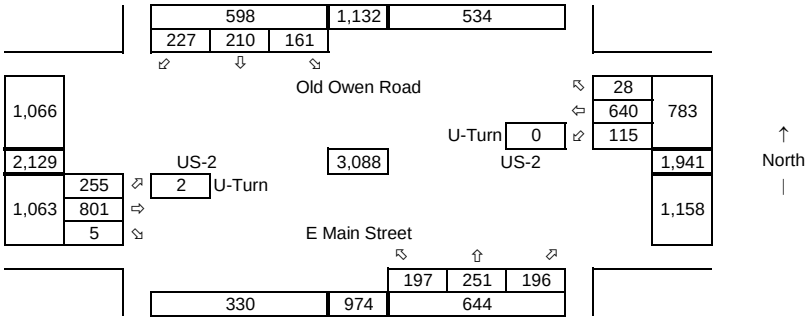
Pipeline Trips
Average Weekday
PM Peak-Hour

North Kelsey Retail
Transpogroup 3/25/2011

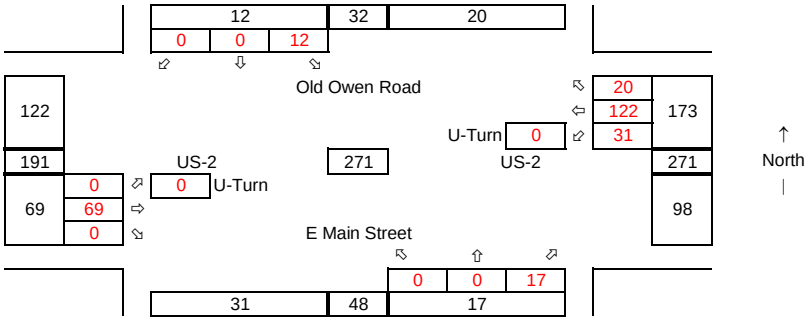


Baseline Volumes
Average Weekday
PM Peak-Hour

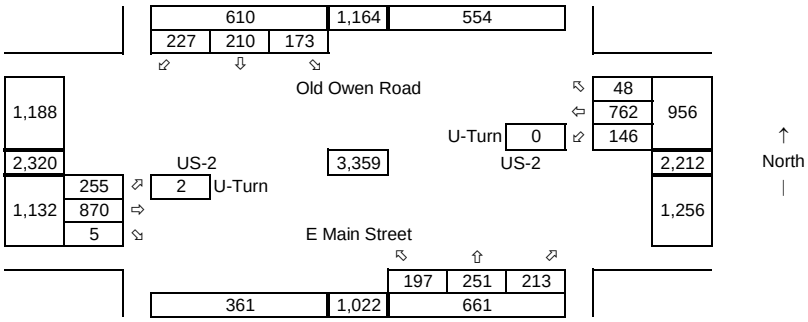
Year: 2023
Growth Rate = 2.0%
Years of Growth = 10
Total Growth = 1.2190



Development Trips
Average Weekday
PM Peak-Hour



Future with Dev. Volumes
Average Weekday
PM Peak-Hour

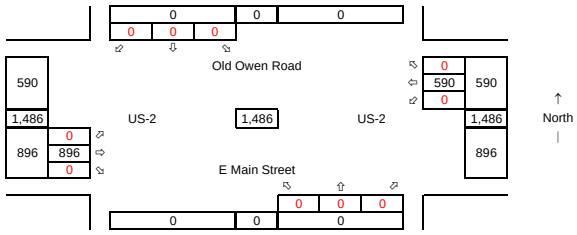


3 Site Access @ US-2

Synchro ID: 3
Existing Volumes
Average Weekday
PM Peak-Hour

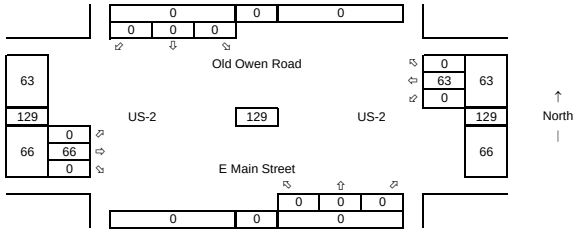
Year: **6/5/2013**

Data Source: **TDG**



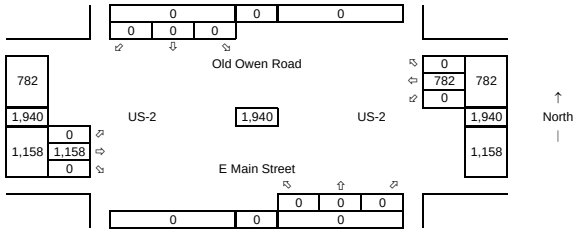
Pipeline Trips
Average Weekday
PM Peak-Hour

North Kelsey Retail
Transpogroup 3/25/2011

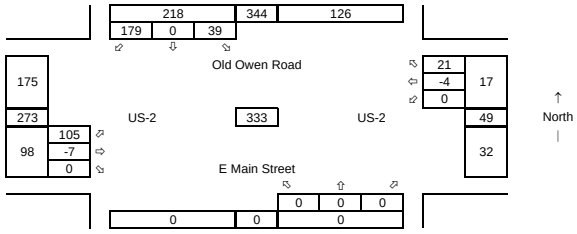


Baseline Volumes
Average Weekday
PM Peak-Hour

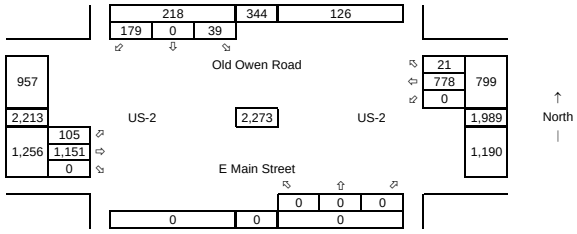
Year: 2023
Growth Rate = 2.0%
Years of Growth = 10
Total Growth = 1.2190



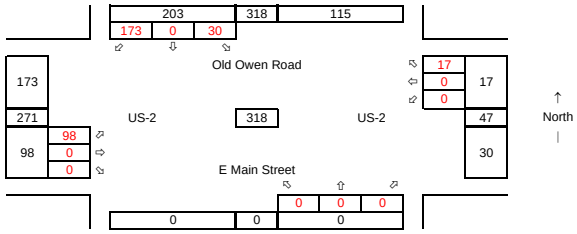
Total Development Trips
Average Weekday
PM Peak-Hour



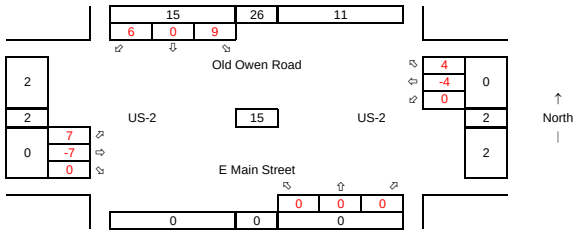
Future with Dev. Volumes
Average Weekday
PM Peak-Hour



New Development Trips
Average Weekday
PM Peak-Hour



Pass-By Development Trips
Average Weekday
PM Peak-Hour



PM Peak-Hour Level of Service Calculations

Lanes, Volumes, Timings
1: Chain Lake Road & US-2

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Volume (vph)	7	219	1222	201	2	130	825	121	270	241	103	202	184	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		500		0		250		200	350		550	200		0
Storage Lanes		1		1		1		1	2		1	2		1
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97	0.95	0.95	0.97	1.00	1.00
Frt				0.850				0.850		0.955				0.850
Flt Protected		0.950				0.950			0.950			0.950		
Satd. Flow (prot)	0	1736	3471	1553	0	1736	3471	1553	3367	3315	0	3367	1827	1553
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	1736	3471	1553	0	1736	3471	1553	3367	3315	0	3367	1827	1553
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				130				115		40				115
Link Speed (mph)			35				35			35			35	
Link Distance (ft)			634				1600			613			1799	
Travel Time (s)			12.4				31.2			11.9			35.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	8	238	1328	218	2	141	897	132	293	262	112	220	200	45
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	246	1328	218	0	143	897	132	293	374	0	220	200	45
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	5	2		1	1	6		7	4		3	8	
Permitted Phases				2				6						8
Detector Phase	5	5	2	2	1	1	6	6	7	4		3	8	8
Switch Phase														
Minimum Initial (s)	3.0	3.0	15.0	15.0	3.0	3.0	15.0	15.0	3.0	5.0		3.0	5.0	5.0
Minimum Split (s)	8.0	8.0	34.0	34.0	8.0	8.0	30.0	30.0	8.0	38.0		8.0	37.0	37.0
Total Split (s)	32.0	32.0	60.0	60.0	25.0	25.0	53.0	53.0	29.0	36.0		29.0	36.0	36.0
Total Split (%)	21.3%	21.3%	40.0%	40.0%	16.7%	16.7%	35.3%	35.3%	19.3%	24.0%		19.3%	24.0%	24.0%
Yellow Time (s)	3.6	3.6	4.0	4.0	3.6	3.6	4.0	4.0	3.6	4.0		3.6	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0

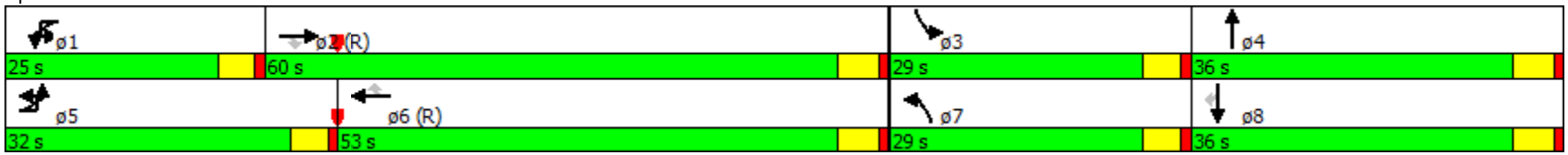
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		4.6	5.0	5.0		4.6	5.0	5.0	4.6	5.0		4.6	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	None	None	C-Max	C-Max	None	Min		None	Min	Min
Act Effct Green (s)		25.8	74.2	74.2		17.1	65.5	65.5	17.8	24.0		15.6	21.7	21.7
Actuated g/C Ratio		0.17	0.49	0.49		0.11	0.44	0.44	0.12	0.16		0.10	0.14	0.14
v/c Ratio		0.83	0.77	0.26		0.73	0.59	0.18	0.73	0.66		0.63	0.76	0.14
Control Delay		81.8	36.7	11.7		86.9	32.2	6.0	74.6	58.0		72.4	79.3	0.9
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		81.8	36.7	11.7		86.9	32.2	6.0	74.6	58.0		72.4	79.3	0.9
LOS		F	D	B		F	C	A	E	E		E	E	A
Approach Delay			39.9				35.9			65.3			68.5	
Approach LOS			D				D			E			E	
Queue Length 50th (ft)		234	548	45		142	254	5	144	164		108	191	0
Queue Length 95th (ft)		325	#866	125		m214	523	m37	190	208		150	268	0
Internal Link Dist (ft)			554				1520			533			1719	
Turn Bay Length (ft)		500				250		200	350			200		
Base Capacity (vph)		332	1716	833		243	1515	742	547	720		547	377	412
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.74	0.77	0.26		0.59	0.59	0.18	0.54	0.52		0.40	0.53	0.11

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 25 (17%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 46.1 Intersection LOS: D
Intersection Capacity Utilization 74.5% ICU Level of Service D
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Chain Lake Road & US-2



Lanes, Volumes, Timings
2: E Main Street/Old Owen Road & US-2

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Volume (vph)	2	209	603	4	94	473	23	162	206	161	132	172	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	225		0	1000		150	150		250
Storage Lanes		1		0	1		0	1		1	1		1
Taper Length (ft)		25			25			25			25		
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.993				0.850			0.850
Flt Protected		0.950			0.950			0.950			0.950		
Satd. Flow (prot)	0	1720	3435	0	1719	3414	0	1719	1810	1538	1719	1810	1538
Flt Permitted		0.950			0.950			0.370			0.273		
Satd. Flow (perm)	0	1720	3435	0	1719	3414	0	670	1810	1538	494	1810	1538
Right Turn on Red				Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			1			4				157			190
Link Speed (mph)			35			55			35			35	
Link Distance (ft)			1600			420			1848			794	
Travel Time (s)			31.2			5.2			36.0			15.5	
Peak Hour Factor	0.92	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	2	213	615	4	96	483	23	165	210	164	135	176	190
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	215	619	0	96	506	0	165	210	164	135	176	190
Turn Type	Prot	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	5	2		1	6		7	4		3	8	
Permitted Phases								4		4	8		8
Detector Phase	5	5	2		1	6		7	4	4	3	8	8
Switch Phase													
Minimum Initial (s)	3.0	3.0	10.0		3.0	10.0		3.0	3.0	3.0	3.0	5.0	5.0
Minimum Split (s)	7.6	7.6	27.0		7.6	24.0		7.6	35.0	35.0	8.0	10.0	10.0
Total Split (s)	30.0	30.0	75.0		30.0	75.0		15.0	30.0	30.0	15.0	30.0	30.0
Total Split (%)	20.0%	20.0%	50.0%		20.0%	50.0%		10.0%	20.0%	20.0%	10.0%	20.0%	20.0%
Yellow Time (s)	3.6	3.6	4.0		3.6	4.0		3.6	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0

Lanes, Volumes, Timings
2: E Main Street/Old Owen Road & US-2

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		4.6	5.0		4.6	5.0		4.6	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Act Effct Green (s)		22.5	85.6		13.7	76.8		32.0	21.2	21.2	31.0	21.1	21.1
Actuated g/C Ratio		0.15	0.57		0.09	0.51		0.21	0.14	0.14	0.21	0.14	0.14
v/c Ratio		0.84	0.32		0.61	0.29		0.77	0.82	0.47	0.74	0.69	0.50
Control Delay		75.4	23.6		81.3	22.4		71.8	87.3	13.4	71.4	75.4	11.8
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		75.4	23.6		81.3	22.4		71.8	87.3	13.4	71.4	75.4	11.8
LOS		E	C		F	C		E	F	B	E	E	B
Approach Delay			37.0			31.8			60.0			50.2	
Approach LOS			D			C			E			D	
Queue Length 50th (ft)		214	143		92	150		135	201	6	109	165	0
Queue Length 95th (ft)		m288	277		151	202		#214	290	73	#179	245	72
Internal Link Dist (ft)			1520			340			1768			714	
Turn Bay Length (ft)		250			225			1000		150	150		250
Base Capacity (vph)		291	1960		291	1750		215	301	387	183	301	414
Starvation Cap Reductn		0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.74	0.32		0.33	0.29		0.77	0.70	0.42	0.74	0.58	0.46

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 43.4 Intersection LOS: D
Intersection Capacity Utilization 62.0% ICU Level of Service B
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: E Main Street/Old Owen Road & US-2

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Volume (vph)	9	292	1527	271	2	156	1004	241	327	352	123	314	256	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		500		0		250		200	350		550	200		0
Storage Lanes		1		1		1		1	2		1	2		1
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97	0.95	0.95	0.97	1.00	1.00
Frt				0.850				0.850		0.961				0.850
Flt Protected		0.950				0.950			0.950			0.950		
Satd. Flow (prot)	0	1736	3471	1553	0	1736	3471	1553	3367	3336	0	3367	1827	1553
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	1736	3471	1553	0	1736	3471	1553	3367	3336	0	3367	1827	1553
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				141				145		29				115
Link Speed (mph)			35				35			35			35	
Link Distance (ft)			634				1600			613			1799	
Travel Time (s)			12.4				31.2			11.9			35.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	10	317	1660	295	2	170	1091	262	355	383	134	341	278	76
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	327	1660	295	0	172	1091	262	355	517	0	341	278	76
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	5	2		1	1	6		7	4		3	8	
Permitted Phases				2				6						8
Detector Phase	5	5	2	2	1	1	6	6	7	4		3	8	8
Switch Phase														
Minimum Initial (s)	3.0	3.0	15.0	15.0	3.0	3.0	15.0	15.0	3.0	5.0		3.0	5.0	5.0
Minimum Split (s)	8.0	8.0	34.0	34.0	8.0	8.0	30.0	30.0	8.0	38.0		8.0	37.0	37.0
Total Split (s)	32.0	32.0	60.0	60.0	25.0	25.0	53.0	53.0	29.0	36.0		29.0	36.0	36.0
Total Split (%)	21.3%	21.3%	40.0%	40.0%	16.7%	16.7%	35.3%	35.3%	19.3%	24.0%		19.3%	24.0%	24.0%
Yellow Time (s)	3.6	3.6	4.0	4.0	3.6	3.6	4.0	4.0	3.6	4.0		3.6	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0

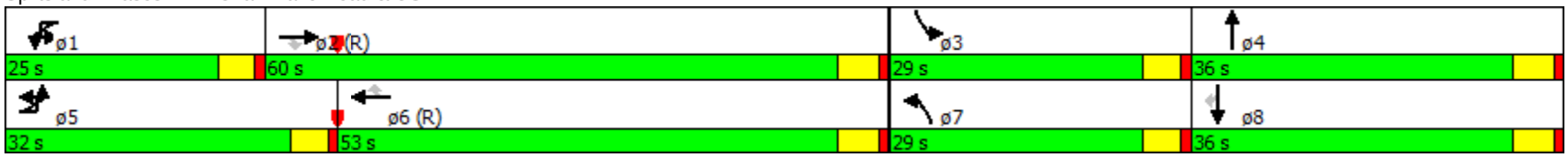
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		4.6	5.0	5.0		4.6	5.0	5.0	4.6	5.0		4.6	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	None	None	C-Max	C-Max	None	Min		None	Min	Min
Act Effct Green (s)		32.7	64.9	64.9		18.5	50.7	50.7	20.3	26.9		20.5	27.2	27.2
Actuated g/C Ratio		0.22	0.43	0.43		0.12	0.34	0.34	0.14	0.18		0.14	0.18	0.18
v/c Ratio		0.87	1.11	0.39		0.81	0.93	0.42	0.78	0.83		0.74	0.84	0.20
Control Delay		78.9	97.6	18.0		96.0	55.3	13.7	74.8	67.8		72.1	81.0	3.2
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		78.9	97.6	18.0		96.0	55.3	13.7	74.8	67.8		72.1	81.0	3.2
LOS		E	F	B		F	E	B	E	E		E	F	A
Approach Delay			84.6				52.8			70.7			68.1	
Approach LOS			F				D			E			E	
Queue Length 50th (ft)		307	~1004	101		173	566	43	175	244		167	264	0
Queue Length 95th (ft)		#543	#1230	198		m#251	m#704	m90	225	305		217	365	13
Internal Link Dist (ft)			554				1520			533			1719	
Turn Bay Length (ft)		500				250		200	350			200		
Base Capacity (vph)		377	1500	751		239	1172	620	547	712		547	378	413
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.87	1.11	0.39		0.72	0.93	0.42	0.65	0.73		0.62	0.74	0.18

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 25 (17%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.11
Intersection Signal Delay: 71.2 Intersection LOS: E
Intersection Capacity Utilization 89.8% ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Chain Lake Road & US-2



Lanes, Volumes, Timings
2: E Main Street/Old Owen Road & US-2

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Volume (vph)	2	255	801	5	115	640	28	197	251	196	161	210	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	225		0	1000		150	150		250
Storage Lanes		1		0	1		0	1		1	1		1
Taper Length (ft)		25			25			25			25		
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.994				0.850			0.850
Flt Protected		0.950			0.950			0.950			0.950		
Satd. Flow (prot)	0	1719	3435	0	1719	3417	0	1719	1810	1538	1719	1810	1538
Flt Permitted		0.950			0.950			0.305			0.195		
Satd. Flow (perm)	0	1719	3435	0	1719	3417	0	552	1810	1538	353	1810	1538
Right Turn on Red				Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			1			4				158			232
Link Speed (mph)			35			55			35			35	
Link Distance (ft)			1600			420			1848			794	
Travel Time (s)			31.2			5.2			36.0			15.5	
Peak Hour Factor	0.92	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	2	260	817	5	117	653	29	201	256	200	164	214	232
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	262	822	0	117	682	0	201	256	200	164	214	232
Turn Type	Prot	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	5	2		1	6		7	4		3	8	
Permitted Phases								4		4	8		8
Detector Phase	5	5	2		1	6		7	4	4	3	8	8
Switch Phase													
Minimum Initial (s)	3.0	3.0	10.0		3.0	10.0		3.0	3.0	3.0	3.0	5.0	5.0
Minimum Split (s)	7.6	7.6	27.0		7.6	24.0		7.6	35.0	35.0	8.0	10.0	10.0
Total Split (s)	30.0	30.0	75.0		30.0	75.0		15.0	30.0	30.0	15.0	30.0	30.0
Total Split (%)	20.0%	20.0%	50.0%		20.0%	50.0%		10.0%	20.0%	20.0%	10.0%	20.0%	20.0%
Yellow Time (s)	3.6	3.6	4.0		3.6	4.0		3.6	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		4.6	5.0		4.6	5.0		4.6	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Act Effct Green (s)		24.9	81.3		15.5	71.9		34.4	23.6	23.6	33.6	23.6	23.6
Actuated g/C Ratio		0.17	0.54		0.10	0.48		0.23	0.16	0.16	0.22	0.16	0.16
v/c Ratio		0.92	0.44		0.66	0.42		0.97	0.90	0.53	0.96	0.75	0.53
Control Delay		58.4	32.7		81.5	26.6		105.3	94.6	19.8	109.2	77.3	11.0
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		58.4	32.7		81.5	26.6		105.3	94.6	19.8	109.2	77.3	11.0
LOS		E	C		F	C		F	F	B	F	E	B
Approach Delay			38.9			34.6			75.1			60.7	
Approach LOS			D			C			E			E	
Queue Length 50th (ft)		266	291		112	228		164	246	36	131	201	0
Queue Length 95th (ft)		m269	m302		176	282		#264	#398	119	#250	296	80
Internal Link Dist (ft)			1520			340			1768			714	
Turn Bay Length (ft)		250			225			1000		150	150		250
Base Capacity (vph)		293	1862		291	1640		207	301	388	170	301	449
Starvation Cap Reductn		0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.89	0.44		0.40	0.42		0.97	0.85	0.52	0.96	0.71	0.52

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 49.6 Intersection LOS: D
Intersection Capacity Utilization 73.8% ICU Level of Service D
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: E Main Street/Old Owen Road & US-2

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Volume (vph)	9	292	1573	271	2	156	1043	249	327	352	123	323	256	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		500		0		250		200	350		550	200		0
Storage Lanes		1		1		1		1	2		1	2		1
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97	0.95	0.95	0.97	1.00	1.00
Frt				0.850				0.850		0.961				0.850
Flt Protected		0.950				0.950			0.950			0.950		
Satd. Flow (prot)	0	1736	3471	1553	0	1736	3471	1553	3367	3336	0	3367	1827	1553
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	1736	3471	1553	0	1736	3471	1553	3367	3336	0	3367	1827	1553
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				137				144		29				115
Link Speed (mph)			35				35			35			35	
Link Distance (ft)			634				1600			613			1799	
Travel Time (s)			12.4				31.2			11.9			35.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	10	317	1710	295	2	170	1134	271	355	383	134	351	278	76
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	327	1710	295	0	172	1134	271	355	517	0	351	278	76
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	5	2		1	1	6		7	4		3	8	
Permitted Phases				2				6						8
Detector Phase	5	5	2	2	1	1	6	6	7	4		3	8	8
Switch Phase														
Minimum Initial (s)	3.0	3.0	15.0	15.0	3.0	3.0	15.0	15.0	3.0	5.0		3.0	5.0	5.0
Minimum Split (s)	8.0	8.0	34.0	34.0	8.0	8.0	30.0	30.0	8.0	38.0		8.0	37.0	37.0
Total Split (s)	32.0	32.0	60.0	60.0	25.0	25.0	53.0	53.0	29.0	36.0		29.0	36.0	36.0
Total Split (%)	21.3%	21.3%	40.0%	40.0%	16.7%	16.7%	35.3%	35.3%	19.3%	24.0%		19.3%	24.0%	24.0%
Yellow Time (s)	3.6	3.6	4.0	4.0	3.6	3.6	4.0	4.0	3.6	4.0		3.6	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0

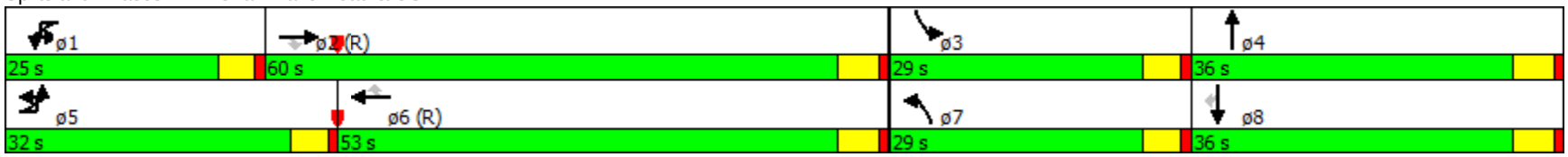
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		4.6	5.0	5.0		4.6	5.0	5.0	4.6	5.0		4.6	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	None	None	C-Max	C-Max	None	Min		None	Min	Min
Act Effct Green (s)		32.7	64.7	64.7		18.5	50.5	50.5	20.3	26.8		20.9	27.3	27.3
Actuated g/C Ratio		0.22	0.43	0.43		0.12	0.34	0.34	0.14	0.18		0.14	0.18	0.18
v/c Ratio		0.87	1.14	0.39		0.81	0.97	0.44	0.78	0.84		0.75	0.84	0.20
Control Delay		78.9	111.2	18.5		96.3	61.0	14.1	74.8	68.4		72.3	80.3	3.2
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		78.9	111.2	18.5		96.3	61.0	14.1	74.8	68.4		72.3	80.3	3.2
LOS		E	F	B		F	E	B	E	E		E	F	A
Approach Delay			94.9				56.8			71.0			68.0	
Approach LOS			F				E			E			E	
Queue Length 50th (ft)		307	~1057	104		173	~621	46	175	245		172	264	0
Queue Length 95th (ft)		#543	#1284	201		m#255	m#752	m93	225	305		223	365	13
Internal Link Dist (ft)			554				1520			533			1719	
Turn Bay Length (ft)		500				250		200	350			200		
Base Capacity (vph)		377	1497	748		239	1168	618	547	712		547	378	413
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.87	1.14	0.39		0.72	0.97	0.44	0.65	0.73		0.64	0.74	0.18

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 25 (17%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 76.7 Intersection LOS: E
Intersection Capacity Utilization 91.1% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Chain Lake Road & US-2



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Volume (vph)	2	255	856	5	126	687	36	197	251	210	169	210	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	225		0	1000		150	150		250
Storage Lanes		1		0	1		0	1		1	1		1
Taper Length (ft)		25			25			25			25		
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.992				0.850			0.850
Flt Protected		0.950			0.950			0.950			0.950		
Satd. Flow (prot)	0	1719	3435	0	1719	3411	0	1719	1810	1538	1719	1810	1538
Flt Permitted		0.950			0.950			0.305			0.195		
Satd. Flow (perm)	0	1719	3435	0	1719	3411	0	552	1810	1538	353	1810	1538
Right Turn on Red				Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						5				169			232
Link Speed (mph)			35			55			35			35	
Link Distance (ft)			1600			420			1848			794	
Travel Time (s)			31.2			5.2			36.0			15.5	
Peak Hour Factor	0.92	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	2	260	873	5	129	701	37	201	256	214	172	214	232
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	262	878	0	129	738	0	201	256	214	172	214	232
Turn Type	Prot	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	5	2		1	6		7	4		3	8	
Permitted Phases								4		4	8		8
Detector Phase	5	5	2		1	6		7	4	4	3	8	8
Switch Phase													
Minimum Initial (s)	3.0	3.0	10.0		3.0	10.0		3.0	3.0	3.0	3.0	5.0	5.0
Minimum Split (s)	7.6	7.6	27.0		7.6	24.0		7.6	35.0	35.0	8.0	10.0	10.0
Total Split (s)	30.0	30.0	75.0		30.0	75.0		15.0	30.0	30.0	15.0	30.0	30.0
Total Split (%)	20.0%	20.0%	50.0%		20.0%	50.0%		10.0%	20.0%	20.0%	10.0%	20.0%	20.0%
Yellow Time (s)	3.6	3.6	4.0		3.6	4.0		3.6	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		4.6	5.0		4.6	5.0		4.6	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Act Effct Green (s)		24.9	80.3		16.5	71.9		34.4	23.6	23.6	33.6	23.6	23.6
Actuated g/C Ratio		0.17	0.54		0.11	0.48		0.23	0.16	0.16	0.22	0.16	0.16
v/c Ratio		0.92	0.48		0.68	0.45		0.97	0.90	0.56	1.01	0.75	0.53
Control Delay		58.1	34.1		81.7	27.3		105.3	94.6	20.0	120.9	77.3	11.0
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		58.1	34.1		81.7	27.3		105.3	94.6	20.0	120.9	77.3	11.0
LOS		E	C		F	C		F	F	C	F	E	B
Approach Delay			39.7			35.4			74.0			64.6	
Approach LOS			D			D			E			E	
Queue Length 50th (ft)		267	311		124	253		164	246	38	138	201	0
Queue Length 95th (ft)		m264	m317		190	309		#264	#398	125	#270	296	80
Internal Link Dist (ft)			1520			340			1768			714	
Turn Bay Length (ft)		250			225			1000		150	150		250
Base Capacity (vph)		293	1838		291	1638		207	301	397	170	301	449
Starvation Cap Reductn		0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.89	0.48		0.44	0.45		0.97	0.85	0.54	1.01	0.71	0.52

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 50.2 Intersection LOS: D
Intersection Capacity Utilization 75.3% ICU Level of Service D
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: E Main Street/Old Owen Road & US-2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	120	1115	754	42	56	95
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	1212	820	46	61	103
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	865				1709	433
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	865				1709	433
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	83				11	82
cM capacity (veh/h)	774				68	571

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	130	606	606	546	319	164
Volume Left	130	0	0	0	0	61
Volume Right	0	0	0	0	46	103
cSH	774	1700	1700	1700	1700	153
Volume to Capacity	0.17	0.36	0.36	0.32	0.19	1.08
Queue Length 95th (ft)	15	0	0	0	0	215
Control Delay (s)	10.6	0.0	0.0	0.0	0.0	153.8
Lane LOS	B					F
Approach Delay (s)	1.0			0.0		153.8
Approach LOS						F

Intersection Summary			
Average Delay	11.2		
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	120	1115	754	42	56	95
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	1212	820	46	61	103
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	865				1709	433
vC1, stage 1 conf vol					842	
vC2, stage 2 conf vol					867	
vCu, unblocked vol	865				1709	433
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	83				75	82
cM capacity (veh/h)	774				243	571

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	130	606	606	546	319	61	103
Volume Left	130	0	0	0	0	61	0
Volume Right	0	0	0	0	46	0	103
cSH	774	1700	1700	1700	1700	243	571
Volume to Capacity	0.17	0.36	0.36	0.32	0.19	0.25	0.18
Queue Length 95th (ft)	15	0	0	0	0	24	16
Control Delay (s)	10.6	0.0	0.0	0.0	0.0	24.7	12.7
Lane LOS	B					C	B
Approach Delay (s)	1.0			0.0		17.1	
Approach LOS						C	

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Volume (vph)	9	292	1640	271	2	156	1121	264	327	352	123	336	256	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		500		0		250		200	350		550	200		0
Storage Lanes		1		1		1		1	2		1	2		1
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97	0.95	0.95	0.97	1.00	1.00
Frt				0.850				0.850		0.961				0.850
Flt Protected		0.950				0.950			0.950			0.950		
Satd. Flow (prot)	0	1736	3471	1553	0	1736	3471	1553	3367	3336	0	3367	1827	1553
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	1736	3471	1553	0	1736	3471	1553	3367	3336	0	3367	1827	1553
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				156				153		30				115
Link Speed (mph)			35				35			35			35	
Link Distance (ft)			634				1600			613			1799	
Travel Time (s)			12.4				31.2			11.9			35.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	10	317	1783	295	2	170	1218	287	355	383	134	365	278	76
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	327	1783	295	0	172	1218	287	355	517	0	365	278	76
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	5	2		1	1	6		7	4		3	8	
Permitted Phases				2				6						8
Detector Phase	5	5	2	2	1	1	6	6	7	4		3	8	8
Switch Phase														
Minimum Initial (s)	3.0	3.0	15.0	15.0	3.0	3.0	15.0	15.0	3.0	5.0		3.0	5.0	5.0
Minimum Split (s)	8.0	8.0	34.0	34.0	8.0	8.0	30.0	30.0	8.0	38.0		8.0	37.0	37.0
Total Split (s)	33.0	33.0	75.0	75.0	18.0	18.0	60.0	60.0	20.0	38.0		19.0	37.0	37.0
Total Split (%)	22.0%	22.0%	50.0%	50.0%	12.0%	12.0%	40.0%	40.0%	13.3%	25.3%		12.7%	24.7%	24.7%
Yellow Time (s)	3.6	3.6	4.0	4.0	3.6	3.6	4.0	4.0	3.6	4.0		3.6	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		4.6	5.0	5.0		4.6	5.0	5.0	4.6	5.0		4.6	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	None	None	C-Max	C-Max	None	Min		None	Min	Min
Act Effct Green (s)		31.5	70.1	70.1		18.3	56.8	56.8	15.4	28.1		14.4	27.1	27.1
Actuated g/C Ratio		0.21	0.47	0.47		0.12	0.38	0.38	0.10	0.19		0.10	0.18	0.18
v/c Ratio		0.90	1.10	0.37		0.82	0.93	0.42	1.03	0.80		1.13	0.84	0.20
Control Delay		84.5	92.8	12.8		95.8	48.8	11.3	120.2	64.2		148.6	81.5	3.2
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		84.5	92.8	12.8		95.8	48.8	11.3	120.2	64.2		148.6	81.5	3.2
LOS		F	F	B		F	D	B	F	E		F	F	A
Approach Delay			81.9				47.2			87.0			107.3	
Approach LOS			F				D			F			F	
Queue Length 50th (ft)		312	~1038	80		175	620	40	~190	241		~212	264	0
Queue Length 95th (ft)		#531	#1175	152		m#342	m#754	m82	#295	299		#319	362	13
Internal Link Dist (ft)			554				1520			533			1719	
Turn Bay Length (ft)		500				250		200	350			200		
Base Capacity (vph)		364	1621	808		211	1314	683	345	757		323	389	421
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.90	1.10	0.37		0.82	0.93	0.42	1.03	0.68		1.13	0.71	0.18

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 25 (17%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 75.6 Intersection LOS: E
Intersection Capacity Utilization 93.3% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Chain Lake Road & US-2

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Volume (vph)	2	255	936	5	151	780	51	197	251	230	183	210	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	225		0	1000		150	150		250
Storage Lanes		1		0	1		0	1		1	1		1
Taper Length (ft)		25			25			25			25		
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.991				0.850			0.850
Flt Protected		0.950			0.950			0.950			0.950		
Satd. Flow (prot)	0	1719	3435	0	1719	3407	0	1719	1810	1538	1719	1810	1538
Flt Permitted		0.950			0.950			0.305			0.195		
Satd. Flow (perm)	0	1719	3435	0	1719	3407	0	552	1810	1538	353	1810	1538
Right Turn on Red				Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						6				185			232
Link Speed (mph)			35			55			35			35	
Link Distance (ft)			1600			420			1848			794	
Travel Time (s)			31.2			5.2			36.0			15.5	
Peak Hour Factor	0.92	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	2	260	955	5	154	796	52	201	256	235	187	214	232
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	262	960	0	154	848	0	201	256	235	187	214	232
Turn Type	Prot	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	5	2		1	6		7	4		3	8	
Permitted Phases								4		4	8		8
Detector Phase	5	5	2		1	6		7	4	4	3	8	8
Switch Phase													
Minimum Initial (s)	3.0	3.0	10.0		3.0	10.0		3.0	3.0	3.0	3.0	5.0	5.0
Minimum Split (s)	7.6	7.6	27.0		7.6	24.0		7.6	35.0	35.0	8.0	10.0	10.0
Total Split (s)	30.0	30.0	75.0		30.0	75.0		15.0	30.0	30.0	15.0	30.0	30.0
Total Split (%)	20.0%	20.0%	50.0%		20.0%	50.0%		10.0%	20.0%	20.0%	10.0%	20.0%	20.0%
Yellow Time (s)	3.6	3.6	4.0		3.6	4.0		3.6	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		4.6	5.0		4.6	5.0		4.6	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Act Effct Green (s)		24.9	78.1		18.7	71.9		34.4	23.6	23.6	33.6	23.6	23.6
Actuated g/C Ratio		0.17	0.52		0.12	0.48		0.23	0.16	0.16	0.22	0.16	0.16
v/c Ratio		0.92	0.54		0.72	0.52		0.97	0.90	0.59	1.10	0.75	0.53
Control Delay		54.5	36.8		81.4	28.7		105.3	94.6	20.6	144.1	77.3	11.0
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		54.5	36.8		81.4	28.7		105.3	94.6	20.6	144.1	77.3	11.0
LOS		D	D		F	C		F	F	C	F	E	B
Approach Delay			40.6			36.8			72.6			72.7	
Approach LOS			D			D			E			E	
Queue Length 50th (ft)		266	356		147	303		164	246	43	~167	201	0
Queue Length 95th (ft)		m249	m328		218	366		#264	#398	135	#304	296	80
Internal Link Dist (ft)			1520			340			1768			714	
Turn Bay Length (ft)		250			225			1000		150	150		250
Base Capacity (vph)		293	1789		291	1636		207	301	410	170	301	449
Starvation Cap Reductn		0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.89	0.54		0.53	0.52		0.97	0.85	0.57	1.10	0.71	0.52

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 51.5 Intersection LOS: D
Intersection Capacity Utilization 78.4% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: E Main Street/Old Owen Road & US-2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	222	1127	762	54	67	230
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	241	1225	828	59	73	250
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	887				1953	443
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	887				1953	443
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	68				0	56
cM capacity (veh/h)	759				38	562

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	241	612	612	552	335	323
Volume Left	241	0	0	0	0	73
Volume Right	0	0	0	0	59	250
cSH	759	1700	1700	1700	1700	137
Volume to Capacity	0.32	0.36	0.36	0.32	0.20	2.35
Queue Length 95th (ft)	34	0	0	0	0	689
Control Delay (s)	11.9	0.0	0.0	0.0	0.0	680.3
Lane LOS	B					F
Approach Delay (s)	2.0			0.0		680.3
Approach LOS						F

Intersection Summary			
Average Delay	83.1		
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	222	1127	762	54	67	230
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	241	1225	828	59	73	250
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	887				1953	443
vC1, stage 1 conf vol					858	
vC2, stage 2 conf vol					1095	
vCu, unblocked vol	887				1953	443
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	68				57	56
cM capacity (veh/h)	759				169	562

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	241	612	612	552	335	73	250
Volume Left	241	0	0	0	0	73	0
Volume Right	0	0	0	0	59	0	250
cSH	759	1700	1700	1700	1700	169	562
Volume to Capacity	0.32	0.36	0.36	0.32	0.20	0.43	0.44
Queue Length 95th (ft)	34	0	0	0	0	49	57
Control Delay (s)	11.9	0.0	0.0	0.0	0.0	41.5	16.4
Lane LOS	B					E	C
Approach Delay (s)	2.0			0.0		22.1	
Approach LOS						C	

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Volume (vph)	9	292	1584	271	2	156	1106	261	327	352	123	326	256	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		500		0		250		200	350		550	200		0
Storage Lanes		1		1		1		1	2		1	2		1
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97	0.95	0.95	0.97	1.00	1.00
Frt				0.850				0.850		0.961				0.850
Flt Protected		0.950				0.950			0.950			0.950		
Satd. Flow (prot)	0	1736	3471	1553	0	1736	3471	1553	3367	3336	0	3367	1827	1553
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	1736	3471	1553	0	1736	3471	1553	3367	3336	0	3367	1827	1553
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				159				153		30				115
Link Speed (mph)			35				35			35			35	
Link Distance (ft)			634				1600			613			1799	
Travel Time (s)			12.4				31.2			11.9			35.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Adj. Flow (vph)	10	317	1722	295	2	170	1202	284	355	383	134	354	278	76
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	327	1722	295	0	172	1202	284	355	517	0	354	278	76
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA		Prot	NA	Perm
Protected Phases	5	5	2		1	1	6		7	4		3	8	
Permitted Phases				2				6						8
Detector Phase	5	5	2	2	1	1	6	6	7	4		3	8	8
Switch Phase														
Minimum Initial (s)	3.0	3.0	15.0	15.0	3.0	3.0	15.0	15.0	3.0	5.0		3.0	5.0	5.0
Minimum Split (s)	8.0	8.0	34.0	34.0	8.0	8.0	30.0	30.0	8.0	38.0		8.0	37.0	37.0
Total Split (s)	33.0	33.0	74.0	74.0	19.0	19.0	60.0	60.0	20.0	38.0		19.0	37.0	37.0
Total Split (%)	22.0%	22.0%	49.3%	49.3%	12.7%	12.7%	40.0%	40.0%	13.3%	25.3%		12.7%	24.7%	24.7%
Yellow Time (s)	3.6	3.6	4.0	4.0	3.6	3.6	4.0	4.0	3.6	4.0		3.6	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		4.6	5.0	5.0		4.6	5.0	5.0	4.6	5.0		4.6	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	None	None	C-Max	C-Max	None	Min		None	Min	Min
Act Effct Green (s)		31.5	70.0	70.0		18.3	56.8	56.8	15.4	28.1		14.4	27.1	27.1
Actuated g/C Ratio		0.21	0.47	0.47		0.12	0.38	0.38	0.10	0.19		0.10	0.18	0.18
v/c Ratio		0.90	1.06	0.36		0.82	0.91	0.42	1.03	0.80		1.10	0.84	0.20
Control Delay		84.5	79.7	12.8		96.0	47.7	11.3	120.2	64.2		138.8	81.5	3.2
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		84.5	79.7	12.8		96.0	47.7	11.3	120.2	64.2		138.8	81.5	3.2
LOS		F	E	B		F	D	B	F	E		F	F	A
Approach Delay			72.0				46.4			87.0			101.7	
Approach LOS			E				D			F			F	
Queue Length 50th (ft)		312	~986	79		174	608	39	~190	241		~201	264	0
Queue Length 95th (ft)		#531	#1122	152		m#327	m#735	m82	#295	299		#306	362	13
Internal Link Dist (ft)			554				1520			533			1719	
Turn Bay Length (ft)		500				250		200	350			200		
Base Capacity (vph)		364	1620	810		211	1314	683	345	757		323	389	421
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.90	1.06	0.36		0.82	0.91	0.42	1.03	0.68		1.10	0.71	0.18

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 25 (17%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 70.5 Intersection LOS: E
Intersection Capacity Utilization 91.5% ICU Level of Service F
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Chain Lake Road & US-2

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Volume (vph)	2	255	870	5	146	762	48	197	251	213	173	210	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		250		0	225		0	1000		150	150		250
Storage Lanes		1		0	1		0	1		1	1		1
Taper Length (ft)		25			25			25			25		
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.999			0.991				0.850			0.850
Flt Protected		0.950			0.950			0.950			0.950		
Satd. Flow (prot)	0	1719	3435	0	1719	3407	0	1719	1810	1538	1719	1810	1538
Flt Permitted		0.950			0.950			0.305			0.195		
Satd. Flow (perm)	0	1719	3435	0	1719	3407	0	552	1810	1538	353	1810	1538
Right Turn on Red				Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						6				171			232
Link Speed (mph)			35			55			35			35	
Link Distance (ft)			1600			420			1848			794	
Travel Time (s)			31.2			5.2			36.0			15.5	
Peak Hour Factor	0.92	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	2%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Adj. Flow (vph)	2	260	888	5	149	778	49	201	256	217	177	214	232
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	262	893	0	149	827	0	201	256	217	177	214	232
Turn Type	Prot	Prot	NA		Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	5	2		1	6		7	4		3	8	
Permitted Phases								4		4	8		8
Detector Phase	5	5	2		1	6		7	4	4	3	8	8
Switch Phase													
Minimum Initial (s)	3.0	3.0	10.0		3.0	10.0		3.0	3.0	3.0	3.0	5.0	5.0
Minimum Split (s)	7.6	7.6	27.0		7.6	24.0		7.6	35.0	35.0	8.0	10.0	10.0
Total Split (s)	30.0	30.0	75.0		30.0	75.0		15.0	30.0	30.0	15.0	30.0	30.0
Total Split (%)	20.0%	20.0%	50.0%		20.0%	50.0%		10.0%	20.0%	20.0%	10.0%	20.0%	20.0%
Yellow Time (s)	3.6	3.6	4.0		3.6	4.0		3.6	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Lost Time (s)		4.6	5.0		4.6	5.0		4.6	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	C-Max		None	C-Max		None	Min	Min	None	Min	Min
Act Effct Green (s)		24.9	78.6		18.2	71.9		34.4	23.6	23.6	33.6	23.6	23.6
Actuated g/C Ratio		0.17	0.52		0.12	0.48		0.23	0.16	0.16	0.22	0.16	0.16
v/c Ratio		0.92	0.50		0.72	0.51		0.97	0.90	0.56	1.04	0.75	0.53
Control Delay		54.7	35.8		81.4	28.4		105.3	94.6	20.2	128.0	77.3	11.0
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		54.7	35.8		81.4	28.4		105.3	94.6	20.2	128.0	77.3	11.0
LOS		D	D		F	C		F	F	C	F	E	B
Approach Delay			40.1			36.5			73.9			67.0	
Approach LOS			D			D			E			E	
Queue Length 50th (ft)		267	335		142	293		164	246	39	~146	201	0
Queue Length 95th (ft)		m256	m318		211	355		#264	#398	126	#282	296	80
Internal Link Dist (ft)			1520			340			1768			714	
Turn Bay Length (ft)		250			225			1000		150	150		250
Base Capacity (vph)		293	1799		291	1636		207	301	398	170	301	449
Starvation Cap Reductn		0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn		0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn		0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio		0.89	0.50		0.51	0.51		0.97	0.85	0.55	1.04	0.71	0.52

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 150
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 50.6 Intersection LOS: D
Intersection Capacity Utilization 77.8% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: E Main Street/Old Owen Road & US-2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	105	1151	778	21	39	179
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	1251	846	23	42	195
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	868				1711	434
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	868				1711	434
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				39	66
cM capacity (veh/h)	771				70	570

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	114	626	626	564	305	237
Volume Left	114	0	0	0	0	42
Volume Right	0	0	0	0	23	195
cSH	771	1700	1700	1700	1700	249
Volume to Capacity	0.15	0.37	0.37	0.33	0.18	0.95
Queue Length 95th (ft)	13	0	0	0	0	217
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	87.9
Lane LOS	B					F
Approach Delay (s)	0.9			0.0		87.9
Approach LOS						F

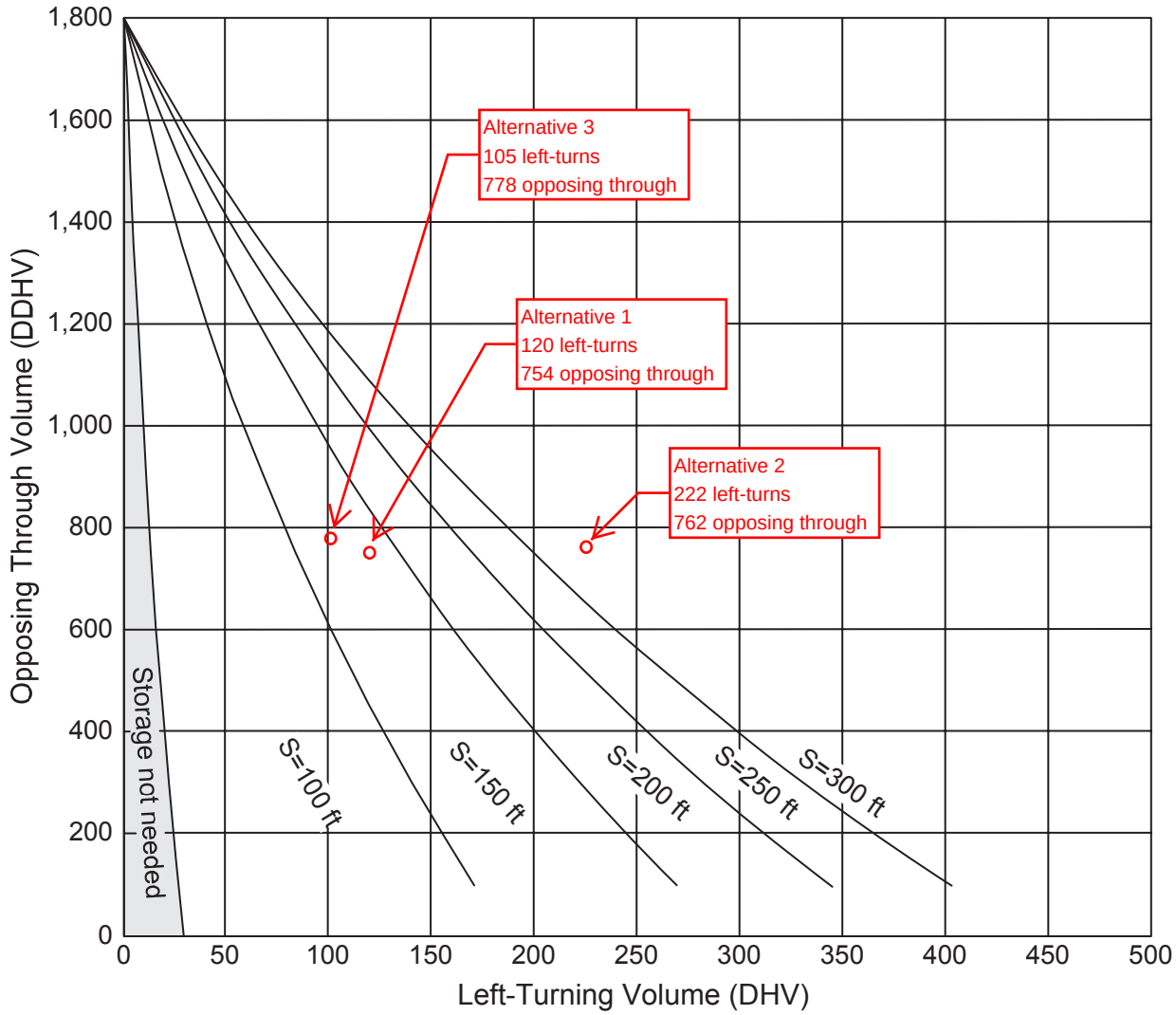
Intersection Summary			
Average Delay	8.9		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	105	1151	778	21	39	179
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	114	1251	846	23	42	195
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	868				1711	434
vC1, stage 1 conf vol					857	
vC2, stage 2 conf vol					854	
vCu, unblocked vol	868				1711	434
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)	2.2				3.5	3.3
p0 queue free %	85				83	66
cM capacity (veh/h)	771				247	570

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	114	626	626	564	305	42	195
Volume Left	114	0	0	0	0	42	0
Volume Right	0	0	0	0	23	0	195
cSH	771	1700	1700	1700	1700	247	570
Volume to Capacity	0.15	0.37	0.37	0.33	0.18	0.17	0.34
Queue Length 95th (ft)	13	0	0	0	0	15	38
Control Delay (s)	10.5	0.0	0.0	0.0	0.0	22.5	14.6
Lane LOS	B					C	B
Approach Delay (s)	0.9			0.0		16.0	
Approach LOS						C	

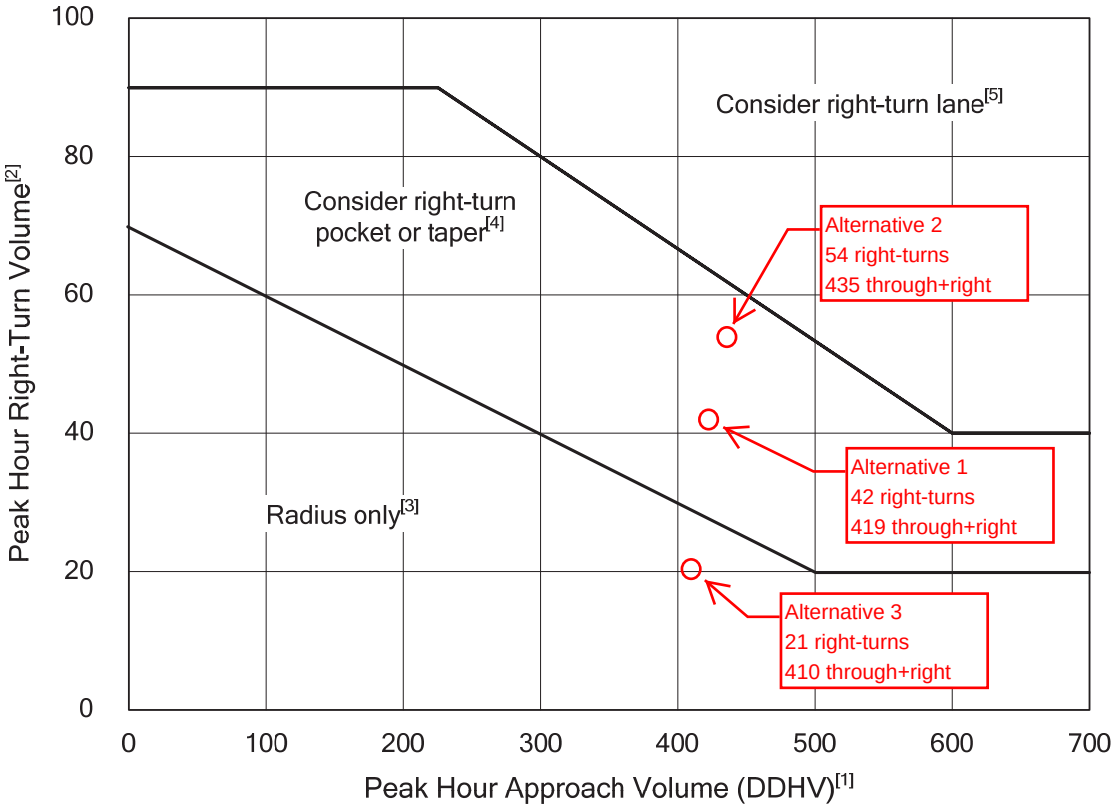
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

Channelization Analysis



S = Left-turn storage length

Left-Turn Storage Guidelines: Four-Lane, Unsignalized
Exhibit 1310-15b



Notes:

[1] For two-lane highways, use the peak hour DDHV (through + right-turn).
For multilane, high-speed highways (posted speed 45 mph or above), use the right-lane peak hour approach volume (through + right-turn).

[2] When all three of the following conditions are met, reduce the right-turn DDHV by 20:
- The posted speed is 45 mph or below
- The right-turn volume is greater than 40 VPH
- The peak hour approach volume (DDHV) is less than 300 VPH

[3] For right-turn corner design, see Exhibit 1310-14.

[4] For right-turn pocket or taper design, see Exhibit 1310-20.

[5] For right-turn lane design, see Exhibit 1310-21.

General:

For additional guidance, see 1310.07(3).

Right-Turn Lane Guidelines[6]
Exhibit 1310-19

(4) Speed Change Lanes

A speed change lane is an auxiliary lane primarily for the acceleration or deceleration of vehicles entering or leaving the through traveled way. Speed change lanes are normally provided for at-grade intersections on multilane divided highways with access control. Where roadside conditions and right of way allow, speed change lanes may be provided on other through roadways. Justification for a speed change lane depends on many factors, including speed; traffic volumes; capacity; type of highway; design and frequency of intersections; and collision history.

Appendix G
Shoreline Use and Modification Matrix

C. Shoreline Use and Modification Matrix

The following matrices indicate the allowable uses and shoreline modifications and some of the standards applicable to those uses and modifications. Where there is a conflict between the chart and the written provisions in Chapters 3, 4, or 5 of this Shoreline Master Program, the written provisions shall apply.

Any use, development or substantial development not classified elsewhere in this Shoreline Master Program or listed below shall require a Conditional Use Permit (CUP).

The chart is coded according to the following legend.

P = May be permitted
C = May be permitted as a conditional use only
X = Prohibited; the use is not eligible for a Variance or Conditional Use Permit
N/A = Not applicable

	Natural	High Intensity	Urban Conservancy	Urban Cons. - Mining	Shoreline Residential	Tye Stormwater Facility	Aquatic [1]
SHORELINE USE							
Agriculture	X	X	X	X	X	X	X
Aquaculture	X	X	X	X	X	X	X
Boating facilities	X	X	X[6]	C[12]	X	P[9]	P
Commercial:							
Water-dependent	X	P	C	X	X	P	X
Water-related, water-enjoyment	X	P	C	X	X	P	X
Nonwater-oriented	X	C	X	X	X	P	X
Flood hazard management	C[4]	P	P	P	P	P	X
Forest practices[7]	X	P	P	P	P	P	X
In-stream structures	X	C	C	C	C	C	C
Industrial:							
Water-dependent	X	P	X	C[5]	X	X	X
Water-related, water-enjoyment	X	P	X	C[5]	X	X	X
Nonwater-oriented	X	C	X	C[5]	X	P	X
Mining	X	X	X	C[5]	X	X	X
Parking (accessory)	X	P	P	C	P	P	X
Parking (primary, including paid)	X	X	X	X	X	X	X
Recreation:							
Water-dependent	C	P	P	P	P	P	C
Water-related, water-enjoyment	C	P	P	P	P	P	C
Nonwater-oriented	X	C	C[2]	C[2]	C	P	X
Single-family residential	X	X	X	X	P	X	X
Multifamily residential	X	P	X	X	P	X	X
Land division (See Section 6.B.7.)	X	P	X	X	P	P	X
Signs:							
On premises	X	P	X	X	X	P	X
Off premises	X	X	X	X	X	P	X
Public, highway	P	P	P	P	X	P	X
Solid waste disposal	X	X	X	X	X	X	X

The chart is coded according to the following legend. P = May be permitted C = May be permitted as a conditional use only X = Prohibited; the use is not eligible for a Variance or Conditional Use Permit N/A = Not applicable	**Natural**	**High Intensity**	**Urban Conservancy**	**Urban Cons. - Mining**	**Shoreline Residential**	**Tye Stormwater Facility**	**Aquatic [1]**
Transportation:							
Water-dependent	X	P	P	P	P	P	C
Nonwater-oriented	X	P[3]	C[3]	C[3]	C[3]	P	C
Roads, railroads	X	P[3]	C[3]	C[3]	P[3]	P	C
Utilities (primary)	X	P[3]	C[3]	C[3]	P[3]	P	C
SHORELINE MODIFICATIONS							
Shoreline stabilization:							
Beach restoration/enhancement	C[4]	P	P[4]	P[4]	P	P	See adjacent upland environment
Bioengineering	C[4]	P	P[4]	P[4]	P	P	
Revetments	X	C[4]	C[4]	C[4]	C[4]	C	
Bulkheads	X	C[4]	C[4]	C[4]	C[4]	C	
Breakwaters/jetties/rock weirs/groins	X	X	X	X	X	X	
Dikes, levees	X	X	X	X	X	P	
Dredging	X	X	X	X	X	P[10]	
Hazardous waste cleanup[8]	P	P	P	P	P	P	
Fill	X	X	X	C[4]	X	P	
Piers, docks	X	X	X	X	X	X[11]	

Notes to Matrix:

1. *The use or shoreline modification may be allowed in the Aquatic Environment if, and only if, permitted in the adjacent upland environment.*
2. *Public access, as approved by the City, is a condition of nonwater-dependent development on properties with shoreline waterbody frontage.*
3. *The use may be allowed provided there is no other feasible route or location.*
4. *The shoreline modification may be allowed for environmental restoration or if the City determines that there will be a net increase in desired shoreline ecological functions.*
5. *Continued aggregate washing, crushing and screening, and continued concrete batching facilities or concrete ready-mix facilities are permitted, together with accessory uses such as truck scales, office trailers, maintenance shops, equipment sheds, aggregate depots, and facilities for fueling equipment, provided that these facilities and activities are not expanded. See Section 5.E. Mining for conditions.*
6. *The existing boat launch at the Washington State Department of Fish and Wildlife Lewis Street Access Site may be modified and improved consistent with state and federal regulatory agency permits that must be obtained prior to Conditional Use Permit approval. No new boating facilities are allowed in the Urban Conservancy environment.*

7. *All forest practices subject to the Washington State Forest Practices Act (Title 222 WAC; Chapters 76.09 and 76.13 RCW) must conform to the provisions of that Act, this Shoreline Master Program, and any other applicable City requirements. See Section 3.L Vegetation Conservation and Appendix A Critical Areas Regulations of this Master Program for other conditions.*
8. *Any cleanup activities must be coordinated with approval and oversight by the Department of Ecology, or conducted under Ecology's Voluntary Cleanup Program.*
9. *New boating facilities may be constructed to provide improved access for non-motorized and small electric boats (≤1.5 hp). All facilities, including boat launches or piers and docks, will be designed in consultation with Washington Department of Fish and Wildlife. No facilities will be constructed to provide long-term moorage.*
10. *Dredging may only be conducted as necessary to maintain the stormwater detention function of the pond. Dredging must be conducted in a way that minimizes impacts to ecological functions and any impacts must be mitigated.*
11. *The prohibition on piers and docks does not apply to public recreational facilities, which are addressed under Boating Facilities.*
12. *The only new boating facility that may be permitted in the Urban Conservancy – Mining environment is a boat launch. A new boat launch or future improvements to a boat launch will be designed in consultation with Washington Department of Fish and Wildlife.*

Appendix H
Boundary Line Adjustment and Short Plat

HERITAGE BAPTIST FELLOWSHIP
PO BOX 1090
MONROE, WA 98272

ORIGINAL LEGAL DESCRIPTIONS

PARCEL A (LOT 2)

THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, IN SNOHOMISH COUNTY, WASHINGTON.
EXCEPT PORTION CONVEYED TO STATE OF WASHINGTON UNDER RECORDING NUMBERS 934495, 2274455 AND 2274456;
ALSO EXCEPT THAT PORTION THEREOF LYING WITHIN RIVMONT HEIGHTS DIV. NO. 1, ACCORDING TO PLAT RECORDED IN VOLUME 17 OF PLATS AT PAGES 99 AND 100 IN SNOHOMISH COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
BEGINNING AT THE NORTHWEST CORNER OF SAID SOUTHWEST QUARTER OF THE NORTHWEST QUARTER;
THENCE EASTERLY ALONG THE NORTH LINE TO A POINT WHICH IS 100 FEET WESTERLY FROM THE NORTHEAST CORNER THEREOF;
THENCE SOUTH 80°53'00" WEST 649.06 FEET;
THENCE SOUTH 77°58'38" WEST ALONG THE SOUTHERLY LINE OF SAID PLAT 640 FEET, MORE OR LESS, TO THE WEST LINE OF SAID SECTION 5;
THENCE NORTHERLY ALONG WEST LINE OF SECTION 5 FOR 245 FEET, MORE OR LESS, TO THE POINT OF BEGINNING.

PARCEL B (LOT 1)

THAT PORTION OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 6, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, IN SNOHOMISH COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:
BEGINNING AT THE NORTHWEST CORNER OF SAID SUBDIVISION;
THENCE SOUTH ALONG THE WEST LINE THEREOF 772.25 FEET TO THE TRUE POINT OF BEGINNING;
THENCE SOUTH 50°15'42" EAST 216.29 FEET ALONG THE SOUTHWESTERLY BOUNDARY OF LOT 13 OF RIVMONT HEIGHTS DIVISION NO. 2, ACCORDING TO PLAT RECORDED IN VOLUME 21 OF PLATS AT PAGE 100, IN SNOHOMISH COUNTY, WASHINGTON, TO THE MOST SOUTHERLY CORNER OF SAID PLAT;
THENCE ALONG THE SOUTHEASTERLY BOUNDARY OF RIVMONT HEIGHTS DIVISION NO. 2 NORTH 31°24'09" EAST 161.75 FEET;
THENCE NORTH 37°59'20" EAST 168.75 FEET;
THENCE NORTH 43°54'17" EAST 179.79 FEET;
THENCE NORTH 53°53'53" EAST 419.06 FEET;
THENCE NORTH 77°58'38" EAST TO A POINT ON THE EAST LINE OF SAID SOUTHEAST QUARTER OF THE NORTHEAST QUARTER BEING ALSO ON THE SOUTHERLY BOUNDARY OF RIVMONT HEIGHTS DIVISION NO. 1, ACCORDING TO PLAT RECORDED IN VOLUME 17 OF PLATS, AT PAGES 99 AND 100, IN SNOHOMISH COUNTY, WASHINGTON;
THENCE SOUTH ALONG THE EAST LINE OF SAID SOUTHEAST QUARTER OF THE NORTHEAST QUARTER TO THE SOUTHEAST CORNER THEREOF;
THENCE WEST ALONG THE SOUTH LINE TO THE SOUTHWEST CORNER OF SAID SOUTHEAST QUARTER OF THE NORTHEAST QUARTER;
THENCE NORTH ALONG THE WEST LINE THEREOF TO THE TRUE POINT OF BEGINNING.
EXCEPT PORTION CONVEYED TO STATE OF WASHINGTON UNDER RECORDING NUMBER 2274455.

CONVEYANCE LEGAL DESCRIPTION

THE WEST 50 FEET OF THE FOLLOWING DESCRIBED PARCEL:
THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, IN SNOHOMISH COUNTY, WASHINGTON.
EXCEPT PORTION CONVEYED TO STATE OF WASHINGTON UNDER RECORDING NUMBERS 934495, 2274455 AND 2274456;
ALSO EXCEPT THAT PORTION THEREOF LYING WITHIN RIVMONT HEIGHTS DIV. NO. 1, ACCORDING TO THE PLAT RECORDED IN VOLUME 17 OF PLATS AT PAGES 99 AND 100, IN SNOHOMISH COUNTY, WASHINGTON.

SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE BY ME OR UNDER MY DIRECTION IN CONFORMANCE WITH THE REQUIREMENTS OF THE SURVEY RECORDING ACT AT THE REQUEST OF Heritage Baptist Fellowship IN April 2004

TIMOTHY A. GRIFFIN
CERTIFICATE NO. 29276

TIMOTHY A. GRIFFIN — STATE OF WASHINGTON — 29276 — REGISTERED PROFESSIONAL LAND SURVEYOR — EXPIRES: 10/03/05

4-29-04

REVISED LEGAL DESCRIPTIONS

LOT 1

THAT PORTION OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 6, TOWNSHIP 27 NORTH, RANGE 7 EAST AND THE WEST 50 OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, IN SNOHOMISH COUNTY, WASHINGTON.
EXCEPT ANY PORTION THEREOF LYING WITHIN RIVMONT HEIGHTS DIVISION NO. 1, ACCORDING TO PLAT RECORDED IN VOLUME 17 OF PLATS, AT PAGES 99 AND 100;
AND EXCEPT ANY PORTION THEREOF LYING WITHIN RIVMONT HEIGHTS DIVISION NO. 2, ACCORDING TO PLAT RECORDED IN VOLUME 21 OF PLATS AT PAGE 100;
AND EXCEPT ANY PORTION THEREOF CONVEYED TO STATE OF WASHINGTON UNDER RECORDING NUMBERS 934495, 2274455 AND 2274456.

LOT 2

THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, IN SNOHOMISH COUNTY, WASHINGTON.
EXCEPT THE WEST 50 FEET THEREOF;
AND EXCEPT PORTION CONVEYED TO STATE OF WASHINGTON UNDER RECORDING NUMBERS 934495, 2274455 AND 2274456;
AND EXCEPT THAT PORTION THEREOF LYING WITHIN RIVMONT HEIGHTS DIV. NO. 1, ACCORDING TO PLAT RECORDED IN VOLUME 17 OF PLATS AT PAGES 99 AND 100, IN SNOHOMISH COUNTY, WASHINGTON.

EASEMENT

BOTH LOTS HAVE RIGHTS TO ACCESS AND TO INSTALL UTILITIES WITHIN THE 90' ACCESS AND UTILITY EASEMENT AND WILL SHARE THE COSTS OF MAINTENANCE OF ANY SHARED UTILITIES AND ACCESS IMPROVEMENTS IN A PRO RATA PORTION.

DECLARATION

KNOW ALL MEN BY THESE PRESENTS THAT THOMAS MINNICK THE UNDERSIGNED OWNERS IN FEE SIMPLE OF THE LAND, HEREBY DECLARE THIS BOUNDARY LINE ADJUSTMENT HEREON AND ACKNOWLEDGE THIS BOUNDARY LINE ADJUSTMENT IN ACCORDANCE WITH OUR FREE WILL AND DESIRES.

Thomas Minnick — April 30, 2004
PASTOR THOMAS MINNICK — DATE
FOR HERITAGE BAPTIST FELLOWSHIP

ACKNOWLEDGEMENT

STATE OF WASHINGTON)
COUNTY OF King) SS

I CERTIFY THAT I KNOW OR HAVE SATISFACTORY EVIDENCE THAT Thomas Minnick SIGNED THIS INSTRUMENT AND ACKNOWLEDGED IT TO BE HIS FREE AND VOLUNTARY ACT FOR THE USES AND PURPOSES MENTIONED IN THE INSTRUMENT.

DATED 4-30-04
SIGNATURE OF NOTARY PUBLIC Sydney Anne McCreary
MY APPOINTMENT EXPIRES 10-16-05

SYDNEY ANNE McCREARY — NOTARY PUBLIC — STATE OF WASHINGTON — 10-16-05

NOTES

1. ALL AREAS IDENTIFIED AS NATIVE GROWTH PROTECTION AREAS (NGPA) SHALL REMAIN UNDISTURBED IN PERPETUITY. NO FILLING, GRADING OR CONSTRUCTION ARE PERMITTED WITHIN THESE AREAS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE CITY OF MONROE COMMUNITY DEVELOPMENT DEPARTMENT.

2. COVENENTS, CONDITIONS AND RESTRICTIONS WILL BE SET WITH CONSTRUCTION DRAWINGS.

3. LEGAL DESCRIPTIONS FOR PROPOSED EASEMENTS:
   A. ACCESS AND UTILITIES WILL FOLLOW 90 FEET ADJACENT TO THE SOUTH BOUNDARY OF ADJUSTED LOT 2.
   B. AN UTILITY EASEMENT IS 50 FEET ADJACENT TO THE EAST BOUNDARY OF ADJUSTED LOT 2.

4. SUBJECT TO TWO EASEMENTS TO PUGET SOUND POWER AND LIGHT FOR ELECTRICAL TRANSMISSION UNDER RECORDING NUMBERS 624046 AND 624047. THE LEGAL DESCRIPTION CONTAINED IN THE EASEMENT IS NOT SUFFICIENT TO DETERMINE ITS EXACT LOCATION WITHIN THE SITE.

5. SUBJECT TO AN EASEMENT FOR WATERLINE UNDER RECORDING NUMBER 1306863. THIS EASEMENT SEEMS TO AFFECT THE PROPERTY NOW PLATTED AS RIVMONT HEIGHTS DIV. 1 AND 2. HOWEVER, A PORTION MAY LIE ALONG THE NORTHERLY PROPERTY LINE OF THE SITE.

6. SUBJECT TO THE RELINQUISHMENT OF ALL EXISTING AND FUTURE RIGHTS TO LIGHT, VIEW AND AIR, TOGETHER WITH THE RIGHTS OF ACCESS TO AND FROM THE STATE HIGHWAY AS CONVEYED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 2274455.

7. THE EXISTING ACCESS TO SR2 DOES NOT COMPLY WITH CURRENT WSDOT OR CITY OF MONROE STANDARDS. NO CONSTUCTION SHALL BE PERMITTED ON THE BOUNDARY LINE ADJUSTMENT OR WITHIN THE STATE RIGHT-OF-WAY UNTIL THE GENERAL PERMIT FROM THE WSDOT HAS BEEN ISSUED. NO BUILDING PERMITS WILL BE ISSUED UNTIL ACCESS IMPROVEMENTS HAVE BEEN COMPLETED.

8. AS OF THE DATE THIS BOUNDARY LINE ADJUSTMENT IS RECORDED, NEITHER DOMESTIC WATER SERVICE NOR SANITARY SEWER SERVICE FROM THE CITY OF MONROE IS AVAILABLE TO SERVE ANY OF THE LOTS WITHIN THIS BOUNDARY LINE ADJUSTMENT. PRIOR TO THE ISSUANCE OF ANY BUILDING PERMIT FOR ANY LOT WITHIN THIS BOUNDARY LINE ADJUSTMENT, DOMESTIC WATER SERVICE MUST BE EXTENDED TO SUCH LOT AT THE LOT OWNER'S SOLE COST AND EXPENSE OR THE LOT OWNER MUST OBTAIN APPROVAL FROM THE SNOHOMISH HEALTH DISTRICT FOR WATER SERVICE TO BE PROVIDED BY A DOMESTIC WELL TO BE CONSTRUCED AT THE LOT OWNER'S SOLE COST AND EXPENSE. ALSO, PRIOR TO THE ISSUANCE OF ANY BUILDING PERMIT FOR ANY LOT WITHIN THIS BOUNDARY LINE ADJUSTMENT, SANITARY SEWER SERVICE MUST BE EXTENDED TO THE LOT AT THE LOT OWNER'S SOLE COST AND EXPENSE OR THE LOT OWNER MUST OBTAIN APPROVAL FROM THE SNOHOMISH HEALTH DISTRICT FOR AN ON-SITE SEWAGE DISPOSAL SYSTEM TO BE CONSTRUCED AT THE LOT OWNER'S SOLE COST AND EXPENSE. THE CITY OF MONROE HAS NOT, EXPRESSLY OR IMPIEDLY MADE ANY DETERMINATION AS TO THE SUITABILITY OF ANY OF THE LOTS WITHIN THIS BOUNDARY LINE ADJUSTMENT FOR ANY DOMESTIC WELL SERVICE OR ON-SITE SEWAGE DISPOSAL SYSTEMS AND THE LOTS WITHIN THIS BOUNDARY LINE ADJUSTMENT MAY NOT BE DEVELOPED UNLESS AND UNTIL APPROVAL OF SUCH SYSTEMS IS OBTAINED FROM THE SNOHOMISH HEALTH DISTRICT OR DOMESTIC WATER SERVICE AND SANITARY SEWER SERVICE IS EXTENDED FROM THE CITY OF MONROE'S UTILITY SYSTEM.

9. THE EXISTING ACCESS TO SR2 WILL BE REMOVED WHEN THE NORTH MONROE INTERCHANGE IS CONSTRUCTED. ALTERNATIVE ACCESS WILL NOT BE PROVIDED BY THE CITY OF MONROE.

DETERMINATION

ON THE BASIS OF THE REPRESENTATIONS HEREBY SUBMITTED, THE CITY PLANNER HAS APPROVED THIS BOUNDARY LINE ADJUSTMENT (BA 199003) UNDER THE PROVISION OF CHAPTERS 17 AND 21, CITY OF MONROE'S MUNICIPAL CODE.

4/30/04
DATE

APPROVED BY DIRECTOR OF COMMUNITY DEVELOPMENT, CITY OF MONROE

AUDITORS CERTIFICATE

FILED FOR RECORD THIS 3rd DAY OF MAY, 2004 AT 11:00 A M. IN BOOK _____ OF SURVEYS AT PAGE _____
OF SURVEYS AT THE REQUEST OF Heritage Baptist Fellowship

Bob Terwilliger
COUNTY AUDITOR

Beverly Wold
DEPUTY AUDITOR

S.W. 1/4, N.W. 1/4 SEC 5, TWP 27 N, R 7 E, W.M. &
S.E. 1/4, N.E. 1/4 SEC 6, TWP 27 N, R 7 E, W.M.

REV. PER CITY COMMENTS 4-21-04 TG
REV. PER CITY COMMENTS 4-02-04 TG
REV. ADD ACCESS DRIVE AND NOTE 9-12-03 TG

200405035217

Mead Gilman & Assoc.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 289, WOODINVILLE, WA 98072 (425) 486-1252

DRAWN BY:	DATE:	JOB NO.:	SHEET:
DEB	04-30-03	02203	1 OF 3
CHKD BY: TG	SCALE: 1" = 200'		

PROJECT: HERITAGE CHURCH BOUNDARY LINE ADJUSTMENT 199003

CLIENT: HERITAGE BAPTIST CHURCH, MONROE, WA

SHEET 1 of 3

SCALE IN FEET

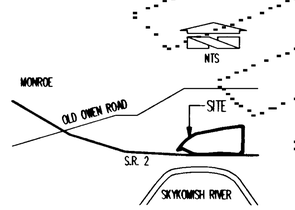
200 0 200 400

SCALE: 1" = 200'

MERIDIAN RECORD OF SURVEY VOL. 27, PG. 164

LEGEND

⊕ FOUND MONUMENT AS DESCRIBED



VICINITY MAP

SEC. CORNER
FND. 1/2" REBAR & CAP
"LS 14471"
N. 0.38'x W. 0.30' OF
CALCULATED POSITION
ORIGINAL IRON PIPE
FROM ROS 27-164
NOT FOUND.
HELD CALCULATED POS.

N 89°41'43" W 1283.16'

2566.32' 1283.16'

N 89°44'07" W 2561.19'

1/4 CORNER
FND. STONE MON.
W/ "X"
IN CASE
DN. 1.8'

SEC. CORNER
MONUMENT IN CASE

N 01°29'40" E 2281.45'

N 01°11'27" E 2380.40'

N 00°54'42" E 2480.59'

N 00°45'50" E 2680.17'

N 00°55'28" E 364.92'

PI MON.
FND. 4"x 4" CONC. MON.
W/ TACK IN LEAD
DN. 0.8' IN ASP. PATCH
330' E. OF INTX. W/ 215TH AVE.

CALHOUN ROAD
N 67°38'32" W 565.91'

FND. 4"x 4" CONC. MON.
W/ TACK IN LEAD
DN. 0.8' IN ASP. PATCH

RIVMONT HEIGHTS DIV. NO. 1
VOL. 17. PGS. 99 & 100

RIVMONT HEIGHTS DIV. NO. 2
VOL. 21. PG. 100

N87°20'19"W 102.46'

N 87°39'16" W 864.56'

S. LN. PLAT OF RIVMONT HGTS DIV. NO. 1

N 82°19'28" E 649.06'

N 79°25'06" E 1052.62' 558.35' 259.63' 234.64'

N55°20'21"E 419.06'

N 45°20'45" E 179.79'

N 39°25'48" E 168.75'

N 32°50'37" E 144.09'

185.04' N75°18'35"E

N 66°34'07" W 450.47'

397.96' N 86°24'35" W

132.46' 46.20'

475.12' N85°22'35"E

448.47' N 89°34'59" W

451.97' N 84°39'11" W

1297.55' N 85°17'11" W

970.63'

N 01°11'27" E

E. LN. SW 1/4, NW 1/4, 5-27-7

UNPLATTED

N 84°39'11" W 48.34'

N 05°20'49" E 90.00'

220.20'

838+45 193.00'

844+00

1297.55' 2595.10'

814+70 392.00'

1/4 CORNER
FND. IRREGULAR SHAPED
IRON BAR
2" N/S x 1 1/2" E/W
HELD CENTER

S. R. 2

LR LINE

EXIST. SR 2 CL

1/4 CORNER
FND. 4"x 4" CONC. MON.
W/ BRASS PIN & WASHER
"SNO. CO. ENG."
DN. 1.2' IN HOLE

N 85°17'11" W 2573.60'

REFERENCES

RECORD OF SURVEY VOL. 27, PG. 164
RECORD OF SURVEY VOL. 46, PG. 117
PLAT OF RIVMONT HEIGHTS DIV. NO. 1 VOL. 17, PGS. 99-100
PLAT OF RIVMONT HEIGHTS DIV. NO. 2 VOL. 21, PG. 100
"WETLAND DELINEATION REPORT MAP FOR HERITAGE BAPTIST FELLOWSHIP" BY WETLANDS RESOURCES, INC. WRI JOB. #99312, DATED DEC. 13, 1999
"PRIMARY STATE HIGHWAY NO. 15 (SR 2)" BY WASH STATE DEPT. OF TRANSPORTATION (WSDOT). SHEETS 3 AND 4 OF 11, APPROVED MAY 6, 1949
"WESTWICK ROAD TO NORTH MONROE INTERCHANGE" RIGHT OF WAY AND LIMITED ACCESS. SHEETS 16 AND 17 OF 17, DATED APRIL 1, 1971

S.W. 1/4, N.W. 1/4 SEC 5, TWP 27 N, R 7 E, W.M. &
S.E. 1/4, N.E. 1/4 SEC 6, TWP 27 N, R 7 E, W.M.

200405035217

SURVEY CONTROL

Mead Gilman & Assoc.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 289, WOODINVILLE, WA 98072 (425) 486-1252

DRAWN BY: DEB	DATE: 04-30-03	JOB NO.: 02203
CHKD BY: TG	SCALE: 1" = 200'	SHEET: 2 OF 3

EXPIRES: 10/03/05 4-29-04

PROJECT: HERITAGE CHURCH BOUNDARY LINE ADJUSTMENT 199003

CLIENT: HERITAGE BAPTIST CHURCH, MONROE, WA

SHEET 2 of 3

LINE TABLE

NUMBER	DIRECTION	DISTANCE
L59	N 66°34'07" W	54.94'
L60	N 21°56'11" E	30.08'
L61	N 48°11'46" E	63.46'
L62	N 18°08'21" E	62.56'
L63	N 55°32'25" E	50.27'
L64	N 62°05'33" E	160.90'
L65	N 67°16'33" E	108.10'
L66	N 84°57'51" E	202.09'
L67	N 75°26'50" E	180.46'
L68	S 66°09'05" W	90.81'
L69	S 68°56'23" W	89.00'
L70	S 82°19'28" W	125.91'
L71	N 52°52'21" E	16.52'
L76	N 28°04'08" W	47.25'
L77	N 39°04'02" W	136.67'
L78	N 50°37'38" W	74.74'
L79	N 36°38'14" W	80.06'
L80	N 05°37'15" E	47.43'
L81	N 18°46'22" E	39.71'
L82	N 07°30'18" E	39.08'
L83	N 20°18'57" W	56.98'
L84	N 36°52'08" W	78.80'
L85	N 51°05'32" W	107.08'
L86	N 84°39'11" W	177.31'
L87	N 28°56'54" W	121.96'
L88	N 69°28'10" W	117.68'
L89	N 29°27'17" W	35.92'
L90	N 05°19'25" W	92.22'
L91	N 17°22'43" W	77.78'
L92	N 87°40'12" W	47.26'
L93	N 76°22'52" W	56.95'
L94	N 73°11'08" W	43.69'
L95	N 29°03'31" W	160.52'
L96	N 50°35'45" E	129.50'
L97	N 70°10'57" E	54.97'
L98	N 51°37'11" E	54.63'
L99	N 10°31'47" E	27.41'
L100	N 62°53'25" E	28.37'
L101	N 76°48'59" E	48.78'
L102	N 71°18'33" W	28.58'
L103	N 01°21'15" E	10.36'
L104	N 53°05'30" W	122.99'
L105	N 43°00'10" W	35.94'
L106	N 71°12'01" W	91.06'
L107	N 73°09'02" W	18.17'
L108	N 66°20'37" E	33.38'
L109	N 49°14'54" E	30.07'
L111	N 25°38'49" E	25.33'
L112	N 62°00'51" W	18.88'
L113	N 79°14'52" W	14.32'
L114	N 69°23'10" E	13.58'
L115	N 52°59'54" E	55.23'
L116	N 76°41'21" W	43.07'
L117	N 86°20'08" W	32.54'
L118	N 75°55'36" W	49.61'
L119	N 85°52'28" E	40.73'
L120	N 69°15'56" E	13.97'
L121	N 42°36'18" W	18.74'
L122	N 65°26'07" W	35.02'
L123	N 84°13'18" W	29.73'
L124	N 89°58'11" E	131.91'

CURVE TABLE

NUMBER	DELTA ANGLE	RADIUS	ARC LENGTH
C3	62°12'55"	200.00	217.17
C4	99°23'10"	200.00	346.92
C5	74°24'47"	200.00	259.75
C6	34°44'37"	200.00	121.28
C7	22°59'11"	200.00	80.24
C8	18°41'46"	200.00	65.26

LOT AREAS

GROSS

ORIGINAL LOT 1	14.74 ACRES
REVISED LOT 1	15.73 ACRES
ORIGINAL LOT 2	28.07 ACRES
REVISED LOT 2	28.08 ACRES

NET

LOT 1	4.17 ACRES
LOT 2	9.66 ACRES

SURVEY NOTES

1. EQUIPMENT & PROCEDURES: A 5" ELECTRONIC TOTAL STATION WAS USED FOR THIS FIELD TRAVERSE SURVEY. ACCURACY MEETS OR EXCEEDS W.A.C. 332-130-090.
2. CONTROL MONUMENTATION VISITED MARCH 2003.
3. WETLAND FLAGS LOCATED BY HARMSEN AND ASSOCIATES, MONROE, WA. WETLANDS AND 200' SHORELINE DESIGNATION BY WETLANDS RESOURSES, INC. "WETLANDS DELINEATION REPORT MAP FOR HERITAGE BAPTIST FELLOWSHIP" DATED DECEMBER 13, 1999. WRI #99312
4. THE NET AREA SHOWN IS THE LOT AREA AFTER ADJUSTMENT WITHOUT AREAS WITHIN THE WETLAND BUFFER, 200 FOOT SHORELINE DESIGNATION AND IN THE PROPOSED ACCESS AND UTILITY EASEMENTS.

SCALE IN FEET

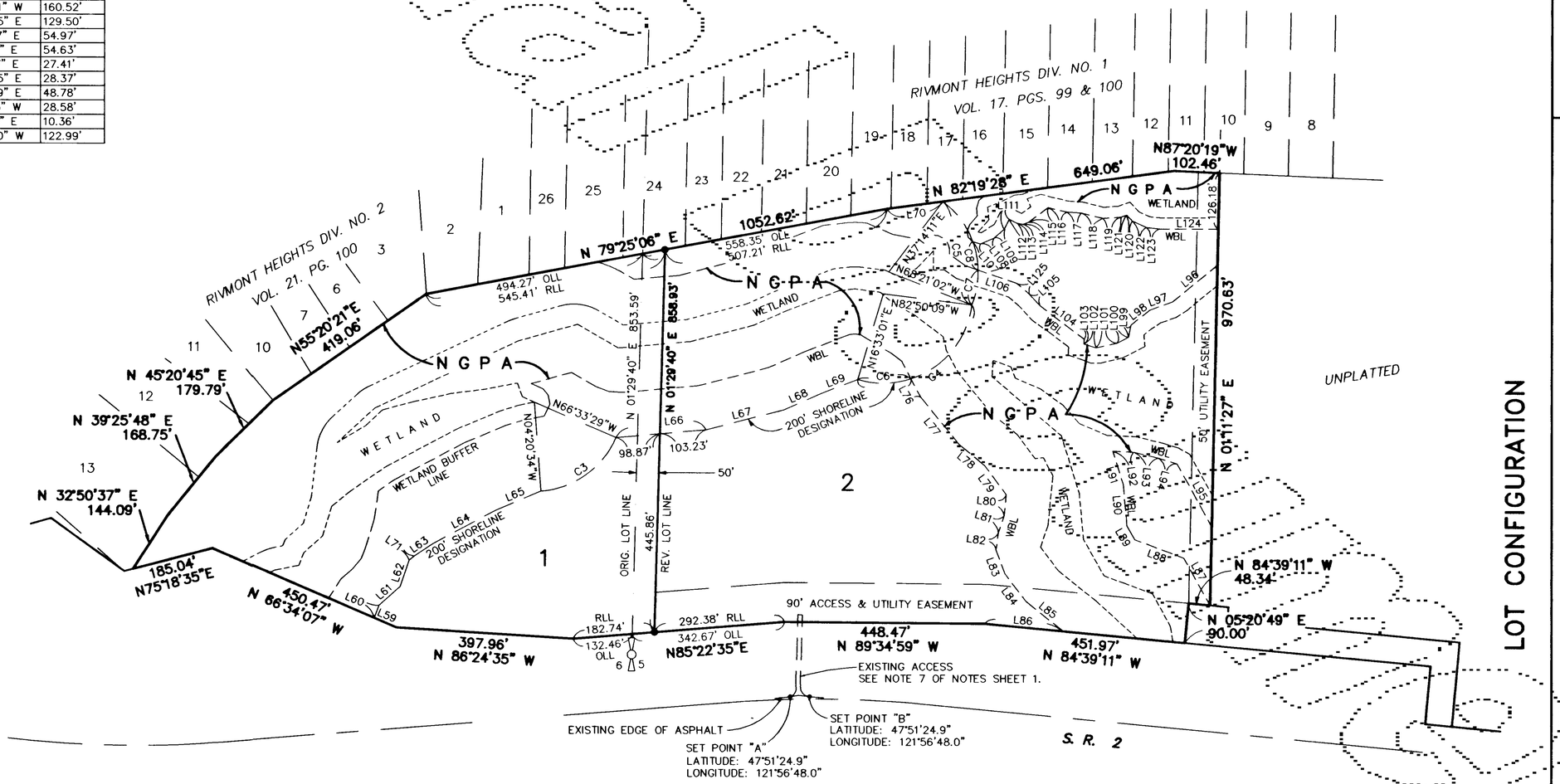
200 0 200 400

SCALE: 1" = 200'

MERIDIAN RECORD OF SURVEY VOL. 27, PG. 164

LEGEND

⊕	FOUND MONUMENT AS DESCRIBED
●	SET 1/2" REBAR & ORANGE CAP "MGA 29276 32434 35145 36811"
WBL	WETLAND BUFFER LINE
OLL	ORIGINAL LOT LINE
RLL	REVISED LOT LINE
NGPA	NATIVE GROWTH PROTECTION AREA SEE NOTE 1 OF NOTES SHEET 1



LOT CONFIGURATION

S.W. 1/4, N.W. 1/4 SEC 5, TWP 27 N, R 7 E, W.M. &
S.E. 1/4, N.E. 1/4 SEC 6, TWP 27 N, R 7 E, W.M.

200405035217

Mead Gilman & Assoc.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 289, WOODINVILLE, WA 98072 (425) 486-1252

DRAWN BY: DEB	DATE: 04-30-03
CHKD BY: TG	SCALE: 1" = 200'
JOB NO.: 02203	SHEET: 3 OF 3

EXPIRES: 10/03/05

4-09-04

PROJECT: HERITAGE CHURCH BOUNDARY LINE ADJUSTMENT 199003

CLIENT: HERITAGE BAPTIST CHURCH, MONROE, WA

SHEET 3 of 3

HERITAGE BAPTIST FELLOWSHIP
PO BOX 1090
MONROE, WA 98272

LEGAL DESCRIPTIONS

LOT 1

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, IN SNOHOMISH COUNTY, WASHINGTON.
EXCEPT THE WEST 50 FEET THEREOF;
AND EXCEPT PORTION CONVEYED TO STATE OF WASHINGTON UNDER RECORDING NUMBERS 934495, 2274455 AND 2274456 FOR HIGHWAY S.R. 2;
AND EXCEPT THAT PORTION THEREOF LYING WITHIN RIVMONT HEIGHTS DIV. NO. 1, ACCORDING TO PLAT RECORDED IN VOLUME 17 OF PLATS AT PAGES 99 AND 100, IN SNOHOMISH COUNTY, WASHINGTON
DESCRIBED AS FOLLOWS:
COMMENCING AT THE INTERSECTION OF THE WEST LINE OF SAID SOUTHWEST QUARTER WITH THE NORTH MARGIN OF S.R. 2;
THENCE NORTH 85°22'35" EAST, ALONG SAID NORTH MARGIN, 50.29 FEET TO THE EAST LINE OF THE WEST 50.00 FEET OF SAID SOUTHWEST QUARTER TO THE POINT OF BEGINNING;
THENCE NORTH 01°29'40" EAST, PARALLEL WITH THE WEST LINE OF SAID SOUTHWEST QUARTER, 858.93 FEET TO THE SOUTH LINE OF SAID PLAT OF RIVMONT HEIGHTS DIV. 1;
THENCE NORTH 79°25'06" EAST, ALONG SAID SOUTH LINE, 255.66 FEET;
THENCE SOUTH 01°29'40" WEST 885.62 FEET TO THE NORTH MARGIN OF SR 2;
THENCE SOUTH 85°22'35" WEST, ALONG SAID NORTH MARGIN, 251.43 FEET TO THE POINT OF BEGINNING.

LOT 2

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, IN SNOHOMISH COUNTY, WASHINGTON.
EXCEPT THE WEST 50 FEET THEREOF;
AND EXCEPT PORTION CONVEYED TO STATE OF WASHINGTON UNDER RECORDING NUMBERS 934495, 2274455 AND 2274456 FOR HIGHWAY S.R. 2;
AND EXCEPT THAT PORTION THEREOF LYING WITHIN RIVMONT HEIGHTS DIV. NO. 1, ACCORDING TO PLAT RECORDED IN VOLUME 17 OF PLATS AT PAGES 99 AND 100, IN SNOHOMISH COUNTY, WASHINGTON
DESCRIBED AS FOLLOWS:
COMMENCING AT THE INTERSECTION OF THE WEST LINE OF SAID SOUTHWEST QUARTER WITH THE NORTH MARGIN OF S.R. 2;
THENCE NORTH 85°22'35" EAST, ALONG SAID NORTH MARGIN, 301.72 FEET TO THE POINT OF BEGINNING;
THENCE NORTH 01°29'40" EAST, PARALLEL WITH THE WEST LINE OF SAID SOUTHWEST QUARTER, 885.62 FEET TO THE SOUTH LINE OF SAID PLAT OF RIVMONT HEIGHTS DIV. 1;
THENCE NORTH 79°25'06" EAST, ALONG SAID SOUTH LINE, 251.56 FEET;
THENCE CONTINUING ALONG SAID SOUTH LINE NORTH 82°19?28? EAST 4.06 FEET;
THENCE SOUTH 01°29'40" WEST 930.59 FEET TO THE NORTH MARGIN OF SR 2;
THENCE SOUTH 89°34'59" EAST, ALONG SAID NORTH MARGIN, 209.32 FEET;
THENCE CONTINUING ALONG SAID NORTH MARGIN, SOUTH 85°22'35" WEST, 40.95 FEET TO THE POINT OF BEGINNING.

LOT 3

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, IN SNOHOMISH COUNTY, WASHINGTON.
EXCEPT THE WEST 50 FEET THEREOF;
AND EXCEPT PORTION CONVEYED TO STATE OF WASHINGTON UNDER RECORDING NUMBERS 934495, 2274455 AND 2274456 FOR S.R. 2;
AND EXCEPT THAT PORTION THEREOF LYING WITHIN RIVMONT HEIGHTS DIV. NO. 1, ACCORDING TO PLAT RECORDED IN VOLUME 17 OF PLATS AT PAGES 99 AND 100, IN SNOHOMISH COUNTY, WASHINGTON
DESCRIBED AS FOLLOWS:
COMMENCING AT THE INTERSECTION OF THE WEST LINE OF SAID SOUTHWEST QUARTER WITH THE NORTH MARGIN OF S.R. 2;
THENCE NORTH 85°22'35" EAST, ALONG SAID NORTH MARGIN, 342.67 FEET;
THENCE CONTINUING ALONG SAID NORTH MARGIN, SOUTH 89°34'59" EAST 209.32 FEET TO THE POINT OF BEGINNING;
THENCE NORTH 01°29'40" EAST 930.59 FEET TO THE SOUTH LINE OF SAID PLAT OF RIVMONT HEIGHTS DIV. NO. 1;
THENCE NORTH 82°19'28" EAST, ALONG SAID SOUTH LINE, 645.00 FEET;
THENCE CONTINUING ALONG SAID SOUTH LINE, SOUTH 87°20'19" EAST, 102.46 FEET TO THE EAST LINE OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SAID SECTION 5;
THENCE SOUTH 01°11'27" WEST, ALONG SAID EAST LINE, 419.00 FEET;
THENCE NORTH 88°48'33" WEST 711.42 FEET;
THENCE SOUTH 01°29'40" WEST 607.97 FEET TO THE NORTH MARGIN OF S.R. 2 TO A POINT LYING 30.01 FEET FROM THE POINT OF BEGINNING;
THENCE NORTH 89°34'59" WEST, ALONG SAID NORTH MARGIN, 30.01 FEET TO THE POINT OF BEGINNING.

LOT 4

A PORTION OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 27 NORTH, RANGE 7 EAST OF THE WILLAMETTE MERIDIAN, IN SNOHOMISH COUNTY, WASHINGTON.
EXCEPT THE WEST 50 FEET THEREOF;
AND EXCEPT PORTION CONVEYED TO STATE OF WASHINGTON UNDER RECORDING NUMBERS 934495, 2274455 AND 2274456 FOR HIGHWAY S.R. 2;
AND EXCEPT THAT PORTION THEREOF LYING WITHIN RIVMONT HEIGHTS DIV. NO. 1, ACCORDING TO PLAT RECORDED IN VOLUME 17 OF PLATS AT PAGES 99 AND 100, IN SNOHOMISH COUNTY, WASHINGTON
DESCIBED AS FOLLOWS:
COMMENCING AT THE INTERSECTION OF THE WEST LINE OF SAID SOUTHWEST QUARTER WITH THE NORTH MARGIN OF SR 2;
THENCE NORTH 85°22'35" EAST, ALONG SAID NORTH MARGIN, 342.67 FEET;
THENCE CONTINUING ALONG SAID NORTH MARGIN, SOUTH 89°34'59" EAST 239.33 FEET TO THE POINT OF BEGINNING;
THENCE NORTH 01°29'40" EAST 607.97 FEET;
THENCE SOUTH 88°48'33" EAST 711.42 FEET TO THE EAST LINE OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER OF SAID SECTION 5;
THENCE SOUTH 01°11'27" WEST, ALONG SAID EAST LINE, 551.63 FEET TO THE NORTH MARGIN OF AN ACCESS TO S.R. 2;
THENCE NORTH 84°39'11" WEST, ALONG SAID MARGIN, 48.34 FEET;
THENCE CONTINUING ALONG SAID MARGIN SOUTH 05°20'49" WEST 90.00 FEET TO THE NORTH MARGIN OF S.R. 2;
THENCE NORTH 84°39'11" WEST, ALONG SAID NORTH MARGIN, 451.97 FEET;
THENCE CONTINUING ALONG SAID MARGIN NORTH 89°34'59" WEST 209.15 FEET TO THE POINT OF BEGINNING.

DEDICATION

KNOW ALL MEN BY THESE PRESENTS THAT THE HERITAGE BAPTIST FELLOWSHIP, THE UNDERSIGNED OWNER OF INTEREST IN THE LAND HEREBY SUBDIVIDED, HEREBY DECLARE THIS PLAT AND DEDICATE TO THE PUBLIC FOREVER ALL ROADS AND WAYS AND OTHER PUBLIC PROPERTY SHOWN HEREON AND THE USE THEREOF FOR ANY AND ALL PUBLIC PURPOSES, WITH THE RIGHT TO MAKE ALL NECESSARY SLOPES FOR CUTS AND FILLS, AND THE RIGHT TO CONTINUE TO DRAIN THE ROADS AND WAYS OVER AND ACROSS ANY LOT OR LOTS WHERE WATER MIGHT TAKE A NATURAL COURSE IN, OVER AND ACROSS ANY LOT OR LOTS, WHERE WATER MIGHT TAKE A NATURAL COURSE, IN THE ORIGINAL REASONABLE GRADING OF THE ROADS AND WAYS SHOWN HEREON.

FOLLOWING ORIGINAL REASONABLE GRADING OF ROADS AND WAYS HEREON, NO DRAINAGE WATERS ON ANY LOT OR LOTS SHALL BE DIVERTED OR BLOCKED FROM THEIR NATURAL COURSE SO AS TO DISCHARGE UPON ANY PUBLIC ROAD RIGHTS-OF-WAYS, OR TO HAMPER PROPER ROAD DRAINAGE. ANY ENCLOSING OF DRAINAGE WATERS IN CULVERTS OR DRAINS OR REROUTING THEREOF ACROSS ANY LOT AS MAY BE UNDERTAKEN BY OR FOR THE OWNER OF SUCH LOT SHALL BE DONE BY AND AT THE EXPENSE OF SUCH OWNER, BUT ONLY AFTER APPROVAL BY THE CITY ENGINEER.

IN WITNESS WHEREOF WE SET OUR HANDS AND SEALS THIS 30th DAY OF April, 2004.

Thomas Minnick
PASTOR THOMAS MINNICK
FOR HERITAGE BAPTIST FELLOWSHIP

ACKNOWLEDGEMENT

STATE OF WASHINGTON)
)SS
COUNTY OF King)

I CERTIFY THAT I KNOW OR HAVE SATISFACTORY EVIDENCE THAT Thomas Minnick SIGNED THIS INSTRUMENT AND ACKNOWLEDGED IT TO BE HIS FREE AND VOLUNTARY ACT FOR THE USES AND PURPOSES MENTIONED IN THE INSTRUMENT.

DATED 4-29-04

SIGNATURE OF NOTARY PUBLIC Sydney Anne McClang

MY APPOINTMENT EXPIRES 10-16-05

SYDNEY ANNE MCCLANG NOTARY PUBLIC 10-16-05 STATE OF WASHINGTON

SURVEYOR'S CERTIFICATE

I, TIMOTHY A. GRIFFIN PROFESSIONAL LAND SURVEYOR, DO HEREBY CERTIFY THAT THIS SHORT PLAT IS BASED ON AN ACTUAL SURVEY AND THAT THE DISTANCES, COURSES AND ANGLES ARE SHOWN THEREON CORRECTLY AND THAT MONUMENTS HAVE BEEN SET AND LOT CORNERS STAKED ON THE GROUND AS SHOWN ON THE PLAT.

TIMOTHY A. GRIFFIN
CERTIFICATE NO. 29276

4-29-04
DATE

TIMOTHY A. GRIFFIN STATE OF WASHINGTON 29276 REGISTERED PROFESSIONAL LAND SURVEYOR
EXPIRES: 10/03/05

NOTES

1. ALL AREAS IDENTIFIED AS NATIVE GROWTH PROTECTION AREAS (NGPA) SHALL REMAIN UNDISTURBED IN PERPETUITY. NO FILLING, GRADING OR CONSTRUCTION ARE PERMITTED WITHIN THESE AREAS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE CITY OF MONROE COMMUNITY DEVELOPMENT DEPARTMENT.

2. COVENENTS, CONDITIONS AND RESTRICTIONS WILL BE SET WITH CONSTRUCTION DRAWINGS.

3. LEGAL DESCRIPTIONS FOR EASEMENTS:
   A. ACCESS AND UTILITIES WILL FOLLOW THE 90 FEET ADJACENT TO THE SOUTH BOUNDARY OF LOTS 1, 2 AND 4 AND THE SOUTH 90 FEET OF THE ACCESS PORTION OF LOT 3.
   B. AN UTILITY EASEMENT IS THE 50 FEET ADJACENT TO THE EAST BOUNDARY OF LOTS 3 AND 4.

4. SUBJECT TO TWO EASEMENTS TO PUGET SOUND POWER AND LIGHT FOR ELECTRICAL TRANSMISSION UNDER RECORDING NUMBERS 624046 AND 624047. THE LEGAL DESCRIPTION CONTAINED IN THE EASEMENT IS NOT SUFFICIENT TO DETERMINE ITS EXACT LOCATION WITHIN THE SITE.

5. SUBJECT TO AN EASEMENT FOR WATERLINE UNDER RECORDING NUMBER 1306863. THIS EASEMENT SEEMS TO AFFECT THE PROPERTY NOW PLATTED AS RIVMONT HEIGHTS DIV. 1 AND 2. HOWEVER, A PORTION MAY LIE ALONG THE NORTHERLY PROPERTY LINE OF THE SITE.

6. SUBJECT TO THE RELINQUISHMENT OF ALL EXISTING AND FUTURE RIGHTS TO LIGHT, VIEW AND AIR, TOGETHER WITH THE RIGHTS OF ACCESS TO AND FROM THE STATE HIGHWAY AS CONVEYED BY INSTRUMENT RECORDED UNDER RECORDING NUMBER 2274455.

7. THE EXISTING ACCESS TO SR2 DOES NOT COMPLY WITH CURRENT WSDOT OR CITY OF MONROE STANDARDS. NO CONSTUCTION SHALL BE PERMITTED ON THE PLAT OR WITHIN THE STATE RIGHT-OF-WAY UNTIL THE GENERAL PERMIT FROM THE WSDOT HAS BEEN ISSUED. NO BUILDING PERMITS WILL BE ISSUED UNTIL ACCESS IMPROVEMENTS HAVE BEEN COMPLETED.

8. AS OF THE DATE THIS SHORT SUBDIVISION IS RECORDED, NEITHER DOMESTIC WATER SERVICE NOR SANITARY SEWER SERVICE FROM THE CITY OF MONROE IS AVAILABLE TO SERVE ANY OF THE LOTS WITHIN THIS SHORT SUBDIVISION. PRIOR TO THE ISSUANCE OF ANY BUILDING PERMIT FOR ANY LOT CREATED BY THIS SHORT SUBDIVISION, DOMESTIC WATER SERVICE MUST BE EXTENDED TO SUCH LOT AT THE LOT OWNER'S SOLE COST AND EXPENSE OR THE LOT OWNER MUST OBTAIN APPROVAL FROM THE SNOHOMISH HEALTH DISTRICT FOR WATER SERVICE TO BE PROVIDED BY A DOMESTIC WELL TO BE CONSTRUCED AT THE LOT OWNER'S SOLE COST AND EXPENSE. ALSO, PRIOR TO THE ISSUANCE OF ANY BUILDING PERMIT FOR ANY LOT CREATED BY THIS SHORT PLAT, SANITARY SEWER SERVICE MUST BE EXTENDED TO THE LOT AT THE LOT OWNER'S SOLE COST AND EXPENSE OR THE LOT OWNER MUST OBTAIN APPROVAL FROM THE SNOHOMISH HEALTH DISTRICT FOR AN ON-SITE SEWAGE DISPOSAL SYSTEM TO BE CONSTRUCED AT THE LOT OWNER'S SOLE COST AND EXPENSE. THE CITY OF MONROE HAS NOT, EXPRESSLY OR IMPIEDLY MADE ANY DETERMINATION AS TO THE SUITABILITY OF ANY OF THE LOTS WITHIN THIS SHORT SUBDIVISION FOR ANY DOMESTIC WELL SERVICE OR ON-SITE SEWAGE DISPOSAL SYSTEMS AND THE LOTS WITHIN THIS SHORT SUBDIVISION MAY NOT BE DEVELOPED UNLESS AND UNTIL APPROVAL OF SUCH SYSTEMS IS OBTAINED FROM THE SNOHOMISH HEALTH DISTRICT OR DOMESTIC WATER SERVICE AND SANITARY SEWER SERVICE IS EXTENDED FROM THE CITY OF MONROE'S UTILITY SYSTEM.

9. THE EXISTING ACCESS TO SR2 WILL BE REMOVED WHEN THE NORTH MONROE INTERCHANGE IS CONSTRUCTED. ALTERNATIVE ACCESS WILL NOT BE PROVIDED BY THE CITY OF MONROE.

EASEMENT

ALL LOTS WITHIN THIS SHORT PLAT AND LOT 1 OF CITY OF MONROE BOUNDARY LINE ADJUSTMENT 199003 HAVE RIGHTS TO ACCESS AND TO INSTALL UTILITIES WITHIN THE 90' ACCESS AND UTILITY EASEMENT AND WILL SHARE THE COSTS OF MAINTENANCE OF ANY SHARED UTILITIES AND ACCESS IMPROVEMENTS IN A PRO RATA PORTION.

DETERMINATION

ON THE BASIS OF THE REPRESENTATIONS HEREBY SUBMITTED, THE CITY PLANNER HAS APPROVED THIS SHORT PLAT (SP 199005) UNDER THE PROVISION OF CHAPTER 17 AND 21 CITY OF MONROE'S MUNICIPAL CODE.

4/30/04
DATE

APPROVED BY DIREGTOR OF COMMUNITY DEVELOPMENT, CITY OF MONROE

AUDITORS CERTIFICATE

FILED FOR RECORD THIS 3rd DAY OF May, 2004 AT 11:00 A M. IN BOOK _____ OF SURVEYS AT PAGE _____

OF SURVEYS AT THE REQUEST OF Heritage Baptist Fellowship

Bob Terwilliger
COUNTY AUDITOR

Beverly Wold
DEPUTY AUDITOR

REV. PER CITY COMMENTS 4-21-04 TG
REV. PER CITY COMMENTS 4-02-04 TG
REV. ADD ACCESS DRIVE AND NOTE 9-12-03 TG

200405035216

S.W. 1/4, N.W. 1/4 SEC 5, TWP 27 N, R 7 E, W.M. &
S.E. 1/4, N.E. 1/4 SEC 6, TWP 27 N, R 7 E, W.M.

Mead Gilman & Assoc.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 289, WOODINVILLE, WA 98072 (425) 486-1252

DRAWN BY:	DATE:	JOB NO.:	SHEET:
DEB	04-30-03	02203	1 OF 3
CHKD BY:	SCALE:		
TG	1" = 200'		

HERITAGE CHURCH
SHORT PLAT 199005

PROJECT:

CLIENT: HERITAGE BAPTIST CHURCH, MONROE, WA

SHEET 1 of 3

SCALE IN FEET

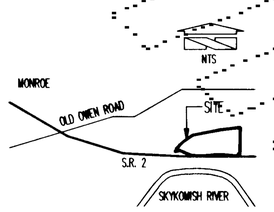
200 0 200 400

SCALE: 1" = 200'

MERIDIAN RECORD OF SURVEY VOL. 27, PG. 164

LEGEND

⊕ FOUND MONUMENT AS DESCRIBED



VICINITY MAP

SEC. CORNER
FND. 1/2" REBAR & CAP
"LS 14471"
N. 0.38'x W. 0.30' OF
CALCULATED POSITION
ORIGINAL IRON PIPE
FROM ROS 27-164
NOT FOUND.
HELD CALCULATED POS.

N 89°41'43" W
1283.16'

2566.32'
1283.16'

N 89°44'07" W
2561.19'

1/4 CORNER
FND. STONE MON.
W/ "x"
IN CASE
DN. 1.8'

SEC. CORNER
MONUMENT IN CASE

N 01°29'40" E
2281.45'

N 01°11'27" E
2380.40'

N 00°54'42" E
2480.59'

N 00°45'50" E
2680.17'

N 00°55'28" E
364.92'

PI MON.
FND. 4"x 4" CONC. MON.
W/ TACK IN LEAD
DN. 0.8' IN ASP. PATCH
330' E. OF INTX. W/ 215TH AVE.

CALHOUN ROAD
N 67°38'32" W
565.91'

FND. 4"x 4" CONC. MON.
W/ TACK IN LEAD
DN. 0.8' IN ASP. PATCH

RIVMONT HEIGHTS DIV. NO. 1
VOL. 17. PGS. 99 & 100

RIVMONT HEIGHTS DIV. NO. 2
VOL. 21. PG. 100

N87°20'19"W
102.46'

N 87°39'16" W
864.56'

S. LN. PLAT OF RIVMONT
HGTS DIV. NO. 1

N 82°19'28" E
649.06'

1052.62'
558.35'

N 79°25'06" E
259.63'

234.64'

N55°20'21"E
419.06'

N 45°20'45" E
179.79'

N 39°25'48" E
168.75'

N 32°50'37" E
144.09'

185.04'
N75°18'35"E

N 66°34'07" W
450.47'

970.63'

N 01°11'27" E

E. LN. SW 1/4, NW 1/4, 5-27-7

UNPLATTED

N 84°39'11" W
48.34'

N 05°20'49" E
90.00'

220.20'

814+70
392.00'

397.96'
N 86°24'35" W

46.20'

132.46'

475.12'
N85°22'35"E

448.47'
N 89°34'59" W

451.97'
N 84°39'11" W

1297.55'
N 85°17'11" W

838+45
193.00'

1297.55'

844+00

2595.10'

1/4 CORNER
FND. IRREGULAR SHAPED
IRON BAR
2" N/S x 1 1/2" E/W
HELD CENTER

S. R. 2

LR LINE

EXIST. SR 2 CL

1/4 CORNER
FND. 4"x 4" CONC. MON.
W/ BRASS PIN & WASHER
"SNO. CO. ENG."
DN. 1.2' IN HOLE

N 85°17'11" W
2573.60'

REFERENCES

RECORD OF SURVEY VOL. 27, PG. 164
RECORD OF SURVEY VOL. 46, PG. 117
PLAT OF RIVMONT HEIGHTS DIV. NO. 1 VOL. 17, PGS. 99-100
PLAT OF RIVMONT HEIGHTS DIV. NO. 2 VOL. 21, PG. 100
"WETLAND DELINEATION REPORT MAP FOR HERITAGE BAPTIST FELLOWSHIP" BY WETLANDS RESOURCES, INC. WRI JOB. #99312, DATED DEC. 13, 1999
"PRIMARY STATE HIGHWAY NO. 15 (SR 2)" BY WASH STATE DEPT. OF TRANSPORTATION (WSDOT). SHEETS 3 AND 4 OF 11, APPROVED MAY 6, 1949
"WESTWICK ROAD TO NORTH MONROE INTERCHANGE" RIGHT OF WAY AND LIMITED ACCESS. SHEETS 16 AND 17 OF 17, DATED APRIL 1, 1971

S.W. 1/4, N.W. 1/4 SEC 5, TWP 27 N, R 7 E, W.M. &
S.E. 1/4, N.E. 1/4 SEC 6, TWP 27 N, R 7 E, W.M.

200405035216

SURVEY CONTROL

Mead Gilman & Assoc.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 289, WOODINVILLE, WA 98072 (425) 486-1252

JOB NO.: 02203	SHEET: 2 OF 3
DATE: 04-30-03	SCALE: 1" = 200'
DRAWN BY: DEB	CHKD BY: TG

EXPIRES: 10/03/05 4-29-04

PROJECT: HERITAGE CHURCH SHORT PLAT 199005

CLIENT: HERITAGE BAPTIST CHURCH, MONROE, WA

SHEET 2 of 3

LINE TABLE

NUMBER	DIRECTION	DISTANCE
L65	N 84°57'51" E	202.09'
L67	N 75°26'50" E	180.46'
L68	S 66°09'05" W	90.81'
L69	S 68°56'23" W	89.00'
L70	S 82°19'28" W	125.91'
L72	N 85°22'35" E	40.95'
L73	S 89°34'59" E	30.01'
L74	S 82°19'51" W	121.85'
L75	N 82°19'28" E	4.06'
L76	N 28°04'08" W	47.25'
L77	N 39°04'02" W	136.67'
L78	N 50°37'38" W	74.74'
L79	N 36°38'14" W	80.06'
L80	N 05°37'15" E	47.43'
L81	N 18°46'22" E	39.71'
L82	N 07°30'18" E	39.08'
L83	N 20°18'57" W	56.98'
L84	N 36°52'08" W	78.80'
L85	N 51°05'32" W	107.08'
L86	N 84°39'11" W	177.31'
L87	N 28°56'54" W	121.96'
L88	N 69°28'10" W	117.68'
L89	N 29°27'17" W	35.92'
L90	N 05°19'25" W	92.22'
L91	N 17°22'43" W	77.78'
L92	N 87°40'12" W	47.26'
L93	N 76°22'52" W	56.95'
L94	N 73°11'08" W	43.69'
L95	N 29°03'31" W	160.52'
L96	N 50°35'45" E	129.50'
L97	N 70°10'57" E	54.97'
L98	N 51°37'11" E	54.63'
L99	N 10°31'47" E	27.41'
L100	N 62°53'25" E	28.37'
L101	N 76°48'59" E	48.78'
L102	N 71°18'33" W	28.58'
L103	N 01°21'15" E	10.36'
L104	N 53°05'30" W	122.99'
L105	N 43°00'10" W	35.94'
L106	N 71°12'01" W	91.06'
L107	N 73°09'02" W	18.17'
L108	N 66°20'37" E	33.38'
L109	N 49°14'54" E	30.07'
L111	N 25°38'49" E	25.33'
L112	N 62°00'51" W	18.88'
L113	N 79°14'52" W	14.32'
L114	N 69°23'10" E	13.58'
L115	N 52°59'54" E	55.23'
L116	N 76°41'21" W	43.07'
L117	N 86°20'08" W	32.54'
L118	N 75°55'36" W	49.61'
L119	N 85°52'28" E	40.73'
L120	N 69°15'50" E	13.97'
L121	N 42°36'18" W	18.74'
L122	N 65°26'02" W	35.02'
L123	N 84°13'18" W	29.73'
L124	N 89°58'11" E	131.91'

CURVE TABLE

NUMBER	DELTA ANGLE	RADIUS	ARC LENGTH
C3	62°12'55"	200.00	217.17
C4	99°23'10"	200.00	346.92
C5	74°24'47"	200.00	259.75
C6	34°44'37"	200.00	121.28
C7	22°59'11"	200.00	80.24
C8	18°41'46"	200.00	65.26
C9	17°17'29"	200.00	60.36
C10	08°39'34"	200.00	30.23
C11	08°47'35"	200.00	30.69

SURVEY NOTES

1. EQUIPMENT & PROCEDURES: A 5" ELECTRONIC TOTAL STATION WAS USED FOR THIS FIELD TRAVERSE SURVEY. ACCURACY MEETS OR EXCEEDS W.A.C. 332-130-090.
2. CONTROL MONUMENTATION VISITED MARCH 2003.
3. WETLAND FLAGS LOCATED BY HARMSEN AND ASSOCIATES, MONROE, WA. WETLANDS AND 200' SHORELINE DESIGNATION BY WETLANDS RESOURSES, INC. "WETLANDS DELINEATION REPORT MAP FOR HERITAGE BAPTIST FELLOWSHIP" DATED DECEMBER 13, 1999. WRI #99312
4. THE NET AREA SHOWN IS THE LOT AREA WITHOUT THE AREAS WITHIN THE WETLAND BUFFER, 200 FOOT SHORELINE DESIGNATION AND IN THE PROPOSED ACCESS AND UTILITY EASEMENTS.

SCALE IN FEET

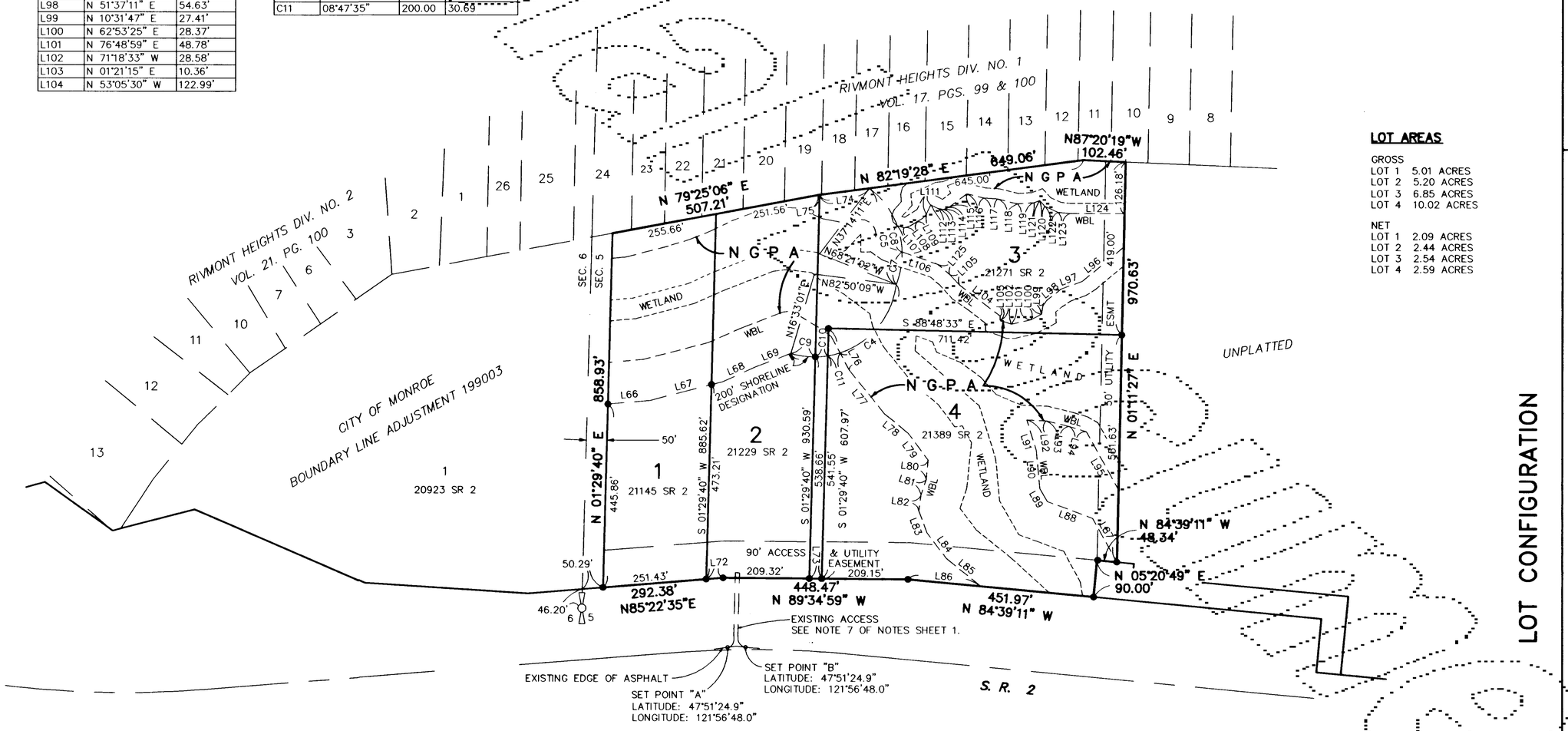
200 0 200 400

SCALE: 1" = 200'

MERIDIAN RECORD OF SURVEY VOL. 27, PG. 164

LEGEND

- ⊕ FOUND MONUMENT AS DESCRIBED
- ● SET 1/2" REBAR & ORANGE CAP "MGA 29276 32434 35145 36811"
- WBL WETLAND BUFFER LINE
- OLL ORIGINAL LOT LINE
- RLL REVISED LOT LINE
- NGPA NATIVE GROWTH PROTECTION AREA SEE NOTE 1 OF NOTES SHEET 1
- 21389 SR 2 PARCEL ADDRESS (TYP.)



LOT AREAS

GROSS
LOT 1 5.01 ACRES
LOT 2 5.20 ACRES
LOT 3 6.85 ACRES
LOT 4 10.02 ACRES

NET
LOT 1 2.09 ACRES
LOT 2 2.44 ACRES
LOT 3 2.54 ACRES
LOT 4 2.59 ACRES

LOT CONFIGURATION

S.W. 1/4, N.W. 1/4 SEC 5, TWP 27 N, R 7 E, W.M. &
S.E. 1/4, N.E. 1/4 SEC 6, TWP 27 N, R 7 E, W.M.

200405035216

Mead Gilman & Assoc.
PROFESSIONAL LAND SURVEYORS
P.O. BOX 289, WOODINVILLE, WA 98072 (425) 486-1252

DRAWN BY:	DATE:	JOB NO.:	SHEET:
DEB	04-30-03	02203	3 OF 3
CHKD BY:	SCALE:		
TG	1" = 200'		

EXPIRES: 10/03/05

PROJECT: HERITAGE CHURCH SHORT PLAT 199005

CLIENT: HERITAGE BAPTIST CHURCH, MONROE, WA

SHEET 3 of 3

Appendix I
Shoreline Environmental Designations Map

City of Monroe Shoreline Environment Designations

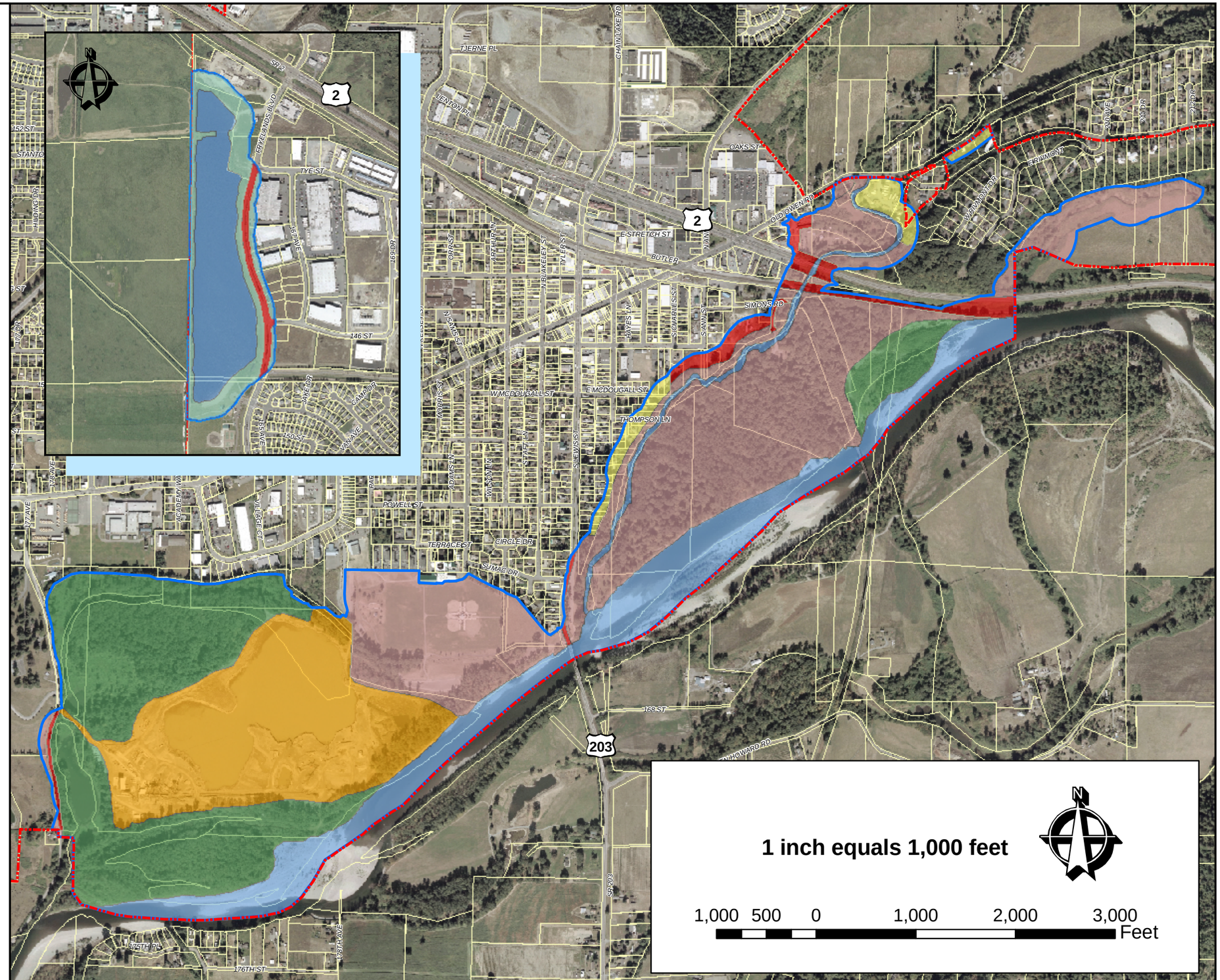
Boundaries

- Monroe City Limits
- Shoreline Boundary

Shoreline Designations

- (A) - Aquatic
- (HI) - High Intensity
- (N) - Natural
- (SR) - Shoreline Residential
- (TSW) - Tye Stormwater Facility
- (UC) - Urban Conservancy
- (UCM) - Urban Conservancy Mining

Shoreline jurisdiction boundaries depicted on this map are approximate. They have not been formally delineated or surveyed and are intended for planning purposes only. Additional site-specific evaluation may be needed to confirm/verify information shown on this map.

Map data shown is the property of the City of Monroe. Inaccuracies may exist. The City of Monroe implies no warranties or guaranties regarding any aspect of data depiction. No real estate decisions are to be made using this map. Please contact the City of Monroe Community Development Department to verify the designation(s).

Project: Shoreline Environment Designations
Y:\GIS\Departments\CD\Shorelines\Shoreline Environment Designations (4-07-08).mxd
Source: City of Monroe 2008; Snohomish County 2008, Watershed Company 2002; FEMA 2006
Revised: 04-30-08
Author: R. Wright