February 2020
Proposed Chehalis River Basin Flood Damage Reduction Project
SEPA Draft Environmental Impact Statement

Appendix G
Land Use Discipline Report

Publication No.: 20-06-002

DEPARTMENT OF
ECOLOGY
State of Washington

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About this Document

This discipline report has been prepared as part of the Washington Department of Ecology's (Ecology's) State Environmental Policy Act (SEPA) Environmental Impact Statement (EIS) to evaluate a proposal from the Chehalis River Basin Flood Control Zone District (Applicant).

Proposed Action

The Applicant seeks to construct a new flood retention facility and temporary reservoir near Pe Ell, Washington, and make changes to the Chehalis-Centralia Airport levee in Chehalis, Washington. The purpose of the Applicant's proposal is to reduce flooding originating in the Willapa Hills and improve levee integrity at the Chehalis-Centralia Airport to reduce flood damage in the Chehalis-Centralia area.

Time Frames for Evaluation

If permitted, the Applicant expects Flood Retention Expandable (FRE) facility construction would begin in 2025 and operations in 2030, and the Airport Levee Changes construction would occur over a 1-year period between 2025 and 2030. The EIS analyzes probable impacts from the Proposed Action and alternatives for construction during the years 2025 to 2030 and for operations from 2030 to 2080. For purposes of analysis, the term "mid-century" applies to the operational period from approximately 2030 to 2060. The term "late-century" applies to the operational period from approximately 2060 to 2080.

Scenarios Evaluated in the Discipline Report

This report analyzes probable significant environmental impacts from the Proposed Action, the Local Actions Alternative, and the No Action Alternative under the following three flooding scenarios (flow rate is measured at the Grand Mound gage):

- **Major flood:** Water flow rate of 38,800 cubic feet per second (cfs) or greater
- **Catastrophic flood:** Water flow rate of 75,100 cfs
- **Recurring flood:** A major flood or greater that occurs in each of 3 consecutive years

The general area of analysis includes the area in the vicinity of the FRE facility and temporary reservoir; the area in the vicinity of the Airport Levee Changes; and downstream areas of the Chehalis River to approximately river mile 9, just west of Montesano.

Local Actions Alternative

The Local Actions Alternative represents a local and nonstructural approach to reduce flood damage in the Chehalis-Centralia area. It considers a variety of local-scale actions that approximate the Applicant's purpose through improving floodplain function, land use management actions, buying out at-risk properties or structures, improving flood emergency response actions, and increasing water storage from Pe Ell to Centralia. No flood retention facility or Airport Levee Changes would be constructed.

No Action

Under the No Action Alternative, no flood retention facility or Airport Levee Changes would be constructed. Basin-wide large and small scale efforts would continue as part of the Chehalis Basin Strategy work, and local flood damage reduction efforts would continue based on local planning and regulatory actions.

SUMMARY

This discipline report describes the current land use conditions along the Chehalis River and its tributaries within the study area. It also describes the regulatory setting and discusses land use plans and policies such as comprehensive plans, Shoreline Master Programs (SMPs), floodplain regulations, and critical areas ordinances. The final section of the report describes potential impacts on land and shoreline use for the Proposed Action, a Local Actions Alternative, and the No Action Alternative.

Land use within the study area primarily consists of agricultural, forested, and vegetated land. The study area is largely rural in character with the more developed areas mainly concentrated within incorporated city and town limits, Chehalis and Centralia Urban Growth Areas (UGAs), and unincorporated communities.

The Flood Retention Expandable (FRE) facility site is within unincorporated Lewis County and currently managed as commercial forest. A large portion of the FRE facility areas are within Lewis County's Forest Resource Lands zoning district. A quarry and some of the construction access roads are within Pacific County's Commercial Forest zoning district.

The airport levee is largely within Chehalis's city limits and is subject to the city's zoning districts and development regulations. The airport levee is located along the south, west, and north boundary of the Chehalis-Centralia Airport. Land uses at the Chehalis-Centralia Airport include a runway, jet access, hangars, and fueling stations.

Construction and operation impacts of the Proposed Action and alternatives are summarized in Tables G-1 and G-2.

Table G-1

Land Use Impact Summary for the Proposed Action

IMPACT	IMPACT FINDING	MITIGATION PROPOSED (SUMMARIZED, SEE SECTION 3.2.4)	SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACT
PROPOSED ACTION (FRE FACILITY AND AIRPORT LEVEE CHANGES) – CONSTRUCTION			
Proposed construction activities and vegetation management associated with the FRE structure and temporary reservoir extents would be inconsistent with land use plans, policies, and regulations due the impacts on shoreline ecological functions at the FRE site and within the temporary reservoir area.	**Significant**	**FISH-1:** Develop and implement a Fish and Aquatic Species and Habitat Plan. **WATER-1:** Develop and implement a Surface Water Quality Mitigation Plan. **WET-1:** Develop and implement a Wetland and Wetland Buffer Mitigation Plan. **WET-2:** Develop and implement a Stream and Stream Buffer Mitigation Plan. **WILDLIFE-1:** Develop and implement a Vegetation Management Plan. **WILDLIFE-2:** Develop and implement a Wildlife Species and Habitat Management Plan. **WILDLIFE-3**: Develop and implement a Riparian Habitat Mitigation Plan.	**Yes, unless mitigation is feasible**
Land use changes from commercial forestry to the FRE facility and temporary reservoir would be inconsistent with the current Forest Resource land use and zoning designations.	**Significant**	Same as above, plus: **LAND-1:** Rezone or convert the land use under a conditional use permit.	**Yes, unless impacts are addressed through conditional use or rezoning**
Potential for impacts from temporary increased flood elevations immediately upstream and downstream of the levee if the Airport Levee Changes are completed before the FRE facility is operational.	Moderate	**LAND-3:** Make Airport Levee Changes during the last part of the FRE construction period.	No

IMPACT	IMPACT FINDING	MITIGATION PROPOSED (SUMMARIZED, SEE SECTION 3.2.4)	SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACT
Construction activities outside of the FRE facility and temporary reservoir associated with forest roads, quarries, and water crossing structures would affect current forest practices as well as shorelines, floodplains, and critical areas; however, impacts would be temporary and consistent with existing or allowed land uses.	Minor	None	No
Potential for impacts depending on where staging for airport levee construction is located; however, these impacts would be temporary.	Minor	None	No
PROPOSED ACTION (FRE FACILITY AND AIRPORT LEVEE CHANGES) – OPERATION			
FRE facility operations would impact shoreline ecological functions, riparian habitat, and critical areas as a result of ongoing vegetation removal, management activities, and temporary inundation within the reservoir extent. Impacts would be inconsistent with land use policies and regulations to maintain no net loss of ecological function.	**Significant**	**FISH-1:** Develop and implement a Fish and Aquatic Species and Habitat Plan. **WATER-1:** Develop and implement a Surface Water Quality Mitigation Plan. **WET-1:** Develop and implement a Wetland and Wetland Buffer Mitigation Plan. **WET-2:** Develop and implement Stream and Stream Buffer Mitigation Plan. **WILDLIFE-1:** Develop and implement a Vegetation Management Plan. **WILDLIFE-2**: Develop and implement a Wildlife Species and Habitat Management Plan. **WILDLIFE-3:** Develop and implement a Riparian Habitat Mitigation Plan.	**Yes, unless mitigation is feasible**
Land use changes from commercial forestry to the FRE facility and temporary reservoir would be inconsistent with the current Forest Resource land use and zoning designations.	**Significant**	**LAND-1:** Rezone or convert the land use under a conditional use permit.	**Yes, unless impacts are addressed through conditional use or rezoning**

IMPACT	IMPACT FINDING	MITIGATION PROPOSED (SUMMARIZED, SEE SECTION 3.2.4)	SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACT
Potential land use changes from increased development in the floodplain as result of the Proposed Action, particularly in areas predicted to be no longer inundated during floods.	Moderate	None	No
Operations of the airport levee would cause land use impacts to shorelines, floodplains, and critical areas.	Moderate	**LAND-2:** Prepare a hydraulics and hydrology study to determine whether compensatory flood storage would be required commensurate with the amount of fill placed in the floodway or Shoreline Master Program (SMP) flood course.	No
A small amount of agricultural land near the airport levee would be converted to roadway or levee.	Minor	None	No
No impacts to land use associated with the raised portion of NW Louisiana Avenue and the airport levee.	None	None	No

Table G-2

Summary of Land Use Impacts for Alternatives

IMPACT	IMPACT FINDING
LOCAL ACTIONS ALTERNATIVE	
Floodproofing and buy-outs would affect existing land uses where properties would be converted to public use or another change from the existing use.	**Significant to minor**
Floodplain storage improvements could lead to the conversion of existing agricultural lands to open space and riparian areas that would experience periodic flooding; the extent of impacts would depend on the acreage that would need to be converted to achieve the Chehalis River Basin Flood Control Zone District's objectives.	**Significant to minor**
Floodproofing of structures, demolition of buy-out structures, and activities associated with floodplain storage improvements and channel migration protection could lead to construction impacts such as noise, dust, and access impacts; however, construction would be temporary and short term.	**Significant to minor**
Channel migration protection would affect natural geomorphic processes.	**Significant to minor**
Construction of floodplain storage improvements could include impacts to existing shoreline and critical area ecological functions during construction; however, impacts would be temporary.	Moderate to minor
Land use management actions could affect how and where development occurs; however, these impacts would be consistent with flood hazard planning and policy documents.	Moderate to minor
Implementation of land use management actions or early flood warning systems would not directly result in construction-related activities.	No impacts
Impacts from continued flooding of residences and buildings would range depending on the extent of flooding and resulting changes in land use patterns as people relocate to avoid recurring flood damage.	**Continuing substantial flood risk**
NO ACTION ALTERNATIVE	
Flooding would not be reduced, and high levels of flooding could lead to land use conversions or restrictions.	**Continuing substantial flood risk**

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1 INTRODUCTION

1.1 Resource Description

Land use refers to how land is developed for various human uses or preserved for natural purposes. This report presents the current land use conditions in the study area and assesses the potential for impacts on land and shoreline use from the Proposed Action, a Local Actions Alternative, and the No Action Alternative. This report describes the regulatory setting and establishes the methods for assessing potential land use impacts.

The land use element includes past, present, and future foreseeable land and shoreline uses of the study area including residential, agricultural, forestlands, commercial/industrial, and open space under public and private ownership. Recreational uses and facilities are addressed in the *Recreation Discipline Report* (ESA 2020a), and critical area considerations are addressed in the *Earth Discipline Report* (Shannon & Wilson and Watershed Geodynamics 2020), *Water Discipline Report* (ESA 2020b), *Wetlands Discipline Report* (Anchor QEA 2020a), and *Wildlife Species and Habitats Discipline Report* (Anchor QEA 2020b).

1.2 Regulatory Context

Federal, tribal, state, and local regulations, statutes, and guidelines require the review of the possible environmental impacts of the Proposed Action, including potential impacts on land use. The jurisdictional authorities and regulations, statutes, and guidance relevant to land use impacts are summarized in Table G-3.

Table G-3
Regulations, Statutes, and Guidelines for Land Use

REGULATION, STATUTE, GUIDELINE	DESCRIPTION
FEDERAL	
Executive Order 11988: Floodplain Management	Requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.
44 Code of Federal Regulations Part 65: Identification and Mapping of Special Hazard Areas	Outlines the steps a community needs to take in order to assist the Federal Emergency Management Agency (FEMA) in providing up-to-date maps on special flood, mudslide, and flood-related erosion hazards.
TRIBAL	
Tribal Environmental Policy Act and Confederated Tribes of the Chehalis Reservation approvals	Approvals from the Confederated Tribes of the Chehalis Reservation would be required for activities on tribal lands including compliance with Tribal Environmental Policy Act, critical areas approvals, clearing, grading, and building permits, land use approvals, land use plans, and tribal laws.

REGULATION, STATUTE, GUIDELINE	DESCRIPTION
STATE	
Growth Management Act (Revised Code of Washington [RCW] 36.70A)	Requires many cities and counties in Washington to adopt comprehensive plans; a comprehensive plan articulates a series of goals, objectives, policies, actions, and standards to manage and plan for population growth that are intended to guide the day-to-day decisions of elected officials and local government staff.
Washington Forest Practices Act (RCW 76.09)	Governs forest practices activities on non-federal and non-tribal forestland in Washington state.
Flood Control by Counties (RCW 86.12)	Provides for the collection of a flood control fee and provides additional authority for county flood control and the development of comprehensive flood control management plans; a county may act to control flooding under the authority of this statute without forming a special purpose district.
Washington Floodplain Management Act (RCW 86.16)	Requires local communities to adopt floodplain management regulations, approved by the Washington Department of Ecology, for a community to qualify for flood insurance under the National Flood Insurance Program; local floodplain management regulations must be at least as stringent as the federal minimum standards established by FEMA; the Floodplain Management Act includes additional restrictions on land uses within designated floodways and provisions to address minimum state requirements adopted applicable to a county, city, or town (RCW 86.16.041).
State Participation in Flood Control Maintenance (RCW 86.26)	Addresses state participation in flood control maintenance,
Shoreline Management Act (RCW 90.58)	Requires all local jurisdictions with Shorelines of the State to adopt Shoreline Master Programs (SMPs) consistent with the Shoreline Management Act, which emphasizes appropriate shoreline land use, protection of shoreline environmental resources, and protection of the public's right to access and use state shorelines.
Farmland Preservation Executive Order 80-01	Requires agencies making decisions on environmental and/or land use permits to consider farmland preservation and give due regard to local government planning, zoning, or other local government agricultural land protection programs.
LOCAL	
Local Zoning, Development, and Land Use Regulations • Lewis County Code • Thurston County Code of Ordinances • Grays Harbor County Code of Ordinances • Pacific County Ordinances and Resolutions • Town of Pe Ell Ordinances • City of Chehalis Municipal Code	These include, but are not limited to, regulations regarding floodplain management, flood damage prevention, frequently flooded areas, critical areas and resource lands, zoning, and subdivisions.

REGULATION, STATUTE, GUIDELINE	DESCRIPTION
• City of Centralia Municipal Code • City of Elma Municipal Code • Montesano Municipal Code • Oakville Municipal Code • Other affected jurisdiction codes	
Local Shoreline Master Programs • Lewis County Coalition SMP (2017) • Thurston Region SMP (Thurston County Code 20.05.015; 1990) • Grays Harbor County SMP (Adopted 1974; Reprinted with updates 2002) • City of Centralia SMP (2019) • City of Chehalis SMP (Resolution No. 19-81; 2002) • City of Elma SMP (2016) • City of Montesano SMP (2016) • Town of Pe Ell SMP (Adopted 1974 Lewis County SMP)	The Shoreline Management Act requires all local jurisdictions with Shorelines of the State to adopt SMPs consistent with the Shoreline Management Act, which emphasizes appropriate shoreline land use, protection of shoreline environmental resources, and protection of the public's right to access and use state shorelines.
Local Comprehensive Plans under the Growth Management Act • Lewis County Comprehensive Plan (2018) • Lewis County Countywide Planning Policies (2016) • Thurston County Comprehensive Plan (2015) • Grays Harbor County Comprehensive Plan (1961 with updates through 2009) • Pacific County Comprehensive Plan (2010; Amended 2012) • City of Chehalis Comprehensive Plan (2017) • City of Centralia Comprehensive Plan (2018) • City of Elma Comprehensive Plan (2003) • City of Montesano Comprehensive Plan (2008) • Oakville Comprehensive Plan (2006)	The Growth Management Act requires many cities and counties in Washington to adopt comprehensive plans. A comprehensive plan articulates a series of goals, objectives, policies, actions, and standards to manage and plan for population growth that are intended to guide the day-to-day decisions of elected officials and local government staff.

REGULATION, STATUTE, GUIDELINE	DESCRIPTION
Flood Hazard Management and Mitigation Plans • Lewis County Multi-Jurisdictional Hazard Mitigation Plan (2016) • Lewis County Comprehensive Flood Hazard Management Plan (2009) • Thurston County Flood Hazard Mitigation Plan (2017) • Grays Harbor County Comprehensive Flood Hazard Management Plan (2001) • Grays Harbor County Multi-Jurisdiction Hazard Mitigation Plan (2018) • Chehalis River Basin Comprehensive Flood Hazard Management Plan (2010) • City of Centralia Comprehensive Flood Management and Natural Hazards Mitigation Plan (2008) • Pe Ell and other affected jurisdiction plans	Washington State regulates flood control management projects on the state's streams and requires a comprehensive flood control management plan to qualify for flood assistance account funds; natural hazard mitigation plans that include floods are required for certain FEMA funds; hazard mitigation is the ongoing effort to lessen the impact disasters have on people's lives and property through damage prevention and flood insurance.

2 METHODOLOGY

2.1 Study Area

The study area for land use consists of areas where land uses may be affected or influenced by the Flood Retention Expandable (FRE) facility and airport levee sites, including areas directly or indirectly affected by construction or operation of the Proposed Action. This includes the area associated with the FRE facility site and construction activities, the area of maximum inundation extent for the temporary reservoir, the area associated with construction and resulting changes to the airport levee, and the area downstream of the FRE facility (mainstem Chehalis River) extending to the modeled limits of late-century catastrophic flooding (approximately river mile [RM] 9 near Montesano). The study area is largely along the mainstem Chehalis River and its floodplains and tributaries from south of (upstream of) Pe Ell, Washington (Lewis County), downstream to near Montesano, Washington (Grays Harbor County; Figure G-1).

The portion of the study area upstream of the FRE facility includes an additional 500-foot area around the proposed FRE facility and temporary reservoir, as well as the proposed construction area associated with staging, quarries, and construction access routes.

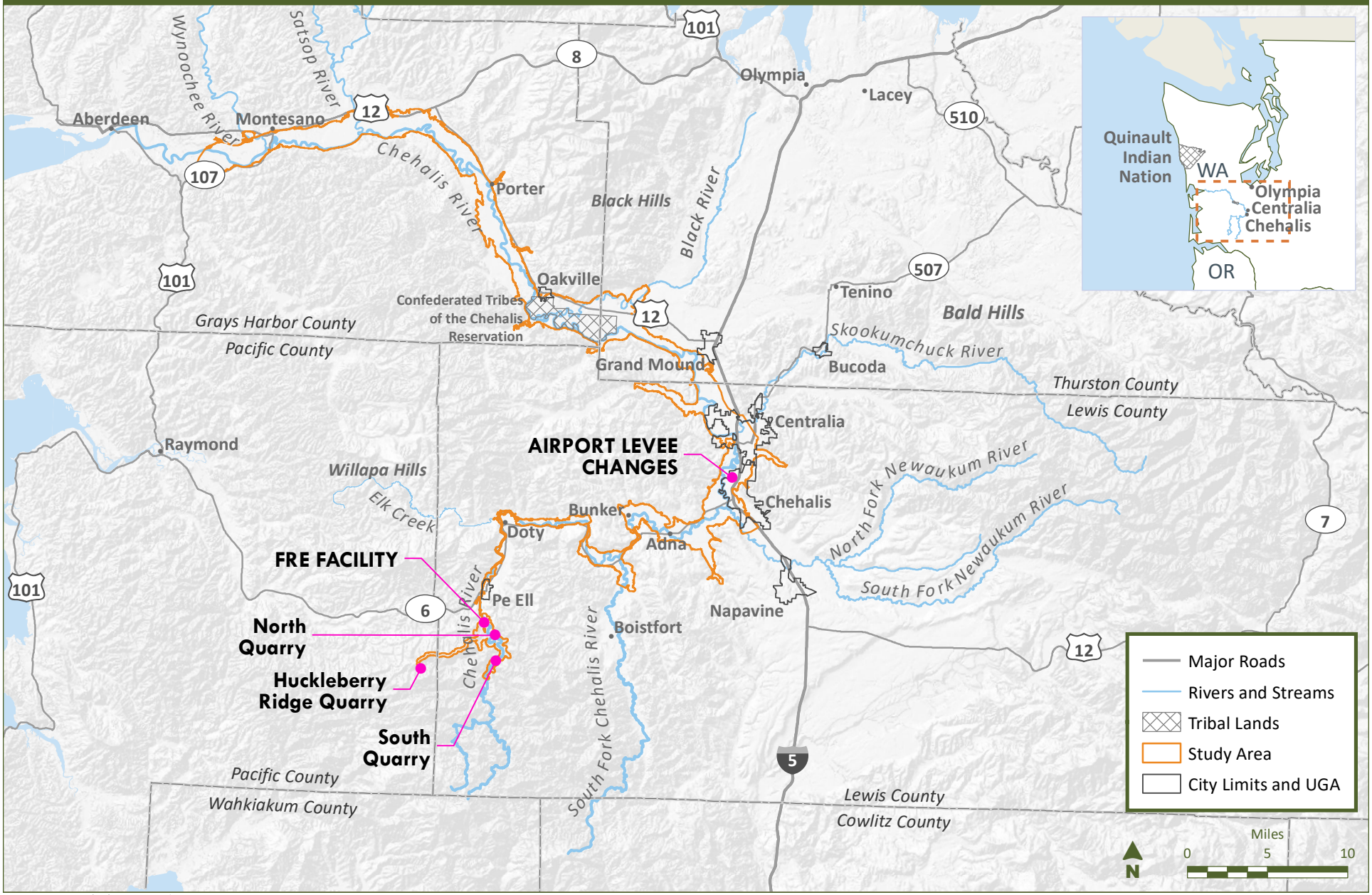
2.2 Affected Environment

A large portion of the study area is within Lewis County, including portions of the Town of Pe Ell, the cities of Chehalis and Centralia, and portions of the Chehalis and Centralia Urban Growth Areas (UGAs). A smaller portion of the study area is within Thurston County, then extends into Grays Harbor County, including portions of the cities of Oakville, Elma, and Montesano (Grays Harbor County). The Confederated Tribes of the Chehalis Reservation's lands (approximately 4,900 acres) are also within the study area located along the Chehalis River, northwest of Chehalis and Centralia, and south of Oakville (Chehalis Tribe 2014). A small portion of Pacific County is included in the study area due to a proposed quarry site and construction routes associated with construction of the FRE facility.

The FRE facility would be located on current Weyerhaeuser and Panesko Tree Farm properties, south of State Route (SR) 6 in Lewis County, on the mainstem Chehalis River at approximately RM 108, about 1 mile south (upstream) of Pe Ell. The Airport Levee Changes would be located at the Chehalis-Centralia Airport within Chehalis in Lewis County, located east of the mainstem Chehalis River.

The affected environment within the study area related to land use and zoning and land use plans and policies including comprehensive plans, Shoreline Master Programs (SMPs), floodplain regulations, and critical areas is described further in the following sections.

Figure G-1
Land Use Study Area



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2.2.1 Land Use and Zoning

Land cover describes the distribution of vegetation types, agricultural areas, and developed areas to provide a general description of land cover patterns within the study area. General land cover distributions throughout the study area as identified in the National Land Cover Database are largely composed of agricultural (approximately 53%) and forested or vegetated areas (approximately 33%). Approximately 14% of the study area is within developed land cover areas that are largely concentrated within incorporated city and town limits, Chehalis and Centralia UGAs, and unincorporated communities (USGS 2016). Developed areas that consist of more rural residential land uses are concentrated within the unincorporated communities of Doty, Dryad, Adna, Littell, Claquato, and Lankner.

Zoning districts are intended to carry out the goals and policies of locally adopted comprehensive plans (Section 2.2.2.1) and establish permitted land uses and development standards. Zoning is defined within each jurisdictions' development regulations, and applications for development permits and approvals are subject to the provisions of local zoning districts and regulations. Areas within unincorporated county limits, including unincorporated communities, UGAs, and Limited Areas of More Intensive Rural Development are subject to the respective county's development regulations while land uses within incorporated city limits are governed under city or town codes, as summarized in Table G-3.

The study area is largely within the generalized zoning types of agriculture (approximately 59%) and rural (approximately 21%). Approximately 5% is within Forest Resource zoning districts and approximately 12% of the study area is within incorporated city limits (primarily Chehalis and Centralia). Current agricultural land uses consist mainly of crop farming, commercial dairy operations, and livestock pastures. Development largely consists of residential, commercial, and industrial land uses.

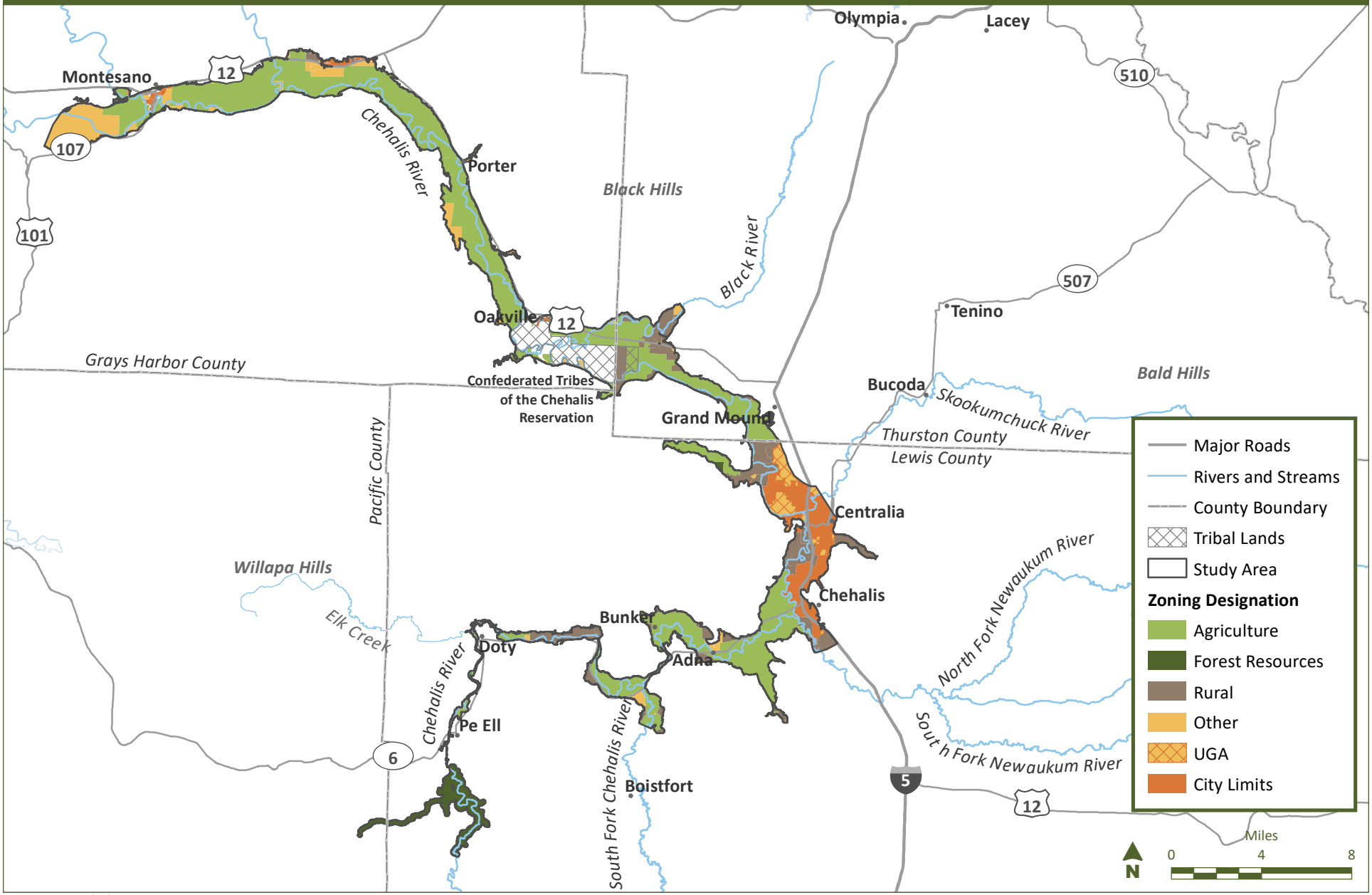
Figure G-2 shows the generalized zoning types in the study area. Table G-4 includes a summary of generalized zoning type distributions within the study area and associated current land uses.

Table G-4
Zoning Districts within the Study Area

ZONING DISTRICT TYPES	PERCENT OF STUDY AREA	TYPES OF EXISTING LAND USES
Agriculture	59%	Crop farming, commercial dairy operations, livestock pastures
Rural	21%	Rural residential, commercial, recreation, open space, timber production
City Limits	12%	Rural, residential, shopping centers, industrial, public facilities, open space
Forest Resource	5%	Commercial forestry
Other[1]	3%	Rural residential, commercial, industrial, parks

Note:
1. Other zoning districts include UGAs and Limited Areas of More Intensive Rural Development.
Source: County (Pacific, Lewis, Thurston, and Grays Harbor) zoning district mapping data

Figure G-2
Zoning Types in Study Area



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All non-federal and non-tribal commercial forestland in Washington is governed by the Forest Practices Act. The forest practices regulatory program prescribes management practices to protect public resources and public safety while maintaining a viable timber industry. The regulatory program includes an adaptive management component, providing flexibility to respond to new information and adapt protective measures as scientific knowledge evolves. The Forest Practice Rules protect unstable slopes, riparian forests, and wetlands; address forest roads; and include a compliance monitoring program.

2.2.1.1 Flood Retention Expandable Facility Site

The FRE facility site is within unincorporated Lewis County and currently managed as commercial forestland. A large portion of the FRE facility construction and operation areas are within Lewis County's Forest Resource Lands zoning district and subject to Lewis County's Land Use and Development Regulations (Lewis County Code Title 17). The Huckleberry Ridge Quarry and a small portion of the construction access roads associated with FRE facility construction are within Pacific County's Commercial Forest zoning district and subject to Pacific County's Zoning Ordinance No. 184. See Figure G-3 for zoning districts near the FRE facility site.

2.2.1.2 Airport Levee Site

The airport levee is largely within the City of Centralia city limits and subject to the city's zoning districts and development regulations (Chehalis Municipal Code Title 17). The airport levee is located along the south, west, and north boundary of the Chehalis-Centralia Airport, adjacent to NW Airport Road and includes a portion of NW Louisiana Avenue along the southern extent of the airport. Land uses at the Chehalis-Centralia Airport include a 5,000-foot runway, jet access, hangars, and 24-hour fuel availability.

The Twin City Town Center is east of the airport and west of Interstate 5 and includes a commercial shopping area. Approximately 30 acres of the planned 108-acre property are currently available for development (City of Chehalis 2019). The airport levee is within the city's Essential Public Facility – Airport (EPF-A) and General Commercial (CG) zoning districts. The Riverside Golf Course is west of the airport levee and the Chehalis Regional Water Reclamation Facility is to the south of the airport levee. Other nearby land uses include agricultural and residential.

The northwestern portion of the airport levee (north of the Riverside Golf Course) is located along the Chehalis city limits boundary. See Figure G-4 for zoning districts in the airport levee vicinity.

Figure G-3
Zoning Near the FRE Facility

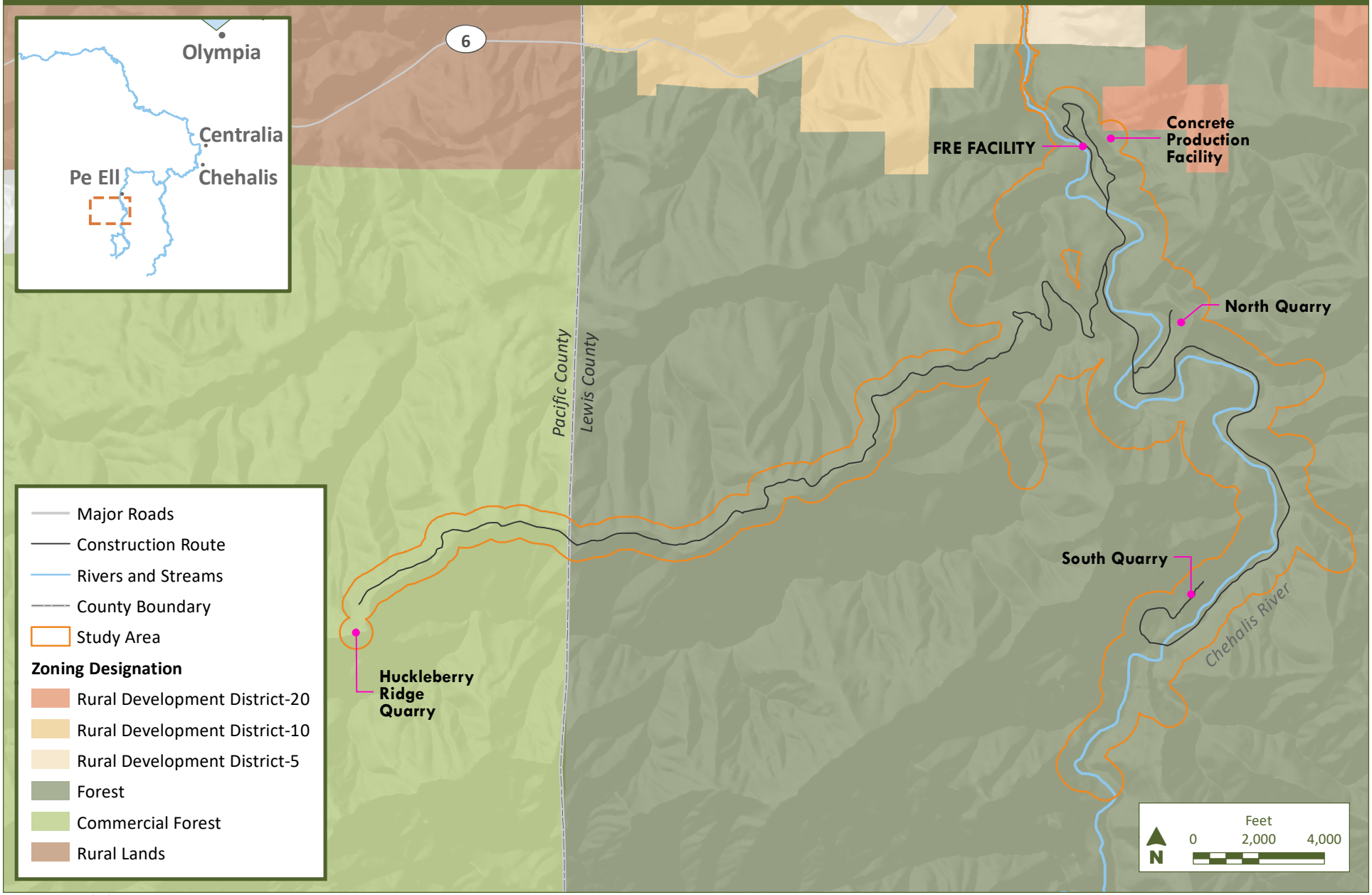

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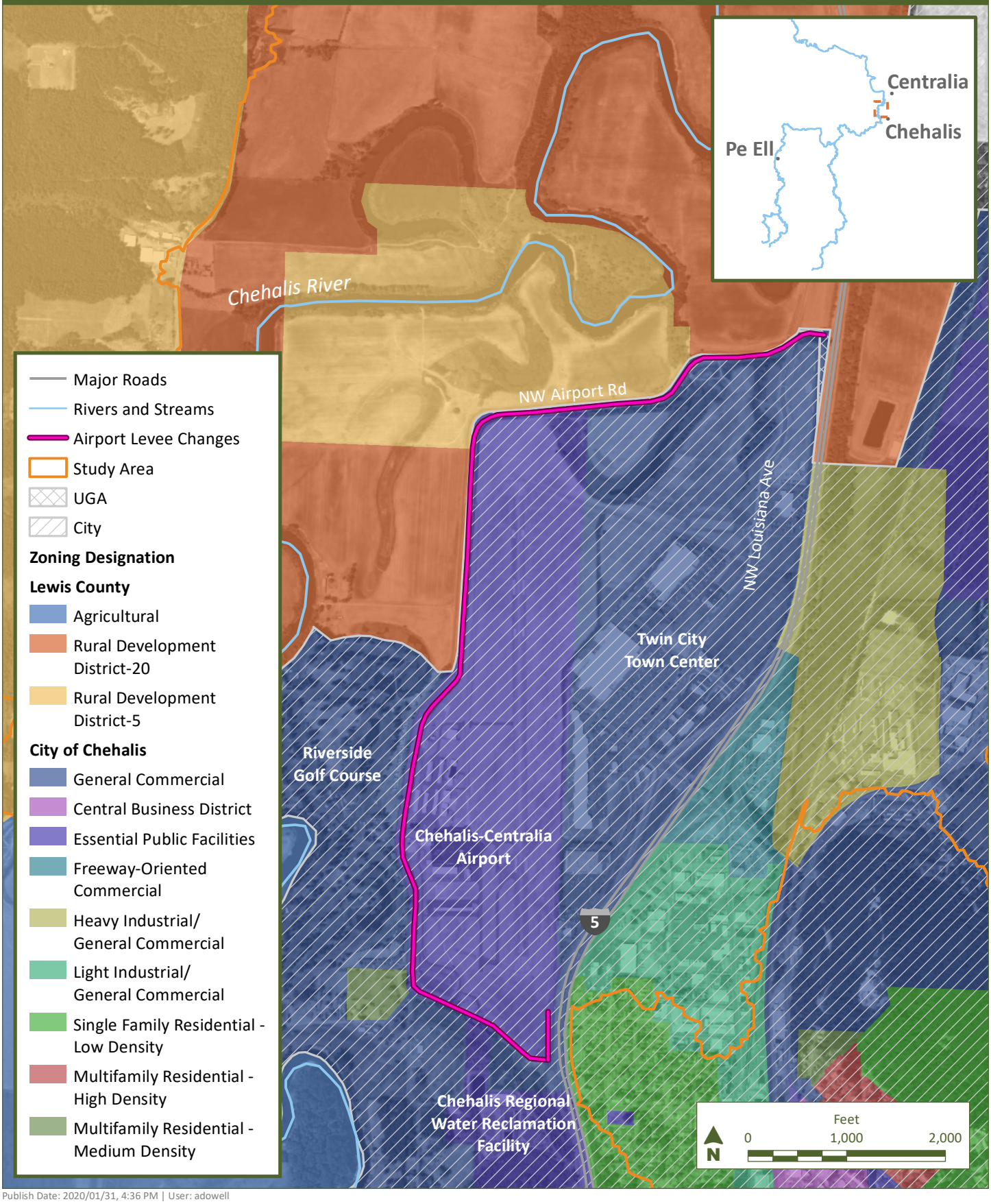
Figure G-4
Zoning Near the Airport Levee



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2.2.2 Land Use Plans and Policies

2.2.2.1 Comprehensive Plans

The state Growth Management Act (GMA) requires counties and cities that meet certain population and growth criteria to create comprehensive plans. These plans contain policies consistent with GMA goals such as encouraging urban growth; reducing sprawl; and encouraging multimodal transportation systems, affordable housing, economic development, and environmental protections (Revised Code of Washington [RCW] 36.70A.020). All the counties and five cities (Centralia, Chehalis, Elma, Montesano and Oakville) within the study area participate in comprehensive planning (Table G-3).

A key element of comprehensive plans are land use designations, which include specific land use goals and policies. These designations establish the direction of future growth in the community. The predominant land use designation in the study area for the unincorporated portions of Lewis, Thurston, and Grays Harbor counties is Agricultural. Lewis, Thurston, and Grays Harbor counties also contain moderate amounts of Rural Residential and Forest Resource Lands. The portion of the study area within Pacific County is entirely within the Forest Lands of Long-Term Commercial Significance land use designation.

In addition to agricultural land protection goals and policies found in the comprehensive plans, Washington's Farmland Preservation Executive Order 80-01 requires agencies making decisions on environmental and/or land use permits to consider farmland preservation. Agencies must give due regard to local government planning, zoning, or other local government agricultural land protection programs.

The main land use designation for the five cities that participate in comprehensive planning is Residential. Most of the residential areas in these cities consist of single-family homes with a relatively low density (typically less than 5 dwelling units per acre). Industrial and Commercial land use designations are also common in Chehalis and Centralia.

2.2.2.1.1 Flood Retention Expandable Facility Site

The land use designations associated with the FRE facility are Forest in Lewis County and Forest Lands of Long-Term Commercial Significance in Pacific County. Key goals and policies for forestland in both counties include encouraging the conservation of productive forestlands and maintaining and enhancing natural resource-based industries.

2.2.2.1.2 Airport Levee Area

The land use designation near the airport levee is Rural in Lewis County and Essential Public Facility and Commercial in Chehalis. Lewis County's goals and policies related to the airport site include maintaining and improving airport facilities to accommodate air service demands and collaborating with cities to site and maintain airport locations. City of Chehalis goals and policies regarding the airport site include ensuring that the airport can meet existing and projected requirements for aviation and discouraging the siting of land uses incompatible with airport operations.

2.2.2.2 Shoreline Master Programs

The Shoreline Management Act applies to all counties and cities that have "Shorelines of the State," as defined in RCW 90.58.030. SMPs regulate development typically within 200 feet of jurisdictional waterbodies to be consistent with the Shoreline Management Act goals stated in RCW 90.58.020. Shoreline jurisdiction also includes floodways and portions of contiguous floodplains, and associated wetlands and deltas. The regulations also provide higher standards for Shorelines of Statewide Significance, such as shorelines along the Chehalis River within the land use study area. The Shoreline Management Act requires that these jurisdictions prepare and implement SMPs that protect natural resources along regulated shorelines, promote public access and enjoyment opportunities, and give priority to water-oriented uses within shoreline environments. Each jurisdiction with Shorelines of the State must establish shoreline "environmental designations" based on the existing land use patterns, physical and biological characteristics of the shoreline, and community goals.

The study area includes designated shoreline jurisdiction areas in Lewis, Thurston, and Grays Harbor counties; the cities of Chehalis, Centralia, Elma, and Montesano; and the Town of Pe Ell. Each of these jurisdictions has an adopted SMP, as identified in Table G-3. Activities occurring within critical areas and critical area buffers within shoreline jurisdiction are also managed under SMPs.

Shoreline jurisdiction also includes floodways and contiguous floodplain areas landward two hundred feet from such floodways (RCW 90.58.030 [2][d]). For the determination of Lewis County and the City of Centralia shoreline jurisdictions, an SMP flood course was identified for determining the extent of the floodway and the areas subject to the Shoreline Management Act. Development within the designated SMP flood courses are prohibited unless a hydraulics and hydrology study indicates the proposed development will not affect the pre-project base flood elevations, floodway elevations, or floodway data widths. The City of Chehalis is in the process of updating its SMP; however, SMP flood courses are not currently planned for inclusion in the city's SMP.

2.2.2.2.1 Flood Retention Expandable Facility Site

The Lewis County shoreline environment designation within the vicinity of the FRE facility (Figure G-5) is Rural Conservancy. There are no mapped SMP flood courses within the vicinity of the FRE facility.

2.2.2.2.2 Airport Levee Area

The Lewis County shoreline environment designation within the vicinity of the Airport Levee Changes (Figure G-6) is Rural Conservancy. The Lewis County shoreline jurisdiction follows the northern and northwestern portions of the Airport Levee Changes, but the southern and southwestern portions are not within shoreline jurisdiction for either Lewis County or the City of Chehalis (Figure G-6). Lewis County SMP flood courses are mapped west of the levee, but the levee does not fall within the SMP flood course.

Figure G-5
Shoreline Environment Designations Near the FRE Facility

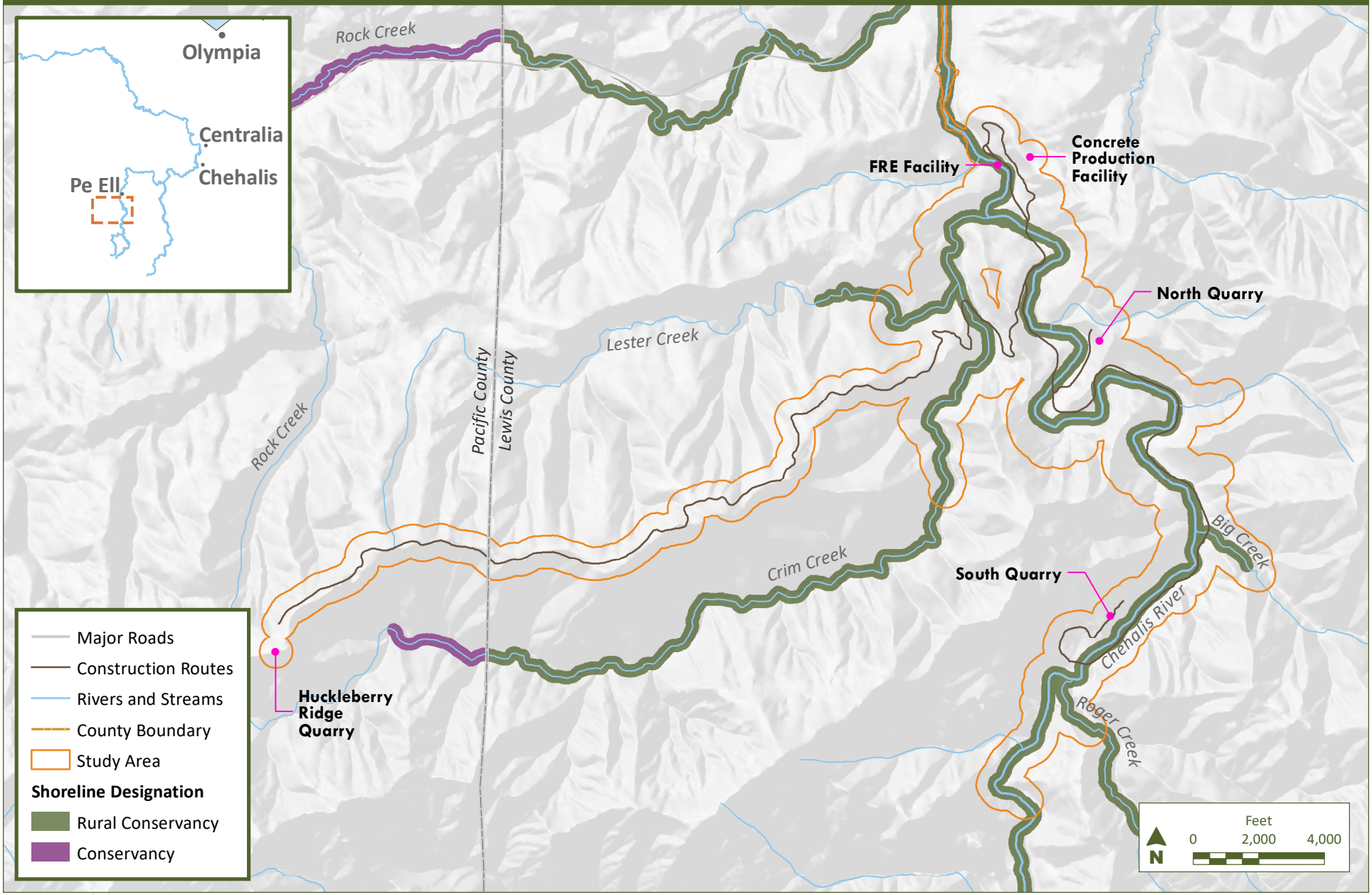

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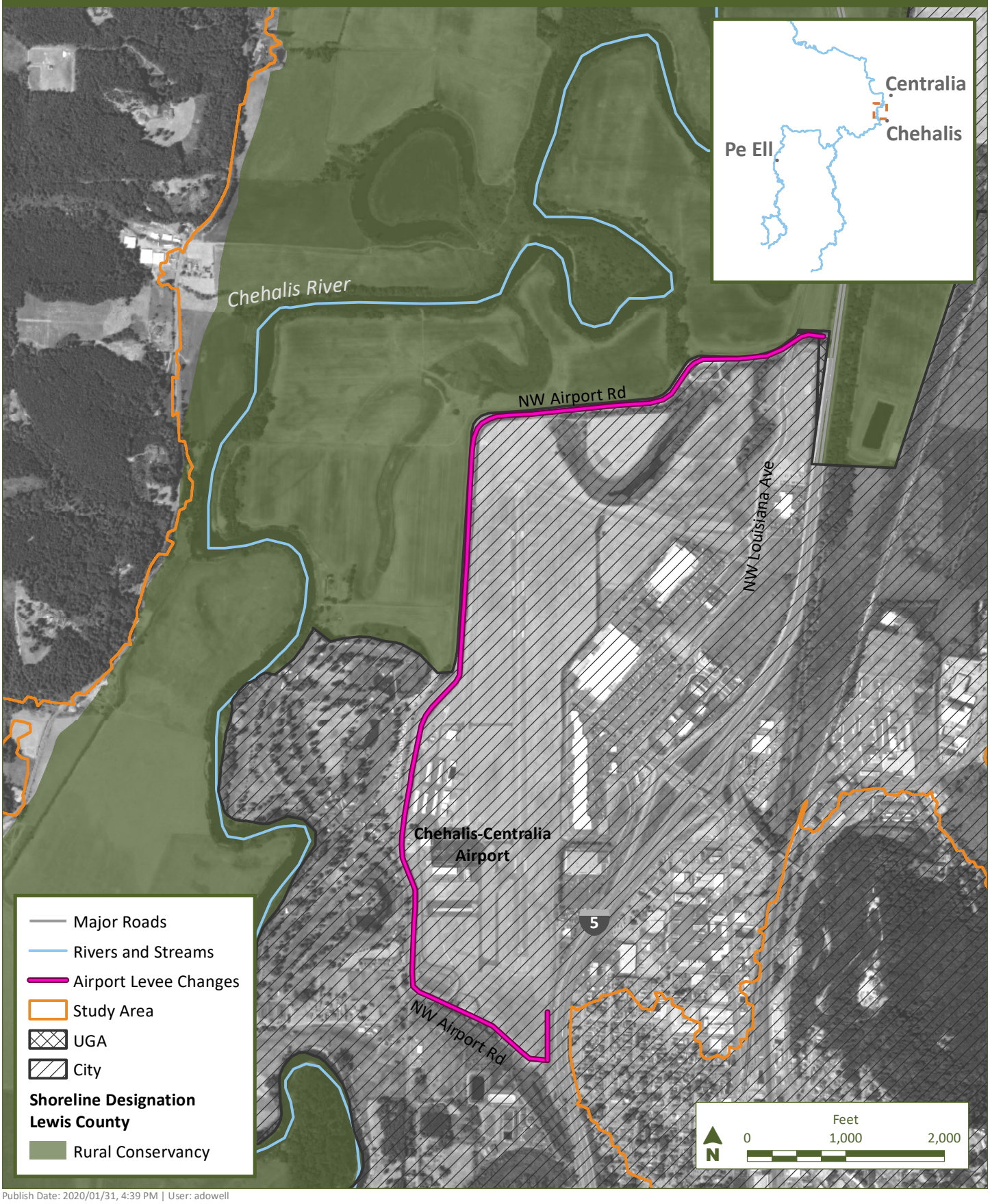
Figure G-6
Shoreline Environment Designations Near the Airport Levee



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2.2.2.3 Floodplain Regulations

Most of the study area is within mapped floodplain areas, designated on Flood Insurance Rate Maps (FIRMs) published by the Federal Emergency Management Agency (FEMA) as having 1% or greater chance of flooding annually (FEMA 100-year flood). A floodway is designated for some reaches, reserving the area containing the fastest-flowing, deepest floodwaters for discharge of the FEMA 100-year flood without obstruction. The Washington Floodplain Management Act (RCW 86.16) requires local communities to adopt floodplain management regulations, approved by the Washington Department of Ecology (Ecology), for a community to qualify for flood insurance under the National Flood Insurance Program (NFIP). Local floodplain management regulations must be at least as stringent as the federal minimum standards established by FEMA. The Floodplain Management Act includes additional restrictions of land uses within designated floodways and provisions to address minimum state requirements adopted applicable to a county, city, or town (RCW 86.16.041).

Cities and counties are responsible for managing development in floodplains in accordance with their locally adopted floodplain management ordinances (Table G-3), which also establishes the regulated floodplain through adoption of floodplain maps for each jurisdiction. The effective floodplain maps are summarized by jurisdiction in Table G-5 and shown in Figure G-7. Additionally, each jurisdiction's floodplain management ordinance requires different restrictions and requirements for development within the floodplain.

Projects that would alter the base flood elevation or boundaries of the 100-year floodplain require revision of the FIRMs to reflect the change in flood risk to the community. Project proponents are required to submit engineering documentation and a hydraulic analysis to the community as well as notifying adjacent communities, Ecology, and FEMA of the proposed change. The Letter of Map Revision or Physical Map Revision process may apply, and conditional approvals by FEMA are needed prior to construction of a project.

FEMA uses a 100-year flood for determining high-risk flood zones or special flood hazard areas. FEMA publishes these in Flood Insurance Studies and uses them for FIRMs. A 100-year flood is also the base flood level used by the National Flood Insurance Program and Lewis County development regulations. The information for the Lewis County Flood Insurance Study is based on 1970s data and it calculates a 100-year flow rate of 56,000 cfs at the Grand Mound gage. This EIS uses a more updated flow rate which includes data from the past 40 years so it is different from the FEMA flow rate.

Figure G-7
FEMA Floodplains and Floodways

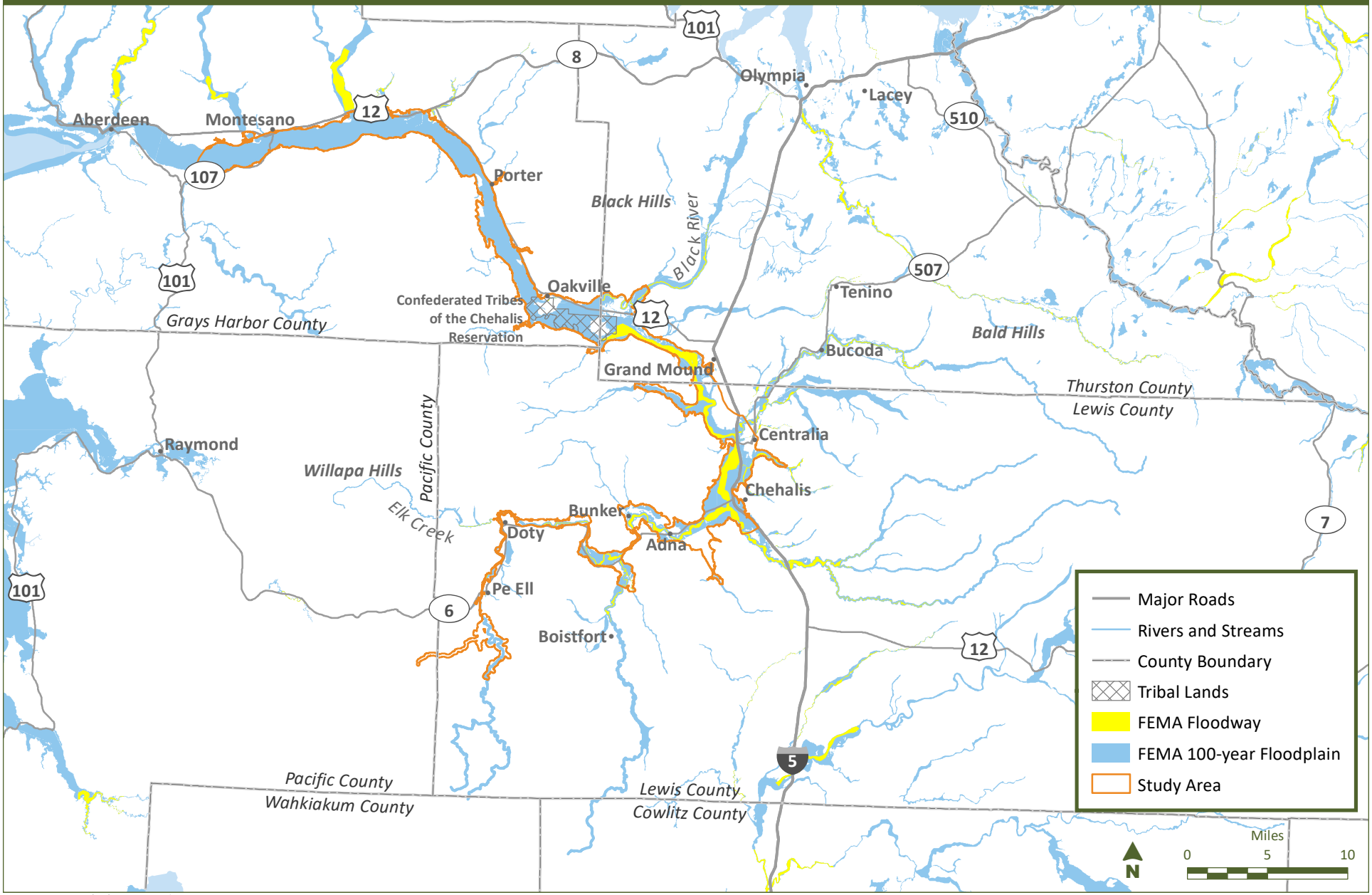

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Table G-5
Listing of Effective Floodplain Maps

JURISDICTION[1]	EFFECTIVE FLOODPLAIN MAPS (REGULATED FLOODPLAIN)	CODE REFERENCE
COUNTIES		
Lewis County[2]	1981 FIRM, unless a new Flood Insurance Study is adopted by the County	Lewis County Code 15.35.060
Thurston County[3]	• 2012 FIRM and any revisions made by FEMA • County's High Ground Water Flood Hazard Areas Resource Map • Flood of record • Highest listed base flood elevation	Thurston County Code 14.38.030 (A)
Grays Harbor County[3]	2017 FIRM and any revisions made by FEMA	Grays Harbor County Municipal Code 18.06.100 (C)
CITIES/TOWNS		
Pe Ell	1981 FIRM	Pe Ell Flood Hazard Ordinance No. 337 Section 3.2
Chehalis[2]	• 2006 FIRM • Best available information shall also be used to determine the flood hazard zone based on elevation data, topographic information, and flood-of-record data	Chehalis Municipal Code 17.22.040
Centralia[2]	• 1982 FIRM, unless a new Flood Insurance Study is adopted by Lewis County • Best available information for flood hazard area identification shall be the basis for regulation until a new FIRM is issued	Centralia Municipal Code 16.21.060
Oakville	• 2017 FIRM and any revisions made by FEMA • Chehalis River Basin Inundation Map Series– 100-Year Flood, prepared by Watershed Science and Engineering (November 25, 2015) • Lands that are flooded by the Chehalis River or Harris Creek after the enactment of [Chapter 14.08]	Oakville Code of Ordinances 14.08.020

Notes:
1. Pacific County is not included in this table because there are no Pacific County floodplains within the study area.
2. A Preliminary Flood Insurance Study dated November 11, 2010 (updated in 2014), and the associated preliminary FIRMs, were prepared for Lewis County and the cities of Chehalis and Centralia. However, this study was pulled back by FEMA without it being accepted by the County and the cities (French & Associates 2014a). Until preliminary FIRMs are accepted by the communities, the existing FIRMs will continue to be the effective FIRMs.
3. FEMA is conducting a Flood Insurance Study update for the Chehalis River within Thurston and Grays Harbor counties that will likely result in updated FIRMs. If this information is available, it will be included in the Final EIS.

In addition to local floodplain management ordinances, floodplain management and mitigation plans, shoreline management regulations, and critical areas regulations provide additional regulatory standards for construction and development within the floodplains. See Table G-3 for a list of these additional regulations and planning documents.

Community Rating System Class

The following communities within the study area have received NFIP Community Rating System (CRS) credits to reduce the cost of flood insurance.

- Thurston County (Class 2)
- Lewis County (Class 6)
- Centralia (Class 6)
- Chehalis (Class 7)

Ecology, either independently or in collaboration with FEMA, provides technical assistance and grants to local communities for the purpose of reducing flood damages and protecting environmental functions of the floodplain (Ecology 2019). As an incentive for implementing floodplain management activities that result in flood damage reduction, a Community Rating System (CRS) was developed under FEMA's NFIP (FEMA 2018b). CRS is a voluntary program in which communities complete activities related to public information, mapping and regulations, flood damage reduction, and warning and response.

Communities that complete CRS activities gain points, which determine their class. Class ratings range from Class 1 communities that have completed the most activities and receive the highest flood insurance premium reductions, to Class 10 communities that do not participate in CRS (FEMA 2018a). Currently, Centralia, Chehalis, Lewis County, and Thurston County participate in CRS (FEMA 2018b).

2.2.2.3.1 Flood Retention Expandable Facility Site

The FRE facility site and temporary reservoir along the mainstem of the Chehalis River are within the FEMA 100-year floodplain (Figure G-7). However, the area of the temporary reservoir that extends up the sides of the valley, the quarry sites, and the concrete production facility is beyond the FEMA 100-year floodplain. There are no designated floodways within the vicinity of the FRE facility. There are no designated floodplains or floodways in Pacific County within the vicinity of the Huckleberry Ridge Quarry and construction access roads associated with the FRE facility.

2.2.2.3.2 Airport Levee Area

The airport levee is within the FEMA 100-year floodplain along the mainstem Chehalis River. While the airport levee is not within the mapped floodways, there are mapped floodways along the Chehalis River west of the airport levee (Figure G-7).

2.2.2.4 Critical Areas Ordinances

The GMA requires jurisdictions to protect critical areas including wetlands, aquifer recharge areas, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas

(Washington Administrative Code [WAC] 36.70A.030[5]). This involves developing and adopting critical areas ordinances that contain development regulations to ensure their protection.

Critical areas are further described in the *Wetlands Discipline Report* (Anchor QEA 2020a), *Wildlife Species and Habitats Discipline Report* (Anchor QEA 2020b), *Water Discipline Report* (ESA 2020b), and the *Earth Discipline Report* (Shannon & Wilson and Watershed Geodynamics 2020).

2.2.2.4.1 Flood Retention Expandable Facility Site

The following critical areas are mapped by Lewis County on or near the FRE facility site (Figures G-8 and G-9):

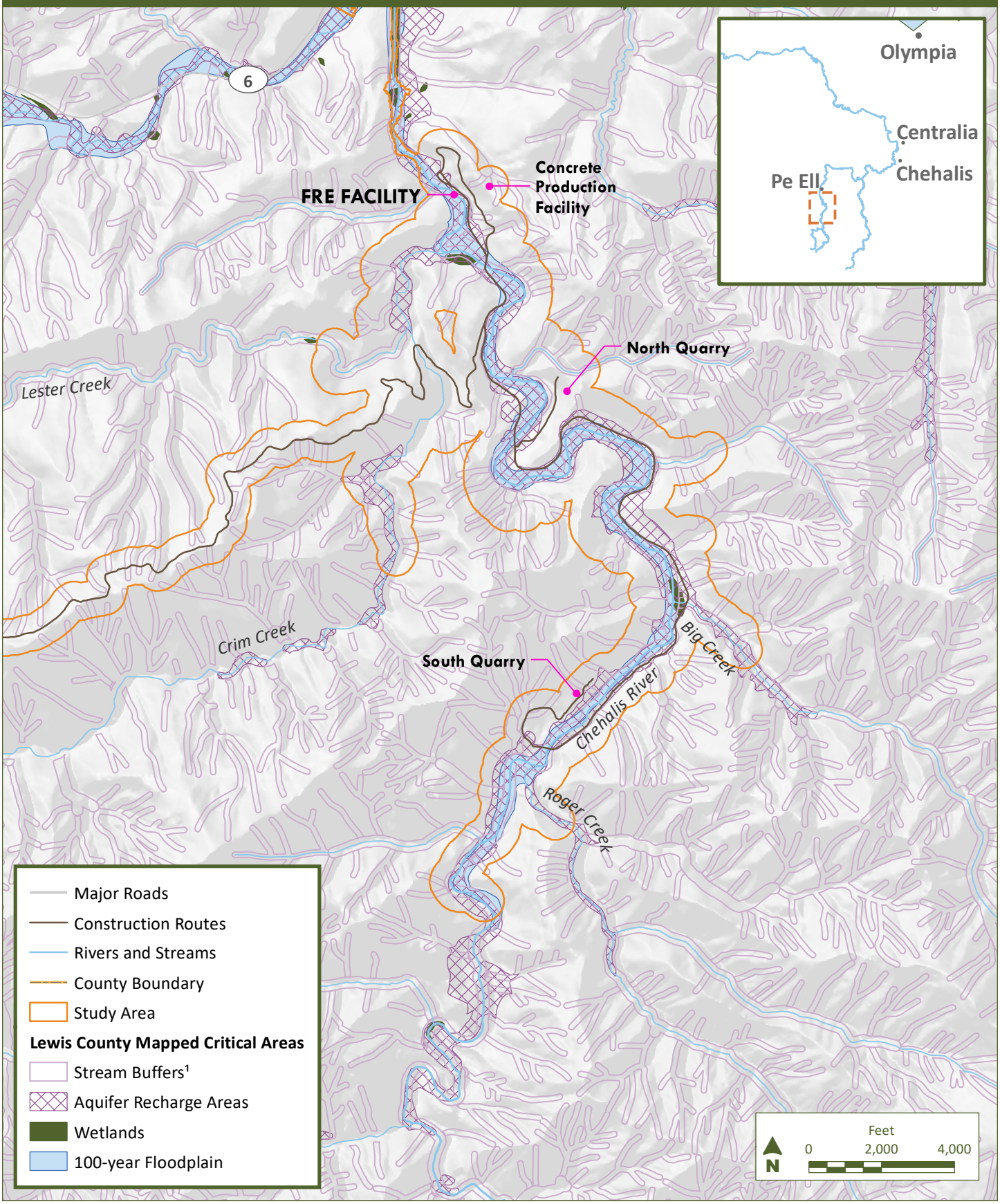
- Fish and wildlife habitat conservation areas (streams)
- Wetlands
  - As part of the EIS analysis, additional wetlands in the vicinity of the FRE facility and temporary reservoir have been identified that are not included in the Lewis County critical areas maps; see the *Wetlands Discipline Report*, Figures O-10 through O-13
- Frequently flooded areas
- Geologically hazardous areas
  - Steep slopes
  - As part of the EIS analysis, additional landslides in the vicinity of the FRE facility and temporary reservoir have been identified that are not included in the Lewis County critical areas maps; see the *Earth Discipline Report*, Figures F-3 through F-5
  - Erosion hazard areas
- Critical aquifer recharge areas

2.2.2.4.2 Airport Levee Area

The following critical areas are mapped by Lewis County on or near the airport levee site:

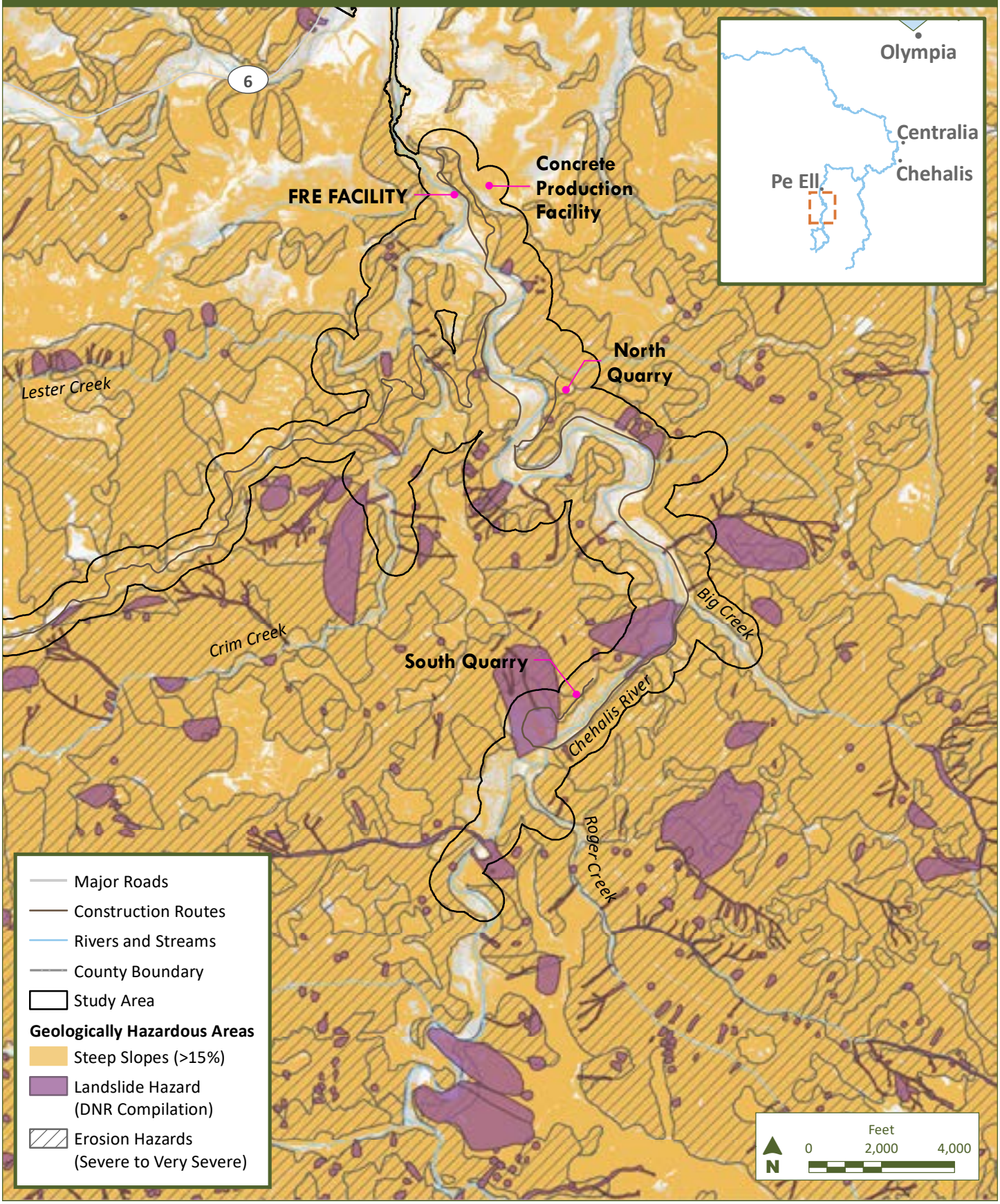
- Fish and wildlife habitat conservation areas (streams)
- Wetlands
  - As part of the EIS analysis, additional wetlands in the vicinity of the airport levee have been identified that are not included in the Lewis County critical areas maps; see the *Wetlands Discipline Report*, Figure O-14
- Frequently flooded areas and floodways
- Geologically hazardous areas
  - Steep slopes (mapped areas are associated with the levee)
  - Moderate to high liquefaction susceptibility

Figure G-8
Critical Areas Near the FRE Facility



Source: Lewis County GIS, 2019
Note:
1 See Figure G-5 for shoreline jurisdiction waterbodies

Figure G-9
Geologically Hazardous Areas Near the FRE Facility



Source: Lewis County GIS, 2019

2.3 Studies and Reports Referenced/Used

Information about land use in the study area was obtained from local jurisdictions, state and federal agencies, and the Chehalis Basin Strategy. Studies, reports, and data sources used include the following:

- Agricultural Land Use Database (WSDA 2019a)
- Chehalis Basin Finished Floor Analysis Database (WSE 2014; Anchor QEA 2017a)
- *Chehalis Basin Strategy Final Programmatic Environmental Impact Statement* (Ecology 2017)
- County and local jurisdictions regulatory codes, plans, and policies (Table G-3)
- County and local jurisdictions zoning, comprehensive plans, shoreline jurisdictions, flood hazard maps (Tables G-3 and G-5)
- FEMA National Flood Hazard Areas Database (FEMA 2019a)
- Forest Practice Applications Database (DNR 2019a)
- Forest Riparian Easements Database (DNR 2019b)
- Grays Harbor County MapSifter Web Map (http://graysharborwa.mapsifter.com/defaultHTML5.aspx)
- Lewis County GIS Web Map (https://gis.lewiscountywa.gov/webmap/)
- Repetitive Flood Loss Strategy Report (French & Associates 2014b)
- Summary of Preliminary Land Use Analyses for the Chehalis Basin Strategy (Anchor QEA 2017b)
- Thurston County GeoData Web Map (https://www.geodata.org/all-map-layers.html)
- U.S. Geological Survey (USGS) National Land Cover Database (USGS 2016)
- Washington Dairies Database (WSDA 2019b)

2.4 Technical Approach

Local land use plans and development regulations were evaluated to assess potential conflicts with the Proposed Action and EIS alternatives. Land use impacts occur when project activities are inconsistent with existing land uses, most typically characterized by inconsistency with the applicable land use policies or zoning. An ArcGIS web map was used to identify potential impacts, based on aerial imagery, mapped flood inundation levels under the modeled flood scenarios, land cover data, and land use data including local zoning, comprehensive plan designations, critical areas, FEMA flood hazard areas, and SMP environment designations.

Terminology used to describe floods varies by the organization, and flood levels vary by location. Flood terms such as “100-year flood” are based on statistics and historical records, but the flood frequency can vary as flood records change, so this terminology can be misleading when discussing future events. For purposes of this report, the terms used for the analysis are “major” and “catastrophic” floods. These are referenced to the cubic feet per second of flow measured at the USGS stream gage on the Chehalis River at Grand Mound. The FRE facility is intended to reduce flood damage from major or larger floods

with a temporary reservoir able to hold the amount of water for a catastrophic flood (65,000 acre-feet). The analysis includes climate change forecasts in the future conditions for all scenarios.

This approach provides consistency in the studies when describing past floods and potential future floods. Table G-6 provides a cross-reference of flooding terms used in other plans and guidance.

Table G-6
Flood Level Terminology

QUALITATIVE TERM USED IN THE EIS	CHANCE OF OCCURRENCE IN 1 YEAR	ASSOCIATED FLOOD-YEAR TERM	FLOW AT GRAND MOUND STREAM GAGE	OTHER NOTES
Major flood	Current: 14% Mid-century: 20% Late-century: 25%	Current: 7-year Mid-century: 5-year Late-century: 4-year	38,800 cfs	• **Similar Sized Chehalis Basin Floods for Reference** – 2009 flood
Catastrophic flood	Current: 1% Mid-century: 2% Late-century: 4%	Current: 100-year Mid-century: 44-year Late-Century: 27-year	75,100 cfs	• **Similarity to Other Flood Plan Terminology (but flow rates used are different)** – Comprehensive Flood Hazard Mitigation Plans – Base flood level used by National Flood Insurance Program – High-risk FEMA flood zones – Special Flood Hazard Area on FEMA maps – Base flood level used by Lewis County floodplain development regulations • **Similar Sized Chehalis Basin Floods for Reference** – 1996 flood

Notes:
Mid- and late-century information is based on SEPA EIS analysis that incorporates climate change projections.

The assessment considered the types of land use changes discussed in Section 2.5. The analysis describes changes to land use conditions within the study area during both construction and operation of the Proposed Action, Local Actions Alternative, and No Action Alternative. For the purposes of this analysis, probable impacts were assumed from construction for the years 2025 to 2030 and from operations for 2030 to 2080.

This analysis does not evaluate the following:

- **Changes to FIRMs:** Where the project will change the floodplain boundaries or flood depths, local governments are expected to provide FEMA with information needed to make changes to FIRMs, which may be different from the modeled results in this EIS. In addition, the EIS future conditions include climate change while FEMA maps currently do not. FEMA does not currently incorporate climate change hydrology into new flood studies or map revisions.
- **Floodway Analyses:** The location of the regulatory floodway will likely change as a result of the FIRM revision. Local flood damage prevention ordinances strictly regulate development in floodways per RCW 86.16.041. This includes measures such as prohibiting new, expanded, or substantially improved residential structures and requiring that no new nonresidential structures or other encroachments increase the 100-year flood elevation.

The potential for FEMA map revisions is also discussed in Section 3.2.2.2.

2.5 Impact Assessment

Implementation of actions within the EIS alternatives may result in land use impacts that affect local jurisdictions and their communities. The analysis for impacts on land uses considered the following:

- Change of an existing land use and consistency with local zoning, planning, and policy documents
- Conversions of land uses and the effect on existing land use, businesses, economies, communities, and environment
- Restrictions or changes to land use as a result of implementation of the alternatives

3 TECHNICAL ANALYSIS AND RESULTS

3.1 Overview

This section describes the probable impacts on land use from the Proposed Action (Section 3.2), Local Actions Alternative (Section 3.3), and No Action Alternative (Section 3.4). This section also evaluates permit conditions and planning document requirements that could address the impacts identified (Section 3.2.3). When probable significant adverse environmental impacts remain after considering these, the report identifies mitigation measures that could avoid, minimize, or reduce the identified impact below the level of significance (Section 3.2.4).

3.2 Proposed Action

3.2.1 Impacts from Construction

Construction impacts were analyzed based on construction activities affecting land uses for the FRE facility estimated to last for 5 years, from 2025 to 2030, and for the Airport Levee Changes, which are planned to occur for 1 year during the same time period.

3.2.1.1 Direct

3.2.1.1.1 Flood Retention Expandable Facility

The FRE facility would be constructed on private property currently owned by Weyerhaeuser and Panesko Tree Farm and currently managed as commercial forestland. The Chehalis River Basin Flood Control Zone District (Applicant) does not intend to manage the FRE facility and temporary reservoir as commercial forest.

FRE facility construction activities that would affect current forest practices would include the proposed development of one to three quarry sites, a concrete production facility, construction areas for offices and storing equipment, and upgraded forest roads. Construction of the FRE facility structure and vegetation management within the temporary reservoir during construction would also affect current land use.

The owner of the managed forestland would be required to comply with Washington Department of Natural Resources (DNR) regulations for construction in managed forests. A Forest Practices Application/Notification (FPA/N) would be required for the harvest of trees and construction activities including roads and water crossing structures in managed forests. The Applicant does not intend to manage the FRE facility and the temporary reservoir area as commercial forest. For the conversion of the land from managed forest to non-managed forest at the FRE facility site and temporary reservoir area, the Applicant would need a Class IV-General Forest Practices Application (FPA) from DNR. Road and construction activities related to the harvest of trees would be required to meet Forest Practices

standards. Once the land in the temporary reservoir area is converted, and for any construction activities of the FRE facility not covered under the Class IV-General Forest Practices Application, local and state permits would apply for construction activities in this area.

Consistency with plans, policies, and regulations related to FRE facility construction activities is summarized here and presented in more detail in Table G-7.

Land Use and Zoning

Construction of the FRE facility would result in a change of land use from commercial forest to the FRE facility and temporary reservoir. The FRE facility would be an allowed accessory use within the Forest Resource Lands; however, since the FRE facility is not proposed as an accessory use to a primary allowed use, the change in land use would be **inconsistent** with the current Forest Resource Lands land use designation and zoning district. A conditional use permit or rezone would be required in order to be consistent with land use plans, policies, and regulations. Mitigation is proposed for the Applicant to coordinate with Lewis County for a rezone of the current Forest Resources Land at the proposed FRE facility and temporary reservoir location or request a conditional use permit to address the inconsistency of the proposed land use within the Forest Resource Lands land use designation and zoning district. For associated forest practices activities, the Applicant will participate in pre-application consultation as provided for in the Forest Practices Rules.

Mitigation is proposed for the Applicant to develop and implement several mitigation plans for land use impacts associated with construction of the FRE facility and temporary reservoir. To be consistent with land use requirements, mitigation plans would need to address slope stability, streambank integrity, and habitat for fish aquatic species (including shade). The mitigation plans include the following:

- **Fish and Aquatic Species and Habitat Plan (FISH-1):** To mitigate the impacts on fish and aquatic species and habitats associated with construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Fish and Aquatic Species and Habitat Plan (for details, see *Fish Species and Habitats Discipline Report*).
- **Wetland and Wetland Buffer Mitigation Plan (WET-1)**: To mitigate impacts on wetlands and wetland buffers from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Wetland and Wetland Buffer Mitigation Plan (for details, see *Wetland Discipline Report*).
- **Stream and Stream Buffer Mitigation Plan (WET-2):** To mitigate impacts on streams and stream buffers from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Stream and Stream Buffer Mitigation Plan (for details, see *Wetland Discipline Report*).
- **Vegetation Management Plan (WILDLIFE-1):** To mitigate the impacts on habitat in the temporary reservoir area from construction and operation of the FRE facility and temporary

reservoir, mitigation is proposed for the Applicant to develop and implement a Vegetation Management Plan (for details, see *Wildlife Species and Habitats Discipline Report*).

- **Wildlife Species and Habitat Management Plan (WILDLIFE-2):** To mitigate the impacts to wildlife species and habitat from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Wildlife Species and Habitat Management Plan (for details, see *Wildlife Species and Habitats Discipline Report*).
- **Riparian Habitat Mitigation Plan (WILDLIFE-3):** To mitigate the impacts to riparian habitat from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Riparian Habitat Mitigation Plan (for details, see *Wildlife Species and Habitats Discipline Report*).
- **Surface Water Quality Mitigation Plan (WATER-1):** To mitigate the impacts to surface water quality from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Surface Water Quality Mitigation Plan (for details, see *Water Discipline Report*).

There is uncertainty if mitigation is feasible; therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on land use. The Applicant may provide mitigation plans as described above. If the agencies determine the plans meet regulatory requirements and implementation is feasible, then the impacts would be addressed as part of the permitting processes.

The proposed quarry sites and concrete production facility would result in a change of existing land use from commercial forest; however, the proposed activities are largely **consistent** with land uses allowed within the Forest Resource zoning districts. Road improvements would occur to existing roads and therefore would be **consistent** with existing land uses. Construction of temporary access roads (within the active construction site), upgrades and widening of existing forest roads, and maintenance and decommissioning of forest roads would likely require prior approval and permits from the Washington Department of Natural Resources. The purpose of these permits and requirements is to ensure road construction (and equipment on the roadway) and maintenance does not affect streams, wetlands, unstable slopes, or other sensitive sites and are consistent with WAC 222-24 (ESA 2020c).

Shorelines, Floodplains, and Critical Areas

The proposed quarry sites and concrete production facility are located outside of shoreline jurisdiction and the FEMA 100-year floodplain. Portions of proposed road improvements would occur within Lewis County's Rural Conservancy shoreline environment designation for the Chehalis River and within the FEMA 100-year floodplain. Construction impacts on land use in the vicinity of the FRE facility would affect existing forestlands, shorelines, floodplains, and critical areas; however, the impacts would be temporary and road improvements would be **consistent** with existing or allowed land uses. Any filling, grading, and vegetation removal associated with road improvements within shorelines, floodplains, and critical areas and their buffers would be required to avoid, minimize, or compensate for impacts so that

there would be no net loss of functions and values. See also the *Earth Discipline Report* (Shannon & Wilson and Watershed Geodynamics 2020), *Wetlands Discipline Report* (Anchor QEA 2020a), and *Wildlife Species and Habitats Discipline Report* (Anchor QEA 2020b) for more details on construction-related impacts to these resources.

Vegetation management within the temporary reservoir would be subject to the SMP critical areas regulations (Lewis County SMP, Appendix 2) and the Lewis County critical areas ordinance (Chapter 17.38), including a critical areas assessment report and associated measures to compensate for anticipated critical areas impacts (see the *Wetlands Discipline Report, Wildlife Species and Habitats Discipline Report, Water Discipline Report,* and *Earth Discipline Report* for additional discussion of impacts on these resources).

Construction impacts on land use in the vicinity of the FRE facility structure and temporary reservoir would affect existing forestlands, shorelines, floodplains, and critical areas. Impacts would be **significant** adverse due the impacts on shoreline ecological functions in the project area and within the temporary reservoir extents. These impacts would be **inconsistent** with land use plans, policies, and regulations as noted in Table G-7. The likelihood of impacts on land uses would be reduced with implementation of best management practices, avoidance and minimization measures, and permit requirements. Best management practices will be implemented as required by permits for construction to minimize noise, dust, and traffic impacts on nearby land uses.

Mitigation is proposed for the Applicant to develop and implement several mitigation plans for impacts on shorelines, riparian, and critical areas associated with construction of the FRE facility and temporary reservoir. To be consistent with land use requirements, mitigation plans would need to address slope stability, stream bank integrity, and habitat for fish aquatic species (including shade). These include the following:

- **Fish and Aquatic Species and Habitat Plan (FISH-1):** To mitigate the impacts on fish and aquatic species and habitats associated with construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Fish and Aquatic Species and Habitat Plan (for details, see *Fish Species and Habitats Discipline Report*).
- **Wetland and Wetland Buffer Mitigation Plan (WET-1)**: To mitigate impacts on wetlands and wetland buffers from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Wetland and Wetland Buffer Mitigation Plan (for details, see *Wetland Discipline Report*).
- **Stream and Stream Buffer Mitigation Plan (WET-2):** To mitigate impacts on streams and stream buffers from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Stream and Stream Buffer Mitigation Plan (for details, see *Wetland Discipline Report*).

- **Vegetation Management Plan (WILDLIFE-1):** To mitigate the impacts to terrestrial habitat from construction and operation of the FRE facility and temporary reservoir, mitigation is proposed for the Applicant to develop and implement a Vegetation Management Plan (for details, see *Wildlife Species and Habitats Discipline Report*).
- **Wildlife Species and Habitat Management Plan (WILDLIFE-2):** To mitigate the impacts to wildlife species and habitat from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Wildlife Species and Habitat Management Plan (for details, see *Wildlife Species and Habitats Discipline Report*).
- **Riparian Habitat Mitigation Plan (WILDLIFE-3):** To mitigate the impacts to riparian habitat from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Riparian Habitat Mitigation Plan (for details, see *Wildlife Species and Habitats Discipline Report*).
- **Surface Water Quality Mitigation Plan (WATER-1):** To mitigate the impacts to surface water quality from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Surface Water Quality Mitigation Plan (for details, see *Water Discipline Report*).

There is uncertainty if mitigation is feasible; therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on riparian habitat and be **inconsistent** with land use requirements. The Applicant may provide mitigation plans as described above. If the agencies determine the plans meet regulatory requirements and implementation is feasible, then the impacts would be addressed as part of the permitting processes.

Construction impacts on land uses from FRE facility construction activities for forest roads, quarries, and water crossing structures would affect forests, shorelines, floodplains, and critical areas but would be **consistent** with existing and allowed land uses defined within land use plans, policies, and regulations. These would have **minor** adverse impacts. Construction actions and consistency with land use policies are described in Table G-7. See Section 3.2.3 for a list of anticipated required land use permits.

Table G-7

Consistency Review of Zoning, Plans, and Policies and FRE Facility Construction

PLAN, POLICY, REGULATION	DESCRIPTION	POLICY CONSISTENCY WITH PLANNED CONSTRUCTION ACTIONS
PACIFIC COUNTY COMPREHENSIVE PLAN		
Goal R-3	Forestlands of long-term commercial significance should be conserved in order to maintain a viable forestry industry for long-term economic use while protecting environmental values.	The proposed Huckleberry Ridge Quarry is a temporary construction activity and is not anticipated to affect the viability of the forestry industry.
PACIFIC COUNTY ZONING (ZONING ORDINANCE NO. 184, SECTION 4 – COMMERCIAL FOREST DISTRICT)		
Section 4 (B): Permitted Uses	(6) Quarrying and mining of minerals or materials including, but not limited to, surface mining of sand, gravel, and rock and the primary reduction, treatment, and processing of minerals or materials[…]	The proposed Huckleberry Ridge Quarry site is consistent with land uses allowed within the Commercial Forestry zoning district.
LEWIS COUNTY COMPREHENSIVE PLAN		
Policy NR 4.3	Allow additional land use activities on resource lands, including small business and agritourism ventures, so long as the uses do not jeopardize the long-term viability of the resource use or occur in a manner inconsistent with rural character.	Quarries and the concrete production facility would be a temporary change of existing land use from existing forestlands managed for commercial forestry; however, the use is a consistent with zoning permitted uses and would be temporary.
Policy NE 4D.1	Support efforts to implement the Chehalis Basin Strategy to limit impacts associated with Chehalis River flooding, as well as other local flood hazard reduction projects.	The Proposed Action is intended to reduce peak flood levels and flood damage, which is consistent with the efforts of the Chehalis Basin Strategy.
Policy NE 4D.2	Prioritize land uses such as forestry, agriculture, public recreation, and water-dependent uses in areas subject to flooding.	Quarries and the concrete production facility are located outside of the FEMA 100-year floodplain. Portions of construction access road improvements cross the floodplain; however, these improvements would be consistent with this policy because they are associated with existing roads and would not preclude the prioritized land uses following construction.

PLAN, POLICY, REGULATION	DESCRIPTION	POLICY CONSISTENCY WITH PLANNED CONSTRUCTION ACTIONS
Policy Rural 2.2	Promote the development of a vital rural economy in Lewis County with jobs in agriculture, mining, timber production, home occupations, small businesses, and a variety of other industries.	The proposed concrete production facility is within approximately 200 feet of a parcel within the Rural land use designation (and RDD-20 zoning district). This parcel is currently managed as commercial forestry and construction activities are not likely to affect the existing land use; therefore, construction activities would be consistent with this policy.
LEWIS COUNTY ZONING (CHAPTER 17.30, ARTICLE III – FOREST RESOURCE LANDS)		
17.30.450 Primary Uses	(5) Extraction and processing of rock, gravel, coal, oil, gas, mineral, and geothermal resources.	The quarry sites and concrete production facility are consistent with land uses allowed within the Forest Resource zoning district.
LEWIS COUNTY SHORELINE MASTER PROGRAM		
17.30.450 Primary Uses	(1) The growing and harvesting of timber, forest products, and associated management activities[…] (2) Removal, harvesting, wholesaling, and retailing of vegetation from forestlands[…] (3) Agriculture, floriculture, horticulture, general farming, dairy[…]and other agricultural activities and structures accessory to farming and animal husbandry (4) Rural governmental services (5) Extraction and processing of rock, gravel, coal, oil, gas, mineral, and geothermal resources	The FRE facility and temporary reservoir would be **inconsistent** with the current primary uses within the Forest Resource Lands land use designation and zoning district and would require a conditional use permit or rezone.
Section 3.01.04 (C): Rural Conservancy Management Policies	(3) Agriculture, aquaculture, forest practices, and low-intensity residential development when consistent with provisions of the SMP are preferred uses.	Proposed construction access road crossings within shoreline jurisdiction would be temporary or improvements to existing forest roads, consistent with existing uses within the commercial forestlands.
Section 4.05.01: Flood Hazard Management Policies	(A) Assure flood hazard protection measures do not result in a net loss of shoreline ecological functions.	The FRE facility would be **inconsistent** with this policy due the impacts on shoreline ecological functions in the project area and within the temporary reservoir extents.

PLAN, POLICY, REGULATION	DESCRIPTION	POLICY CONSISTENCY WITH PLANNED CONSTRUCTION ACTIONS
Section 5.03: Allowed Shoreline Uses	Per Table 5-1: Permitted, Conditional, and Prohibited Uses: • Expansion of roads within existing right-of-way is a permitted use in Rural Conservancy. • Expansion of roads outside of a right-of-way or movement of existing roads; and bridges for motorized and non-motorized uses are allowed as a conditional use in Rural Conservancy. • New roads for permitted shoreline use are a permitted use in Rural Conservancy.	Proposed expansion of existing roads and road crossings within shoreline jurisdiction are consistent with permitted and conditional uses within Rural Conservancy.
Section 5.16.02 (C): Transportation Facilities Regulations	Crossings of waterbodies, such as bridges, shall be designed to minimize impacts to aquatic habitat, allow for fish passage, and permit the passage of flood debris.	Construction route improvements would be designed to be consistent with regulatory requirements for shorelines, floodplains, and critical areas to minimize impacts consistent with this provision.
Section 6.01.01: Regulations – Shoreline Modification Table	Per Table 6-1: Permitted, Conditional, and Prohibited Shoreline Modifications: • Clearing and grading is a permitted modification within Rural Conservancy. • Placement of fill landward of ordinary high water mark is allowed as a permitted modification within Rural Conservancy. • Placement of fill waterward of ordinary high water mark is allowed as a conditional modification within Rural Conservancy.	Clearing, grading, and fill associated with the proposed expansion of existing roads and road crossings within shoreline jurisdiction would likely be permitted or conditionally permitted consistent with this provision.

3.2.1.1.2 *Airport Levee*

Construction of the Airport Levee Changes would be completed in approximately 1 year and would result in temporary detours and other traffic management methods. Construction traffic could cause delays in getting to the Chehalis-Centralia Airport, Twin City Town Center, Riverside Golf Course, or Riverside RV Park; however, the *Transportation Discipline Report* (ESA 2020c) concludes that "Vehicles traveling on the surrounding roadways, including I-5 and its on- and off-ramps, would likely encounter moderate congestion and delays due to truck activity, which could affect travel to commercial development near the airport or airport operations." If staging areas were located on the Riverside Golf Course, Riverside RV Park, Chehalis-Centralia Airport, or Twin City Town Center, parking for those uses could be limited during the construction period and airport operations could be affected. Construction impacts on land use in the vicinity of the airport levee are anticipated to be **minor** because they would be temporary and limited to the construction period.

The *Water Discipline Report* identifies the potential for impacts from temporary increased flood elevations immediately upstream and downstream of the levee if the Airport Levee Changes are completed before the FRE facility is operational, which would result in **moderate** adverse impacts to land uses in those areas. Mitigation is proposed for the Applicant to develop a schedule in which the levee is built during the last part of the FRE facility construction period to eliminate the risk of additional flooding from a catastrophic flood if the Airport Levee Changes are completed before the FRE facility is constructed.

3.2.1.2 Indirect

No indirect impacts on land uses from the construction of the FRE facility or Airport Levee Changes are anticipated.

3.2.2 Impacts from Operation

3.2.2.1 Direct

3.2.2.1.1 Flood Retention Expandable Facility

The FRE facility would permanently change the land use within the project area. Weyerhaeuser and the Panesko Tree Farm properties would be acquired for the FRE facility site and the temporary reservoir area and the area would no longer be managed as commercial forestland. Probable land use impacts associated with consistency with plans, policies, and regulations related to FRE facility operation are summarized below and presented in more detail in Table G-8.

Land Use and Zoning

The operation of the FRE facility would result in a change of land use from commercial forest to the FRE facility and temporary reservoir. The FRE facility would be an allowed accessory use within the Forest Resource Lands; however, since the FRE facility is not proposed as an accessory use to a primary allowed use, the change in land use would be **inconsistent** with the current Forest Resource Lands land use designation and zoning district. A conditional use permit or rezone would be required in order to be consistent with land use plans, policies, and regulations. Mitigation is proposed for the Applicant to coordinate with Lewis County for a rezone of the current Forest Resources Land at the proposed FRE facility and temporary reservoir location or request a conditional use permit to address the inconsistency of the proposed land use within the Forest Resource Lands land use designation and zoning district. For associated forest practices activities, the Applicant will participate in pre-application consultation as provided for under the Forest Practices Rules. Activities proposed under Class IV-General conversion would need to address no net loss of ecological function.

Construction and operations would result in land use conversions for the temporary reservoir (847 acres) and the FRE facility (34.9 acres) and a loss of commercial forest that would affect Weyerhaeuser and the Panesko Tree Farm businesses. Impacts to ecological functions, including shorelines and critical areas, are discussed further in the following section.

Shorelines, Floodplains, and Critical Areas

The FRE facility and temporary reservoir are located within Lewis County shoreline jurisdiction and within critical areas both within and outside of the shoreline jurisdiction.

The FRE facility would be **consistent** with an in-water use which is allowed as a conditional use in the Rural Conservancy shoreline environment designation. The Lewis County SMP requires new publicly funded structural flood hazard management measures dedicate and improve public access, if feasible. Due to safety concerns related to FRE operations, this would not be feasible, therefore, the FRE facility would be **consistent** with the requirement (Lewis County SMP 6.05.02 (L); see Table G-8).

Vegetation management within the temporary reservoir would be subject to the SMP critical areas regulations (Lewis County SMP, Appendix 2) and the Lewis County critical areas ordinance (Chapter 17.38), including a critical areas assessment report and associated measures to compensate for anticipated critical areas impacts (see the *Wetlands Discipline Report, Wildlife Species and Habitats Discipline Report, Water Discipline Report,* and *Earth Discipline Report* for additional discussion of impacts on these resources).

The FRE facility is located within the FEMA 100-year floodplain and would require a Permit for Floodplain Development from Lewis County. The FRE facility is likely to alter the FEMA 100-year floodplain. If the floodplain is altered, a Letter of Map Revision, Conditional Letter of Map Revision, or Physical Map Revision may be required by Lewis County and FEMA. To comply with 44 Code of Federal Regulations (CFR) 65.3, NFIP participating communities must provide FEMA with technical information related to changes to the Special Flood Hazard Area (SFHA). This would apply for the area from the FRE facility downstream to near Montesano where flood impacts are likely to occur. Conditional approvals by FEMA are needed prior to construction. This may lead to a formal change of the FIRM. The potential for FEMA map revisions is also discussed in Section 3.2.2.2.

Approvals associated with shoreline, floodplain, and critical areas (see Section 3.2.3) would incorporate development, mitigation, and monitoring requirements to meet the requirements of the SMP, flood hazard ordinance, and critical areas ordinance. The likelihood of impacts on land uses would be reduced with implementation of best management practices, avoidance and minimization measures, and permit requirements. Best management practices will be implemented as required by permits for operations. Consistency with plans, policies, and regulations related to FRE facility operation is presented in more detail in Table G-8.

Adverse impacts on shoreline ecological functions and critical areas from the FRE facility structure, ongoing vegetation removal and management activities, and temporary inundation are anticipated in the vicinity of the FRE facility and temporary reservoir. Impacts to shoreline ecological functions from riparian land use changes associated with the FRE facility would be **significant** under the Lewis County SMP. FRE facility operations are **inconsistent** with several land use plans and policies to maintain no net

loss of ecological function, as detailed in Table G-8. Therefore, the proposed land use conversions are considered **significant** adverse impacts. See the *Earth Discipline Report, Water Discipline Report, Wetlands Discipline Report*, and *Wildlife Species and Habitats Discipline Report* for additional discussion on impacts to these resources. Significant impacts on wetlands, wildlife habitats, wildlife species, and water quality are identified in these reports for operation of the FRE facility.

Mitigation is proposed for the Applicant to develop and implement several mitigation plans for impacts on shorelines and critical areas associated with construction of the FRE facility and temporary reservoir. To be consistent with land use requirements, mitigation plans would need to address slope stability, streambank integrity, and habitat for fish and aquatic species (including shade). These include the following:

- **Fish and Aquatic Species and Habitat Plan (FISH-1):** To mitigate the impacts on fish and aquatic species and habitats associated with construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Fish and Aquatic Species and Habitat Plan (for details, see *Fish Species and Habitats Discipline Report*).
- **Wetland and Wetland Buffer Mitigation Plan (WET-1)**: To mitigate impacts on wetlands and wetland buffers from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Wetland and Wetland Buffer Mitigation Plan (for details, see *Wetland Discipline Report*).
- **Stream and Stream Buffer Mitigation Plan (WET-2):** To mitigate impacts on streams and stream buffers from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Stream and Stream Buffer Mitigation Plan (for details, see *Wetland Discipline Report*).
- **Vegetation Management Plan (WILDLIFE-1):** To mitigate the impacts to terrestrial habitat from construction and operation of the FRE facility and temporary reservoir, mitigation is proposed for the Applicant to develop and implement a Vegetation Management Plan (for details, see *Wildlife Species and Habitats Discipline Report*).
- **Wildlife Species and Habitat Management Plan (WILDLIFE-2):** To mitigate the impacts to wildlife species and habitat from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Wildlife Species and Habitat Management Plan (for details, see *Wildlife Species and Habitats Discipline Report*).
- **Riparian Habitat Mitigation Plan (WILDLIFE-3):** To mitigate the impacts to riparian habitat from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Riparian Habitat Mitigation Plan (for details, see *Wildlife Species and Habitats Discipline Report*).

- **Surface Water Quality Mitigation Plan (WATER-1):** To mitigate the impacts to surface water quality from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Surface Water Quality Mitigation Plan (for details, see *Water Discipline Report*).

There is uncertainty if mitigation is feasible; therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on riparian habitat and be inconsistent with land use requirements. The Applicant may provide mitigation plans as described above. If the agencies determine the plans are feasible and meet regulatory requirements, then the impacts would be addressed as part of the permitting processes.

Table G-8
Consistency Review of Zoning, Plans, and Policies and FRE Facility Operation

PLAN, POLICY, REGULATION	DESCRIPTION	POLICY CONSISTENCY
LEWIS COUNTY COMPREHENSIVE PLAN		
Policy NR 4.3	Allow additional land use activities on resource lands, including small business and agritourism ventures, so long as the uses do not jeopardize the long-term viability of the resource use or occur in a manner inconsistent with rural character.	The FRE facility would change the land use from commercial forestry in the project area; however, these changes would be consistent with this policy because they would not jeopardize the long-term viability of forest resources in the community and are consistent with rural character.
Policy NE 4D.1	Support efforts to implement the Chehalis Basin Strategy to limit impacts associated with Chehalis River flooding, as well as other local flood hazard reduction projects.	The FRE facility would be consistent with the efforts of the Chehalis Basin Strategy to limit impacts from Chehalis River flooding.
Policy NE 4D.2	Prioritize land uses such as forestry, agriculture, public recreation, and water-dependent uses in areas subject to flooding.	The FRE facility would be designed for flood retention, and its location is necessary within the floodplain. The FRE facility would not preclude the prioritized land uses in the vicinity and would be consistent with this policy.
Policy NE 4D.4	Prohibit development within floodways, unless a hydraulics and hydrology study shows the property is not within a floodway or will not affect the pre-project base flood elevations, floodway elevations, or floodway data widths.	The FRE facility would be within the Chehalis River channel and is intended to reduce peak flood levels, as described in the *Water Discipline Report*.

PLAN, POLICY, REGULATION	DESCRIPTION	POLICY CONSISTENCY
LEWIS COUNTY ZONING (CHAPTER 17.30, ARTICLE III – FOREST RESOURCE LANDS)		
17.30.450 Primary Uses	(1) The growing and harvesting of timber, forest products, and associated management activities[…] (2) Removal, harvesting, wholesaling, and retailing of vegetation from forestlands[…] (3) Agriculture, floriculture, horticulture, general farming, dairy[…]and other agricultural activities and structures accessory to farming and animal husbandry (4) Rural governmental services (5) Extraction and processing of rock, gravel, coal, oil, gas, mineral, and geothermal resources	The FRE facility and temporary reservoir would be **inconsistent** with the current primary uses within the Forest Resource Lands land use designation and zoning district and would require a conditional use permit or rezone.
17.30.460 Accessory Uses	Uses allowed outright where directly connected with and in aid of a forestry activity: (7) Watershed management facilities, including but not limited to diversion devices, impoundments, dams for flood control, fire control, and stock watering.	The FRE facility would be consistent with allowed accessory uses within the Forest Resource Lands land use designation and zoning district; however, the use would not be allowed outright because the FRE facility is not directly connected with a forestry activity.
LEWIS COUNTY SHORELINE MASTER PROGRAM		
Section 3.01.04: Rural Conservancy Purpose	The purpose of the Rural Conservancy shoreline environment designation is to protect ecological functions, conserve existing natural resources and valuable historic and cultural areas, provide for sustained resource use, achieve natural floodplain processes, and provide recreational opportunities in areas that are outside municipalities or UGAs.	The FRE facility would be **inconsistent** with the general purpose of the Rural Conservancy designation; however, it would be consistent with permitted and conditional uses within Rural Conservancy.
Section 4.05.01: Flood Hazard Management Policies	(A) Assure flood hazard protection measures do not result in a net loss of shoreline ecological functions.	The FRE facility would have a significant adverse impact on shoreline ecological functions in the FRE area and within the temporary reservoir. The FRE facility would be **inconsistent** with the requirement if mitigation is not feasible.

PLAN, POLICY, REGULATION	DESCRIPTION	POLICY CONSISTENCY
Section 6.05.02: In-Water Structures Regulations	(L) In-water structures designed by public entities shall include public access under SMP Section 4.06 whenever feasible. At a minimum, in-water structures should not decrease public access or the use potential of shorelines.	Due to safety concerns, public access to the FRE facility would not be feasible. Therefore, it is consistent with the requirement.

3.2.2.1.2 Airport Levee Changes

Land Use and Zoning

Following construction of the Airport Levee Changes, the finished elevation of the levee would be 4 to 7 feet higher than it is now, but the land use associated with the airport levee and the raised portion of NW Louisiana Avenue would remain unchanged and there would be **no adverse impacts** on land uses. The potential for FEMA map revisions is discussed in Section 3.2.2.2. If an engineering documentation and hydraulic analysis results in a Letter of Map Revision removing areas behind the levee from the 100-year floodplain, future development in those areas would not be subject to the flood ordinance, which could result in additional development.

Shorelines, Floodplains, and Critical Areas

The airport levee would result in impacts on wetlands and wetland buffers, including permanently filled, eliminated, and disturbed wetlands and wetland buffers. Shoreline and critical areas review, and measures to compensate for critical areas impacts, would be required as a condition of shoreline and building permits. Impacts on regulated critical areas would be offset or minimized such that there would be no net loss of critical area functions and values. There would be **moderate** adverse impacts on land uses associated with shorelines, floodplains, and critical areas.

The *Water Discipline Report* includes additional discussion of the potential for impacts from temporary increased flood elevations immediately upstream and downstream of the levee if the Airport Levee Changes are completed before the FRE facility is operational, which would result in a moderate adverse impact to land uses in those areas. See Section 3.2.4 for proposed mitigation measures to address this inconsistency.

3.2.2.1.3 Changes in Downstream Inundation

Changes in downstream inundation were analyzed to evaluate the effects on existing land uses as a result of implementation of the Proposed Action. Operation of the FRE facility, combined with the Airport Levee Changes, would reduce flood inundation levels for downstream land uses. The degree of reduction in inundation would vary by flood scenario and location. Changes in downstream inundation were analyzed for both major and catastrophic flood scenarios. The recurring flood scenario was not quantitatively analyzed for this report but was evaluated qualitatively.

The structures database prepared for the *Chehalis Basin Finished Floor Analysis* (Anchor QEA 2017a) and *Description of Structures Database/Methodology for Finished Floor Estimation* (WSE 2014) were used to assess flood damage reduction to structures. The *Chehalis Basin Finished Floor Analysis* included 5,181 structures of value (excludes structures such as sheds, garages, and carports) in its database and 4,374 of those structures are within the land use study area. The Applicant is updating the Lewis County Comprehensive Flood Hazard Mitigation Plan which will also evaluate impacts to structures from flood events and with projects. If available, this information will be included in the Final EIS.

At the time this report was prepared, the estimated elevation of the lowest finished floor was available for 3,233 of the 4,374 structures (WSE 2014; Anchor QEA 2017a). Predicted inundation depths were calculated using the modeled major and catastrophic flood scenarios for the Proposed Action and No Action Alternative. The following two sets of calculations were prepared using the finished floor elevations structures database:

- **Structures with Finished Floor Elevation Data**: 3,233 structures
  - Structures with a value for "finished floor height above ground" (including a value of 0 inches)
  - Predicted inundation depths were calculated by subtracting the "finished floor height above ground" from the inundation depths under the modeled flood scenarios
  - Tables G-9a and G-10a provide a summary of the depth of predicted inundation for structures in the study area based on finished floor estimations for these 3,233 structures
- **Structures without Finished Floor Elevation Data**: 1,141 structures
  - Structures that have a null value (i.e., -9999) for "finished floor height above ground"
  - Predicted inundation depths were not adjusted from the inundation depths predicted under the modeled flood scenarios
  - Tables G-9b and G-10b provide a summary of the depth of predicted inundation for structures in the study area based on ground elevations for the 1,141 structures in the study area that do not have estimated finished flood elevation data

Assessing Flood Damage Reduction for Structures

Finished floor elevation is the elevation of the lowest finished floor of valuable structures (excludes structures sheds, garages, and carports), calculated by the estimated height of the finished floor above ground level.

The finished floor elevation is used to identify inundation depth under different flood scenarios. For those structures where finished floor elevation estimations were not available, inundation depth was calculated based on modeled inundation depth at ground elevation for a structure's location.

Table G-9a

Inundated Structures in Study Area with Identified Finished Floor Elevations Under the Major Flood Scenario

DEPTH OF INUNDATION	MID-CENTURY			LATE-CENTURY		
	NO ACTION	PROPOSED ACTION	DIFFERENCE	NO ACTION	PROPOSED ACTION	DIFFERENCE
>0 to 0.5 foot	30	16	-14	49	37	-12
>0.5 to 1 foot	19	10	-9	23	16	-7
>1 to 3 feet	22	14	-8	45	26	-19
>3 to 5 feet	6	4	-2	11	9	-2
>5 to 8 feet	4	3	-1	7	3	-4
>8 feet	2	1	-1	3	3	0
Total Inundated Structures[1]	**83**	**48**	**-35**	**138**	**94**	**-44**

Note:
1. The number of total inundated structures is based on the estimated finished floor elevations available for 3,233 of the 4,374 structures included in the structures database and within the study area.

Table G-9b

Inundated Structures in Study Area Without Identified Finished Floor Elevations Under the Major Flood Scenario

DEPTH OF INUNDATION	MID-CENTURY			LATE-CENTURY		
	NO ACTION	PROPOSED ACTION	DIFFERENCE	NO ACTION	PROPOSED ACTION	DIFFERENCE
>0 to 0.5 foot	127	99	-28	141	125	-16
>0.5 to 1 foot	50	42	-8	73	44	-29
>1 to 3 feet	95	45	-50	134	94	-40
>3 to 5 feet	7	4	-3	26	8	-18
>5 to 8 feet	2	1	-1	2	2	0
> 8 feet	2	1	-1	3	2	-1
Total Inundated Structures[1]	**283**	**192**	**-91**	**379**	**275**	**-104**

Note:
1. The number of total inundated structures is based on the ground elevations available for 1,141 of the 4,374 structures included in the structures database and within the study area that did not have estimated finished floor elevation data.

Table G-10a

Inundated Structures in Study Area with Identified Finished Floor Elevations Under the Catastrophic Flood Scenario

DEPTH OF INUNDATION	MID-CENTURY			LATE-CENTURY		
	NO ACTION	PROPOSED ACTION	DIFFERENCE	NO ACTION	PROPOSED ACTION	DIFFERENCE
>0 to 0.5 foot	328	153	-175	358	249	-109
>0.5 to 1 foot	242	100	-142	317	186	-131
>1 to 3 feet	520	144	-376	817	304	-513
>3 to 5 feet	143	51	-92	297	98	-199
>5 to 8 feet	59	15	-44	103	35	-68
> 8 feet	15	8	-7	31	15	-16
Total Inundated Structures[1]	**1,307**	**471**	**-836**	**1,923**	**887**	**-1,036**

Note:
1. The number of total inundated structures is based on the estimated finished floor elevations available for 3,233 of the 4,374 structures included in the structures database and within the study area.

Table G-10b

Inundated Structures in Study Area Without Identified Finished Floor Elevations Under the Catastrophic Flood Scenario

DEPTH OF INUNDATION	MID-CENTURY			LATE-CENTURY		
	NO ACTION	PROPOSED ACTION	DIFFERENCE	NO ACTION	PROPOSED ACTION	DIFFERENCE
>0 to 0.5 foot	155	146	-9	120	128	8
>0.5 to 1 foot	110	111	1	89	107	18
>1 to 3 feet	366	250	-116	347	330	-17
>3 to 5 feet	207	102	-105	288	158	-130
>5 to 8 feet	78	18	-60	155	50	-105
> 8 feet	22	12	-10	33	15	-18
Total Inundated Structures[1]	**938**	**639**	**-299**	**1,032**	**788**	**-244**

Note:
1. The number of total inundated structures is based on the ground elevations available for 1,141 of the 4,374 structures included in the structures database and within the study area that did not have estimated finished floor elevation data.

Table G-11 summarizes the predicted acres no longer inundated under the modeled flood scenarios.

Table G-11
Acres No Longer Inundated with the Proposed Action

JURISDICTION	ACRES NO LONGER INUNDATED			
	MID-CENTURY MAJOR FLOOD	LATE-CENTURY MAJOR FLOOD	MID-CENTURY CATASTROPHIC FLOOD	LATE-CENTURY CATASTROPHIC FLOOD
Incorporated city limits	174	239	1,288	506
Urban Growth Areas	82	123	142	126
Unincorporated county limits	3,368	3,153	3,250	3,163
Total	**3,625**	**3,514**	**4,679**	**3,795**

Under the **modeled late-century major flood**, 148 structures (Tables G-9a and G-9b) and approximately 3,514 acres would no longer be inundated with the Proposed Action. Approximately 7% of the acres predicted to be no longer inundated are within incorporated city limits, and approximately 90% of this area is within unincorporated, largely agricultural county lands (see Table G-11). Areas no longer inundated are mapped largely near the confluence of the South Fork Chehalis River (Figure G-10), between Bunker and Littell (Figure G-11), in Centralia west of Fort Borst Park (Figure G-12), and in smaller areas downstream to Oakville. At the Chehalis-Centralia Airport, limited areas that would experience flooding under the No Action Alternative would be protected by the Proposed Action under the major flood scenario (Figure G-13). Areas along the Newaukum River within the study area would experience limited to no predicted changes from the Proposed Action under the late-century major flood scenario.

Applicant's Metrics for "Flood Damage Reduction" to Structures

The Proposed Action is likely to meet the Applicant's goal to remove about **635 structures of value** from flooding risk during a catastrophic flood.

Under the Proposed Action, the following number of structures are predicted to no longer be inundated:

- 1,135 structures of value under the modeled mid-century catastrophic flood
- 1,280 structures of value under the modeled late-century catastrophic flood

Under the **modeled late-century catastrophic flood**, 1,280 structures (Tables G-10a and G-10b) and approximately 3,795 acres would no longer be inundated with the Proposed Action. Approximately 13% of the acres predicted to be no longer inundated are within incorporated city limits, and approximately

83% are within unincorporated, largely agricultural county lands (see Table G-11). Predicted changes in inundation with the Proposed Action are summarized as follows:

- Much of the study area from Pe Ell to just upstream of the confluence of the South Fork Chehalis River would be no longer inundated, with reductions in inundation ranging from less than 1 inch to greater than 8 feet of change (ESA 2020b, Attachment 1, Figures N.5-[a and b]). Associated land uses in these areas largely comprise rural and agricultural lands.
- Many residential areas within the City of Centralia are predicted to be protected from flooding under the catastrophic flood scenarios (ESA 2020b, Attachment 1, Figure N.9-[d and e] and N.10-[d and e]).
- Much of the study area in Chehalis is modeled to experience a reduction of 3 to 5 feet in inundation; however, much of this area would still experience flooding, with some areas still experiencing more than 10 feet of inundation.
- The Chehalis-Centralia Airport would not be protected from flooding under the late-century scenario; however, it would be protected under the mid-century scenario (ESA 2020b, Attachment 1, Figures N.9-c and N.10-c).
- Downstream of Centralia, the modeled reduction in inundation would be less than 3 feet with most of the area still inundated, and with some areas still experiencing more than 10 feet in inundation.

Under the **recurring flood scenario**, the number of structures and area that would be inundated as described in this section would occur 3 consecutive years in a row, which would likely be a hardship for property owners. Some property owners may decide to relocate as a result of the recurring floods.

Figure G-10
Predicted Changes in Inundation Depths at the South Fork Chehalis River Confluence

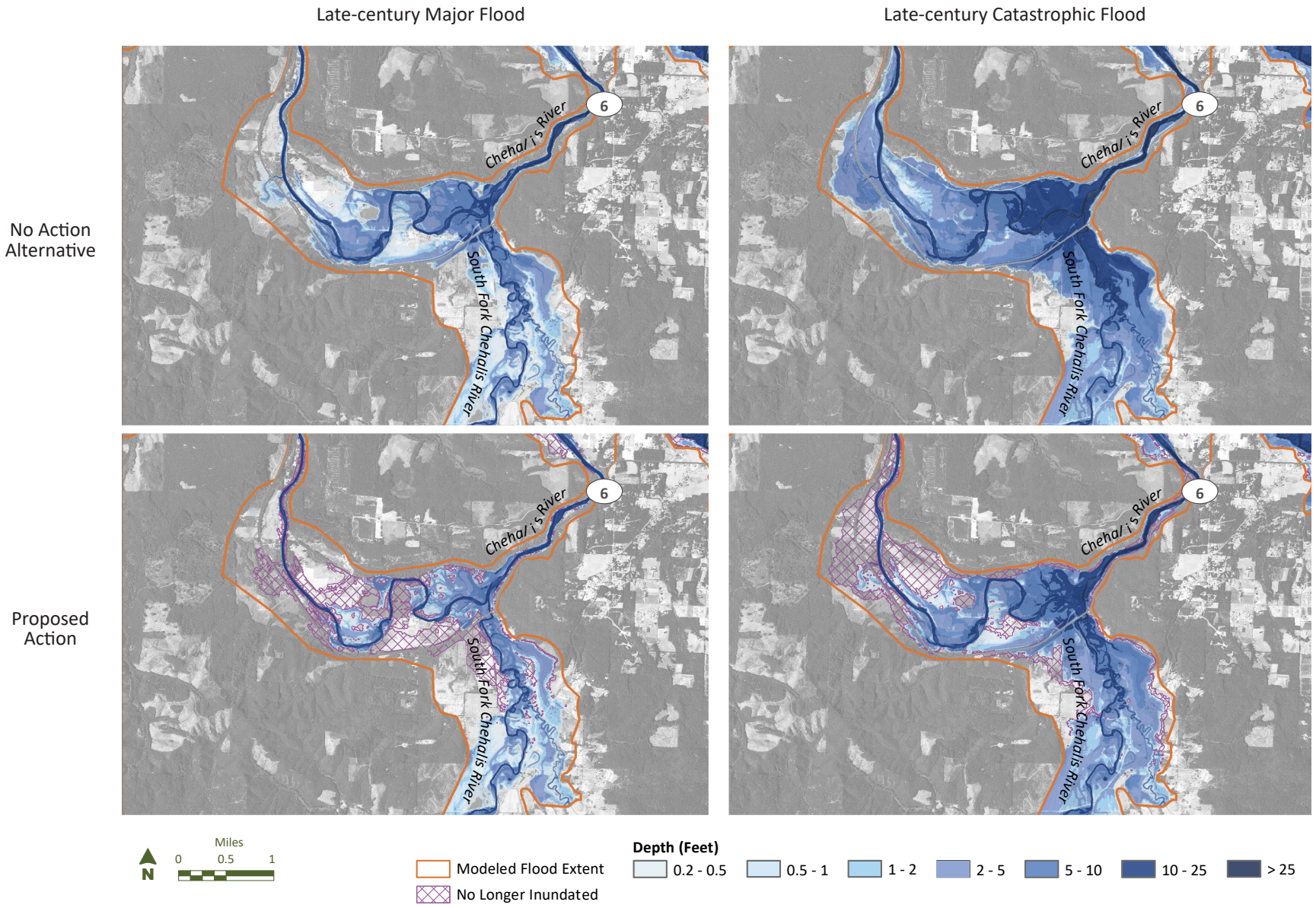


Figure G-11
Predicted Changes in Inundation Depths in Chehalis between Bunker and Littell

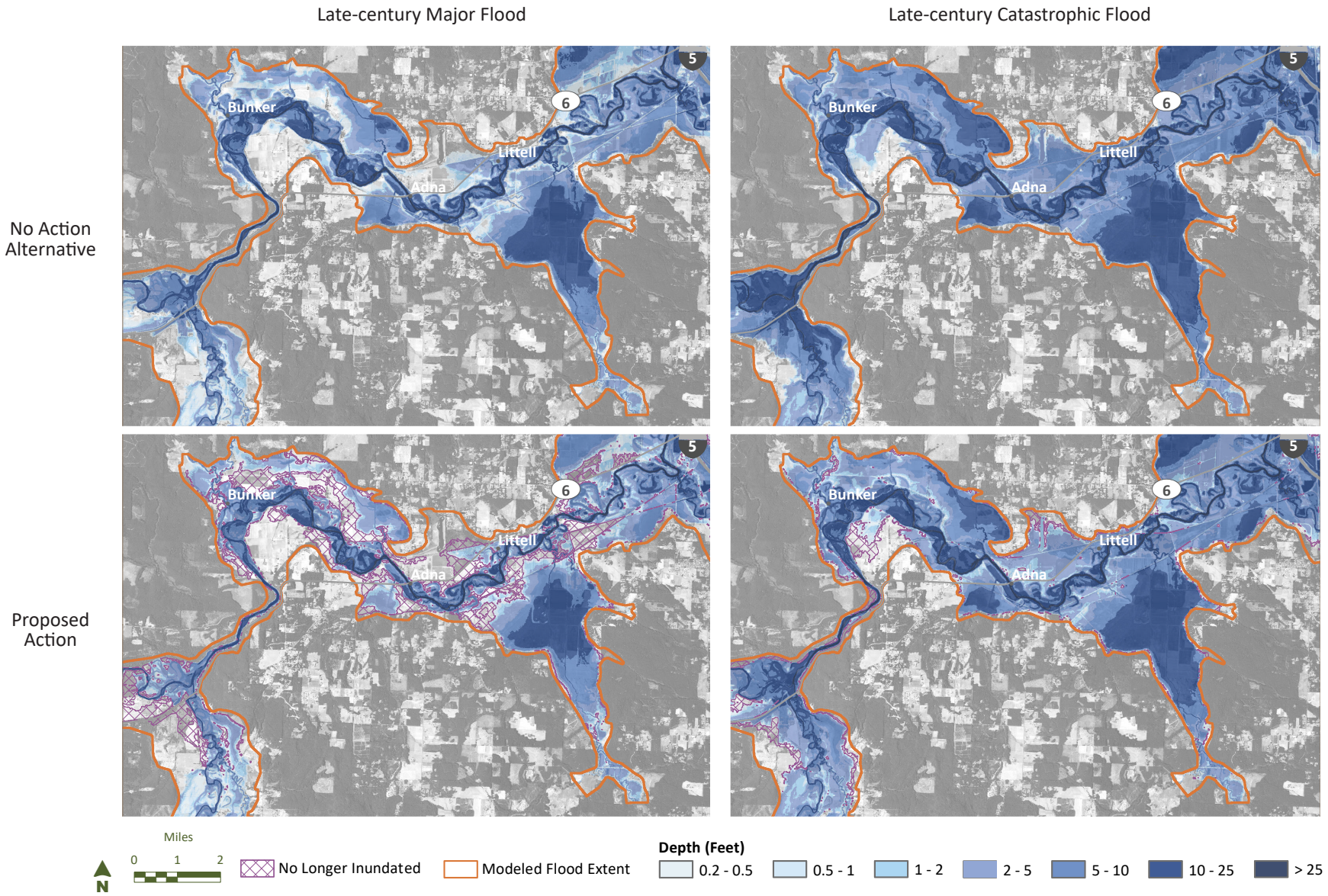


Figure G-12
Predicted Changes in Inundation Depths in Centralia West of Fort Borst Park

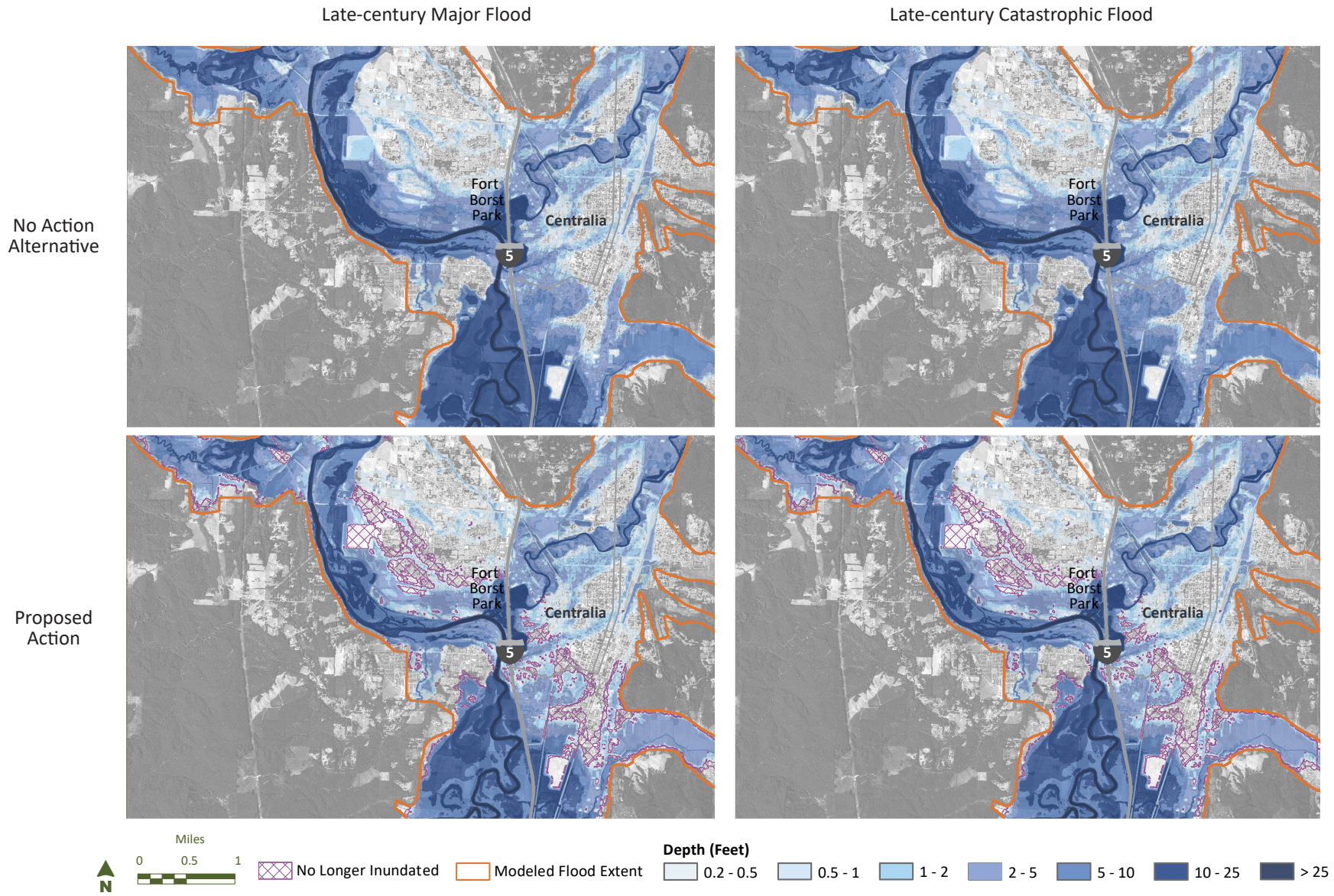
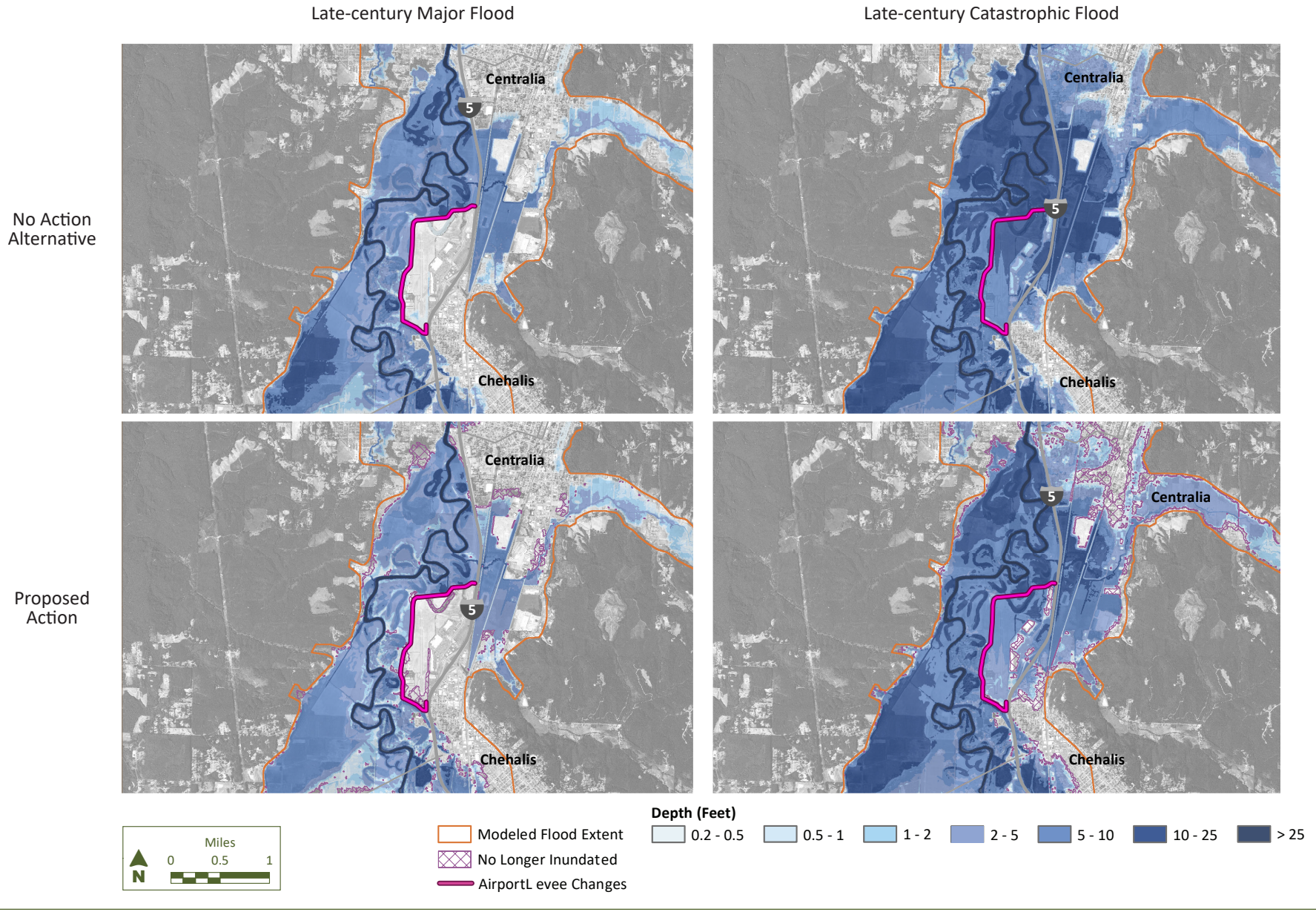


Figure G-13
Predicted Changes in Inundation Depths Near the Airport Levee



3.2.2.2 Indirect

Indirect land use impacts could include the potential for increased development in areas predicted to experience no flooding or less severe flooding as a result of the Proposed Action. The Office of Financial Management (OFM) Growth Management Act county projections for 2020 through 2050 (OFM 2017) are approximately 15% for Lewis County with an average population increase of 2.36% every 5 years. Extending the population projection to 2080 by applying the average 5-year growth rate results in an estimated population increase of 25,900 with in Lewis County between 2020 and 2080. However, the growth rate within floodplain areas is expected to be much lower due to flood risks. New construction in the study area is expected to be concentrated in UGAs and incorporated areas, such as Chehalis and Centralia.

The Chehalis Basin Programmatic EIS projected an increase in the Chehalis River floodplain population between 16% and 35%, which would result in a total population increase of approximately 761 to 1,720 people by 2120 (note that the EIS analyzes impacts through 2080). The Chehalis Basin floodplain defined for the Programmatic EIS overlaps with most of the land use study area (excluding limited areas of agricultural and rural lands near Doty and Dryad and limited areas within Centralia that are largely developed) and extends farther downstream to Aberdeen and includes portions of the Skookumchuck River floodplain.

This floodplain population projection for the Programmatic EIS was based on the following methods and assumptions (Programmatic EIS Appendix L: Buildout Analysis, Ecology 2017):

- The OFM population projections were extended beyond 2040 by applying the 5-year growth rate (from 2035 to 2040) through 2120.
- The ratio of growth in the floodplain compared to the combined counties' growth rate (for Lewis and Grays Harbor counties 2000 to 2010) was applied from 2015 through 2120 (ratio of 1:3).
- The 2014 population estimate, based on the structure survey (WSE 2014), is assumed to be equal to the 2015 population in the floodplain.
- There were 2.5 people per residence in both Lewis and Grays Harbor counties in 2014 (U.S. Census Bureau 2016).

Construction of new structures in the Programmatic EIS Chehalis River floodplain was expected to be nominal based on population growth trends, with an estimated four to nine structures being built in the floodplain per year over the next 100 years. Most of these structures would be concentrated in UGAs and incorporated areas, such as Chehalis and Centralia (Anchor QEA 2016, 2017b).

In the future, there is a possibility that the full extent of the buildable area could be utilized if it were removed from the threat of a catastrophic flood. Tables G-12 and G-13 provide a summary of the predicted areas that would no longer be inundated by zoning type under the modeled mid-century and late-century catastrophic flood scenarios to help illustrate the types of development that could be

anticipated in these areas and within which jurisdiction. Further, the number of lots no longer inundated was approximated based on the minimum lot size allowed within specific zoning designations for agriculture, rural, and residential areas to help estimate the future maximum developed conditions within these areas. It is important to note that these areas, if developed under maximum allowed density, would not be protected during future flood events larger than a catastrophic flood. While agriculture- and rural-zoned lands make up the majority of the areas that would no longer be inundated, residential-zoned lands make up close to 25% of the approximated number of lots that would no longer be inundated and are largely located within Centralia.

The potential land use changes from increased development in the floodplain as result of the Proposed Action would need to be consistent with current zoning designations and would be a **moderate** adverse impact, particularly in areas predicted to be no longer inundated during floods (ESA 2020b, Attachment 1, Figures N.7 through 10-[b through e]).

The potential land use changes to agricultural lands could include conversion of field crops that are more tolerant of flooding to higher-value vegetable crops. However, this conversion could be limited by continued smaller floods because the FRE facility would not retain water during flows less than major flood flows (Anchor QEA 2020a). A reduction in the extent of major floods would likely result in fewer livestock losses. Less severe flooding would also provide more areas of refuge from floodwaters for livestock (Ecology 2017).

Indirect land use impacts will require review of FEMA flood maps through a Conditional Letter of Map Revision, which is "FEMA's comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway" (FEMA 2019b). Following completion of a proposed project, the community could request a formal revision to the FIRM based on "as-built" certification and additional supporting data through a Letter of Map Revision. Since the modeled scenarios for major and catastrophic floods include climate change predictions (ESA 2020b), it is uncertain how the modeled scenarios would compare to FEMA's review of the Proposed Action's effect to the floodplain. The impact of potential land use restriction changes related to the regulatory floodplain as a result of the Proposed Action would be variable depending on the location.

The FEMA mapped SFHA may change due to implementation of the Proposed Action. A larger flood event may still inundate areas removed from the SFHA. Where land use regulations relating to floodplain management have been relaxed due to removal from the SFHA, there could be a perception that areas that were formerly in the SFHA are entirely safe from flooding. Floods larger than the modeled late-century catastrophic flood, like the 2007 flood, may still inundate portions of these areas.

Table G-12

Areas No Longer Inundated, by Zoning Designation, Under the Proposed Action in the Mid-Century Catastrophic Flood Scenario

	ACRES NO LONGER INUNDATED, BY ZONING DESIGNATION[1]								
JURISDICTION	**AGRICULTURE**	**RURAL**	**RESIDENTIAL**	**COMMERCIAL**	**INDUSTRIAL**	**PUBLIC FACILITY**	**FOREST**	**MINE**	**PARKS/ OPEN SPACE**
Grays Harbor County	366	155	5	12	5	0	0	0	0
Elma	0	43	23	10	178	0	0	0	0
Montesano	0	<1	0	13	<1	0	0	0	0
Oakville	1	0	23	1	0	0	0	0	0
Centralia	0	7	309	79	96	0	0	0	74
Chehalis	0	0	17	244	57	196	0	0	0
Lewis County	934	1,103	0	67	49	0	27	7	35
Pe Ell	0	0	17	0	0	0	0	0	0
Thurston County	249	176	4	0	0	0	0	0	0
STUDY AREA SUMMARY									
Total Acres	1,551	1,485	399	428	385	196	27	7	109
Percent of Total	34%	32%	9%	9%	8%	4%	<1%	<1%	2%
Percent within Mapped Floodway	11%	8%	<1%	6%	<1%	5%	<1%	<1%	1%
Approximate Number of Lots[2]	73	213	91	Lots were not approximated for these zones due to the varying densities allowed within the designations based on proposed land use.					

Notes:

1. The number of acres predicted to no longer be inundated within this table varies slightly from the values in Table G-11 due to minor differences of analyzed datasets and right-of-way areas that are not included in this table.
2. The number of lots within each zoning type was approximated based on the minimum lot size allowed within the specific zoning designations and the total number of acres within the designations. This approximation did not account for existing conditions or current lot configurations.

Table G-13

Areas No Longer Inundated, by Zoning Designation, Under the Proposed Action in the Late-Century Catastrophic Flood Scenario

	ACRES NO LONGER INUNDATED, BY ZONING DESIGNATION[1]								
JURISDICTION	**AGRICULTURE**	**RURAL**	**RESIDENTIAL**	**COMMERCIAL**	**INDUSTRIAL**	**PUBLIC FACILITY**	**FOREST**	**MINE**	**PARKS/ OPEN SPACE**
Grays Harbor County	240	80	<1	<1	2	0	0	0	0
Elma	0	<1	<1	<1	2	0	0	0	0
Montesano	0	<1	0	6	<1	0	0	0	0
Oakville	2	0	17	1	0	0	0	0	0
Centralia	0	5	220	58	103	0	0	0	69
Chehalis	0	0	12	69	31	9	0	0	0
Lewis County	980	1,161	0	34	44	0	32	7	38
Pe Ell	0	0	18	0	0	0	0	0	0
Thurston County	296	167	3	1	0	0	0	0	0
STUDY AREA SUMMARY									
Total Acres	1,518	1,414	272	170	182	9	32	7	108
Percent of Total	41%	38%	7%	5%	5%	<1%	<1%	<1%	3%
Percent within Mapped Floodway	11%	8%	<1%	1%	<1%	<1%	<1%	<1%	1%
Approximate Number of Lots[2]	62	192	84	Lots were not approximated for these zones due to the varying densities allowed within the designations based on proposed land use.					

Notes:

1. The number of acres predicted to no longer be inundated within this table varies slightly from the values in Table G-11 due to minor differences of analyzed datasets and right-of-way areas that are not included in this table.
2. The number of lots within each zoning type was approximated based on the minimum lot size allowed within the specific zoning designations and the total number of acres within the designations. This approximation did not account for existing conditions or current lot configurations.

3.2.3 Required Permits

The Proposed Action would require the following permits:

- **Airport Obstruction Zone application (Lewis County):** For the Airport Levee Changes, a permit would be required for construction taking place within the airport approach zone.
- **Building permit (Lewis County; potential special use, see Table G-8):** The FRE facility and Airport Levee Changes would require a building permit to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure.
- **Comprehensive plan update and rezone (Lewis County):** The FRE facility would be inconsistent with the current Forest Resource Lands land use designation and zoning district and could require a rezone.
- **Coastal Zone Management Program Consistency (Ecology):** Construction and operation of the FRE facility may be subject to the federal consistency provision of the Coastal Zone Management Act and the state's Coastal Zone Management Program.
- **Critical areas review (Lewis County and City of Chehalis):** The FRE facility and Airport Levee Changes would adversely affect a critical area or buffer, so a critical area assessment report and critical area mitigation plan would be required.
- **Earth-moving permit (City of Chehalis):** An earth-moving permit would be required for land disturbance that would be necessary to construct the Airport Levee Changes.
- **Fill and grade permit (Lewis County):** A permit would be required for filling and grading necessary to construct the FRE facility and for the Airport Levee Changes.
- **Floodplain development permit (Lewis County and City of Chehalis):** For the FRE facility and Airport Levee Changes, a floodplain development permit would be required for any construction or development that takes place within an area of special flood hazard.
- **Forest Practices Applications (DNR):** Forest Practices Applications (FPAs) associated with construction of the FRE facility on non-federal forestland, including and not limited to timber harvest, use of rock pits, constructing or abandoning forest roads, and converting land to non-forestry use, would be subject to the Forest Practices Rules (222 WAC).
- **Letter of Map Revision, Conditional Letter of Map Revision, or Physical Map Revision (FEMA):** To comply with 44 CFR 65.3, NFIP participating communities must provide FEMA with technical information related to changes to the SFHA. This would apply from the area inundated in the FRE reservoir downstream to near Montesano. Conditional approvals by FEMA are needed prior to construction of the project. This may lead to a formal change of the FIRM.
- **Right-of-way use permit (City of Chehalis):** A right-of-way use permit would be required for activities that would disturb, alter, or use the right-of-way.
- **Shoreline Conditional Use Permit (Lewis County and Ecology):** The FRE facility would be considered an in-water structure within Lewis County's SMP, which is a conditional use within the Rural Conservancy shoreline environment designation. Ecology has final approval for these permits.

- **Shoreline Substantial Development Permit (SSDP), including shoreline critical areas review (Lewis County):** For the FRE facility and Airport Levee Changes, a SSDP would be required for development occurring within Shorelines of the State.
- **SSDP, including shoreline critical areas review (City of Chehalis):** For the Airport Levee Changes, a SSDP would be required for development occurring within Shorelines of the State.
- **Storm drainage approval (Lewis County):** The FRE facility and Airport Levee Changes would require approval for any construction that would change the point of discharge of surface waters, discharge surface waters at a higher velocity and/or quantity than that prior to development, or increase pollution of surface waters.

See also the *Earth Discipline Report, Transportation Discipline Report*, *Water Discipline Report*, *Wetlands Discipline Report*, and *Wildlife Species and Habitats Discipline Report* for other permits that may be required.

3.2.4 Proposed Mitigation Measures

This section describes the mitigation measures proposed for the Applicant to implement that would reduce and compensate for impacts related to land use from construction and operation of the Proposed Action. These mitigation measures would be implemented in addition to compliance with environmental permits, plans, and authorizations described in Section 3.2.3. The Applicant will implement the following measures to mitigate impacts on land use:

- **LAND-1:** To remove the inconsistency with land use policies for construction of the FRE facility, mitigation is proposed for the Applicant to coordinate with Lewis County for a rezone of the current Forest Resources Land at the proposed FRE facility and temporary reservoir location or request a conditional use permit to address the inconsistency of the proposed land use within the Forest Resource Lands land use designation and zoning district. For associated forest practices activities, the Applicant will participate in pre-application consultation as provided for in the Forest Practices Rules.
- **LAND-2:** To reduce impacts from construction of the Airport Levee Changes, mitigation is proposed for the Applicant to prepare a hydraulics and hydrology study to determine whether compensatory flood storage would be required commensurate with the amount of fill placed in the floodway or SMP flood course (Lewis County SMP Section 6.03.02 [K]).
- **LAND-3:** The *Water Discipline Report,* Appendix N, identifies the potential for impacts from temporary increased flood elevations immediately upstream and downstream of the levee if the Airport Levee Changes are completed before the FRE facility is operational, which would result in impacts to land uses in those areas. Mitigation is proposed for the Applicant to develop a schedule in which the levee is built during the last part of the FRE facility construction period to eliminate the risk of additional flooding from a catastrophic flood if the Airport Levee Changes are completed before the FRE facility is constructed.

Other Related Mitigation Measures

- **Fish and Aquatic Species and Habitat Plan (FISH-1):** To mitigate the impacts on fish and aquatic species and habitats associated with construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Fish and Aquatic Species and Habitat Plan (for details, see *Fish Species and Habitats Discipline Report*).
- **Surface Water Quality Mitigation Plan (WATER-1):** To mitigate the impacts to surface water quality from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Surface Water Quality Mitigation Plan (for details, see *Water Discipline Report*).
- **Wetland and Wetland Buffer Mitigation Plan (WET-1)**: To mitigate impacts on wetlands and wetland buffers from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Wetland and Wetland Buffer Mitigation Plan (for details, see *Wetland Discipline Report*).
- **Stream and Stream Buffer Mitigation Plan (WET-2):** To mitigate impacts on streams and stream buffers from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Stream and Stream Buffer Mitigation Plan (for details, see *Wetland Discipline Report*).
- **Vegetation Management Plan (WILDLIFE-1):** To mitigate the impacts to terrestrial habitat from construction and operation of the FRE facility and temporary reservoir, mitigation is proposed for the Applicant to develop and implement a Vegetation Management Plan (for details, see *Wildlife Species and Habitats Discipline Report*).
- **Wildlife Species and Habitat Management Plan (WILDLIFE-2):** To mitigate the impacts to wildlife species and habitat from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Wildlife Species and Habitat Management Plan (for details, see *Wildlife Species and Habitats Discipline Report*).
- **Riparian Habitat Mitigation Plan (WILDLIFE-3):** To mitigate the impacts to riparian habitat from construction and operation of the Proposed Action, mitigation is proposed for the Applicant to develop and implement a Riparian Habitat Mitigation Plan (for details, see *Wildlife Species and Habitats Discipline Report*).

3.2.5 Significant and Unavoidable Adverse Environmental Impacts

There is uncertainty if mitigation is technically feasible or economically practicable. Therefore, the Proposed Action would have **significant and unavoidable** adverse environmental impacts on riparian habitat and be inconsistent with land use requirements. The Applicant may provide mitigation plans as described above. If the agencies determine the plans meet regulatory requirements and the implementation is feasible, then the impacts would be addressed as part of the permitting processes.

3.3 Local Actions Alternative

3.3.1 Impacts from Construction

3.3.1.1 Direct

Local actions could include construction impacts on land uses from floodproofing structures, demolition of buy-out structures, relocation of structures, and activities associated with floodplain storage improvements and channel migration protection (e.g., grading, planting, in-water work). Construction impacts on adjacent land uses could include noise, dust, and access impacts. Because construction would be temporary and short-term, these adverse impacts would range from **significant to minor** depending on the proximity and intensity of adjacent land uses.

Floodplain storage improvements and channel migration protection activities would likely occur within shoreline jurisdiction and critical areas. Probable impacts from construction of floodplain storage improvements and channel migration protection could include impacts on existing shoreline and critical area ecological functions during construction; however, these impacts would be temporary, and the actions are intended to improve overall floodplain and shoreline ecological functions. Floodplain storage improvement and channel migration construction adverse impacts are anticipated to be **moderate to minor**, depending on intensity of temporary impacts to ecological functions.

Implementation of land use management actions or early flood warning systems would not directly result in construction-related activities; therefore, there would be **no adverse impacts** on land uses that are construction-related.

3.3.1.2 Indirect

No indirect impacts on land uses from construction of the Local Actions Alternative are anticipated.

3.3.2 Impacts from Operation

This section analyzes the potential impacts from operation and implementation of local actions.

3.3.2.1 Direct

3.3.2.1.1 Land Use Management Actions

The Local Actions Alternative includes land use management actions that would have direct effects on how and where development occurs within the study area. Adoption of new flood data, such as incorporation of floods of record and adoption of updated FEMA floodplain and floodway maps, would change the extent of the regulated floodplain and change how development could occur in the expanded regulated floodplain and floodway areas. For example, the Lewis County 2014 preliminary FIRMs that have not been locally adopted indicate a much wider extent of the floodway within the entire floodplain compared to the existing mapped floodway. While adoption of the preliminary FIRMs would impact land use, especially where the floodway is expanded and new residential construction

would be prohibited, these actions would reduce flood risk to new structures and those that are substantially improved or mitigated.

Implementation of higher development and construction standards (e.g., filling restrictions and higher freeboard requirements) would also reduce flood risk to structures. Changes to freeboard height requirements to be 3 feet above base flood elevation or flood of record could significantly reduce flood damage to future development. For context, the large majority of structures modeled to be inundated from a predicted major flood, and almost half of the structures predicted from catastrophic flood, would experience 3 feet or less of inundation under the No Action Alternative (Tables G-9a, G-9b, G-10a, and G-10b).

While land use management actions are anticipated to affect how future development within floodplains would occur, these impacts are largely consistent with flood hazard planning and policy documents and adverse impacts are anticipated to be **moderate to minor**.

3.3.2.1.2 Floodproofing and Buy-Outs of Structures

The Local Actions Alternative includes floodproofing and buy-outs and relocations of at-risk properties or structures. A floodproofing program could be developed to protect structures, such as the same structures that would no longer be inundated under the Proposed Action as described in Section 3.2.2.1.3. Floodproofing, buy-outs, and relocations could also focus on repetitive loss areas or properties. The *Chehalis River Basin Repetitive Flood Loss Strategy* report (French & Associates 2014b) initiated by the Chehalis Basin Flood Authority in 2014 includes repetitive flood loss area maps based on aggregated data made available to the communities by the NFIP. This analysis could be updated as a part of the Local Actions Alternative to support a floodproofing and buy-out strategy.

Floodproofing would protect existing structures at risk of repetitive flood loss and structures that would no longer be protected from flooding compared to the Proposed Action. Buy-outs and relocations would impact existing land uses where properties would be converted to public use or other change from the existing use. These adverse impacts are anticipated to be **significant to minor**, depending on the potential need for zoning changes based on the location and number of structures that would be a part of the buy-out program.

3.3.2.1.3 Floodplain Storage Improvements and Channel Migration Protection

The Local Actions Alternative includes elements to improve floodplain storage and provide channel migration protection. Land use impacts from floodplain storage improvement could include conversions of existing agricultural lands to non-agricultural open space and riparian areas with potential changes of land ownership or conservation easements. Actions such as placing wood in rivers to increase water levels to more fully occupy floodplain areas would result in increased periodic flooding of some areas within the floodplain. Opportunities for floodplain storage improvements could be focused in areas outside of incorporated cities and UGAs and in areas that would no longer be protected from flooding

compared to the Proposed Action. Channel migration protection structures would reduce bank erosion and channel migration potential, reducing the potential and intensity of flood damage for properties in channel migration areas. As discussed in the *Earth Discipline Report*, decreases in channel migration from these activities are anticipated to be minor and local.

Land use impacts from floodplain storage improvements are anticipated to be **significant to minor**, depending on the extent of acreage needed for floodplain storage improvements to achieve the Proposed Action objectives.

Land use impacts from channel migration protection are anticipated to be **significant to minor,** depending on the location and extent of shorelines that would be protected or affected.

3.3.2.2 Indirect

No indirect impacts on land uses from the operation of the Local Actions Alternatives are anticipated.

3.3.3 Flood Conditions and Impacts

This discipline report analyzes probable impacts to land use under the No Action Alternative, and similar impacts would likely occur for the Local Actions Alternative. Major and catastrophic floods would continue to affect land use. As discussed in Section 3.2.2.1.3 and Section 3.4, and presented in Tables G-9a, G-9b, G-10a, and G-10b, residences and buildings would continue to experience significant adverse impacts. Impacts to these residences and buildings would likely be avoided or reduced as described in Section 3.3.2.1 through local land use actions such as adoption of new flood data, incorporation of floods of record, adoption of updated FEMA floodplain and floodway maps, floodproofing, and buy-outs. Flood frequency and severity are predicted to increase in the future. Residences and buildings would continue to experience **substantial flood risk** under the Local Actions Alternative.

3.4 No Action Alternative

Under the No Action Alternative, flooding would not be significantly reduced. Over time, it is possible that flooding could lead to land use conversions or restrictions because existing land uses could become incompatible with areas that experience high amounts of flooding. Agricultural losses to crops and livestock from flooding would continue, although livestock losses would be lessened to some degree by farm pads that have been constructed since the 2007 flood. Landowners may also choose to relocate homes and businesses outside of the floodplain to avoid damages.

3.4.1 Flood Conditions and Impacts

This discipline report analyzes probable impacts to land use under the No Action Alternative. It analyzes potential impacts for major and catastrophic floods in the future, including expected increases in precipitation and flood peaks from climate change. The analysis used water modeling to provide the expected duration and height of flooding in the study area.

As described in Section 3.2.2.1.3, 4,374 buildings were evaluated. Tables G-9a and G-9b identify that for major floods, 366 buildings would likely be inundated to some level in mid-century, and in late-century 517 buildings would likely be inundated. Tables G-10a and G-10b identify that for catastrophic floods, 2,245 buildings would likely be inundated to some level in mid-century and 2,955 buildings in late-century. Flood frequency and severity are predicted to increase in the future. Residences and buildings would continue to experience **substantial flood risk** under the No Action Alternative.

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