
City of DuPont

Old Fort Lake Subarea Plan Update and Land Use Code Amendments

Planned Action

Draft Environmental Impact Statement

Prepared for

City of DuPont

DuPont, Washington



Prepared by

D.E. Sherrard and Associates

AHBL, Inc.

November 2024

Dear Affected Agencies, Tribes, Organizations and Interested Parties:

Enclosed is the Draft Environmental Impact Statement (DEIS) for the Proposed Old Fort Lake Subarea Plan and Zoning Regulations Amendments.

City staff and the Planning Commission have been working on revisions to the adopted Old Fort Lake Subarea Plan since June 2023. The major features of the proposed plan revisions and zoning revisions is to develop this large area of undeveloped land in the city as primarily a residential area with a variety of housing types with retail and other uses that support the residential use and attract amenity-related non-residential uses primarily oriented to the existing golf course. This would change the predominant land use from the types envisioned under the current Old Fort Lake Subarea Plan and zoning of research and development and light manufacturing uses.

This DEIS analyzes the probable adverse environmental impacts associated with the Proposed Subarea Plan and Zoning Amendments and with the No Action Alternative of retaining the existing plan and zoning.

The public comment period associated with this DEIS is November 8, 2024 through December 9, 2024.

Agencies, affected tribes, organizations and members of the public are invited to comment on the adequacy of the environmental document or the merits of the alternatives discussed or both.

Comments may be submitted to the following email address: oflspupdate@dupontwa.gov. Alternatively, comments may be provided in hard copy via US mail or hand delivery to The City of DuPont at 1700 Civic Drive, DuPont, WA 98327, care of Barb Kincaid.

The Planning Commission will hold a Public Hearing on the proposed Old Fort Lake Subarea Plan and Zoning Amendments on or after 6:00 PM on November 13, 2024 at the DuPont City Hall, Council Chambers. That meeting is open for public comment on the Draft EIS, as well as general comments on the amendments. The time available for public comments will be limited, therefore submittal of DEIS comments by the means outlined above is encouraged.

Following the DEIS comment period, City of DuPont will prepare a Final EIS (FEIS) that addresses comments received during the DEIS comment period. The Final EIS is anticipated to be issued in early January 2025.

The DEIS can be reviewed at the City of DuPont at 1700 Civic Drive, DuPont, WA and online at <https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>.

Thank you for your interest in the Old Fort Lake Subarea Plan Amendments and the Draft EIS.

Sincerely,

A handwritten signature in black ink, appearing to read "Barb Kincaid".

Barbara Kincaid, City of DuPont SEPA Official
Director of Public Services

FACT SHEET

Name of Proposal	Old Fort Lake Subarea Plan Update and Land Use Code Amendments
Description of Proposal	City Council approval of amendments to the Old Fort Lake Subarea Plan and adoption of amendments to the Land Use Code. Alternatives include: Retention of the Existing Subarea Plan and Zoning Features to be developed as part of future build-out of the site under the provisions of the current adopted Subarea Plan and zoning will include a variety of allowed uses which may include: • Single-Family Residential Use: Up to 100 units at a density of 3 units per acre. • Multifamily Residential Use: Up to 1,000 units at a density of 32 units per acre. • Non-residential uses including office, research and development, light manufacturing, and limited retail and service uses totaling about 1.4 million square feet. Amendments to the Subarea Plan and Zoning Features to be developed as part of future build-out of the site under the provisions of the proposed amendments to the Subarea Plan and zoning will include a variety of allowed uses which may include: • Single-Family Residential Use: 70 acres with a projected range of 280-560 units. • Middle Housing (up to six-units per lot): 93 acres with a projected range of 1,128-1,880 units. • Multifamily Residential Use: 34 acres with a projected range of 680-1,360 units. • Non-residential uses including retail, service, light manufacturing, hotels and other uses totaling about 409,800 square feet.
Location of Proposal	DuPont, WA
Proponent	City of DuPont
Proponent Contact	Barbara Kincaid Public Services Director Email: bkinaid@dupontwa.gov Phone: (253) 912-5393
Lead Agency	City of DuPont
Approval and Licenses	City Council Approval of Subarea Plan Amendments City Council Approval of Land Use Code Amendments City Council Approval of Planned Action Ordinance

Authors and Principal Contributors	D.E. Sherrard and Associates, LLC, EIS Preparation AHBL Inc., Document Management Fehr and Peers, Transportation Landau Associates, Noise Aqua Terra Cultural Resource Consultants Raedeke Associates, Plants and Animals
Date of Issue	November 8, 2024
Date Comments Due	December 9, 2024
Comment May Be Submitted to	Comments can be emailed to: oflspupdate@dupontwa.gov . Another alternative is to drop off or mail comments to: Barb Kincaid, Director of Public Services and City SEPA Official City of DuPont 1700 Civic Drive DuPont, WA 98327
Date of Action on Applications	February 2025: City Council Adoption of the Subarea Plan and Zoning Amendments
Location of Background Information	City of DuPont Department of Community Development 1700 Civic Drive DuPont, WA 98327 Phone: (253) 964-8121 https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update
Availability of EIS	Copies of this DEIS have been distributed to agencies, organizations, and individuals noted on the Distribution List. This DEIS can be reviewed at: DuPont City Hall Department of Community Development 1700 Civic Drive DuPont, WA 98327 The DEIS can be downloaded by following the link below: https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update

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- B. Existing Zoning Code Available at: [DuPont Municipal Code \(codepublishing.com\)](https://www.duPontMunicipalCode.com)
- C. Proposed Subarea Plan Available at: <https://www.duPontWA.gov/696/Old-Fort-Lake-Subarea-Plan-Update>
- D. Proposed Zoning Amendments Available at: <https://wa-dupont2.civicplus.com/DocumentCenter/View/6350/Comprehensive-Plan---2017-Appendix-E---Old-Fort-Lake-Subarea-Plan>

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- E. All Technical Reports are Available at: <https://wa-dupont2.civicplus.com/DocumentCenter/View/6350/Comprehensive-Plan---2017-Appendix-E---Old-Fort-Lake-Subarea-Plan>

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ACRONYMS

APA	Aquifer Protection Area
BA	Biological Assessment
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMZ	Channel migration zone
dB	decibel
dBA	A-weighted decibel
DEIS	Draft Environmental Impact Statement
DMC	DuPont Municipal Code
DNAPL	Dense non-aqueous phase liquid
DNR	Washington State Department of Natural Resources
DPS	Distinct Population Segment
Ecology	Washington Department of Ecology
EDNA	Environmental Designation for Noise Abatement
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
I-5	Interstate 5
Leq	A-weighted energy equivalent
mg/L	milligrams per liter
mllw	mean lower low water
mm	millimeter
mph	miles per hour
MRSC	Municipal Research Center of Washington
MTCA	Model Toxics Control Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

ACRONYMS (Continued)

OHW	Ordinary High Water
OHWM	Ordinary High-Water Mark
DMC	DuPont Municipal Code
PAH	polyaromatic hydrocarbon
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
PHS	Priority Habitat and Species
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
ROW	Right-of-way
SEPA	State Environmental Policy Act
SHPO	State Historical Preservation Office
SMA	Shoreline Management Act
SPTH	Site-potential tree height
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary Erosion and Sediment Control
TIR	Technical Information Report
TOC	total organic carbon
TPH	Total Petroleum Hydrocarbons
TSCA	Toxic Substance Control Act
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VOC	volatile organic compound
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington Department of Energy
WNHP	Washington Natural Heritage Program
WSDOT	Washington State Department of Transportation
WUTC	Washington Utilities and Transportation Commission

1. SUMMARY

Figure 1-1 Vicinity Map

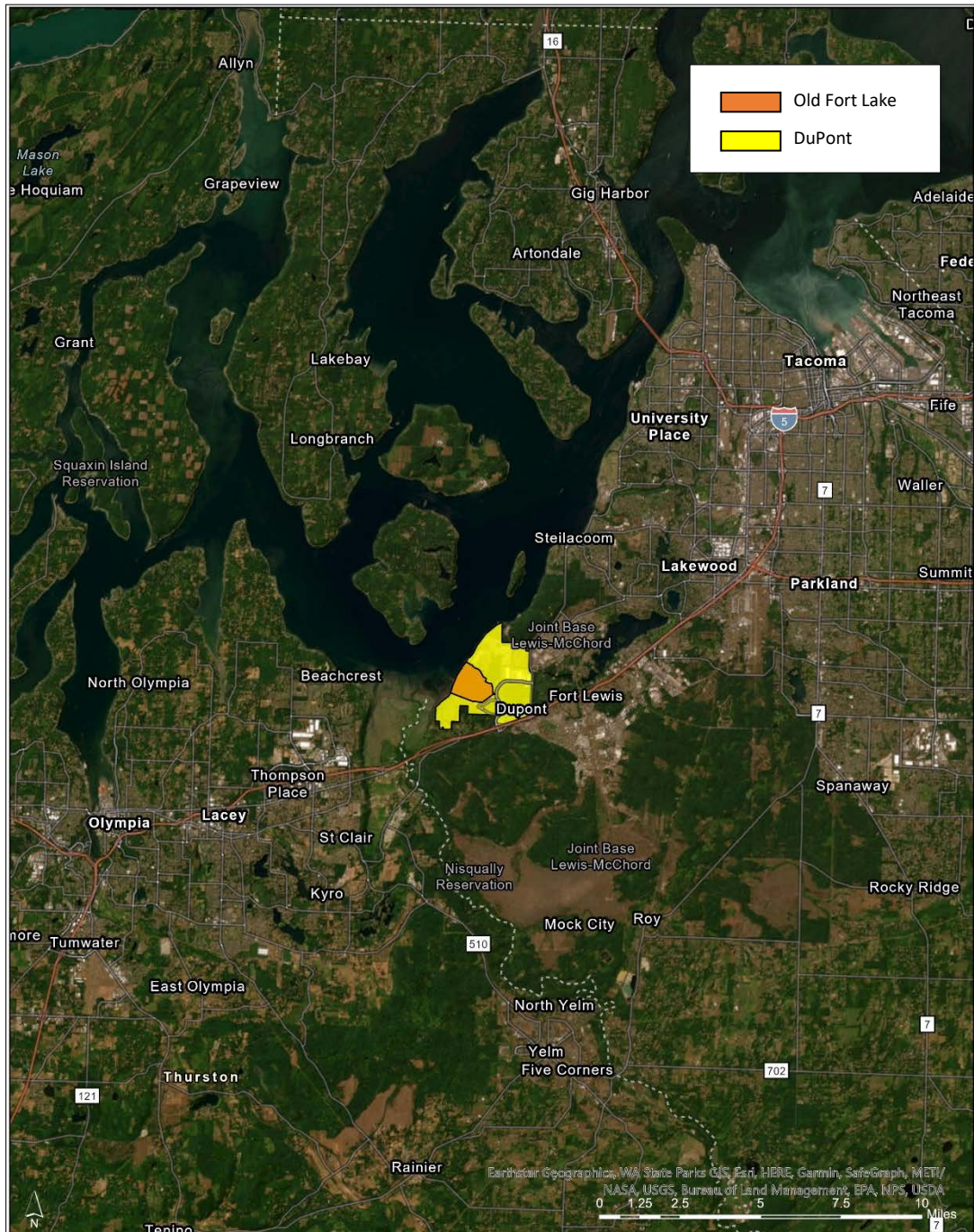
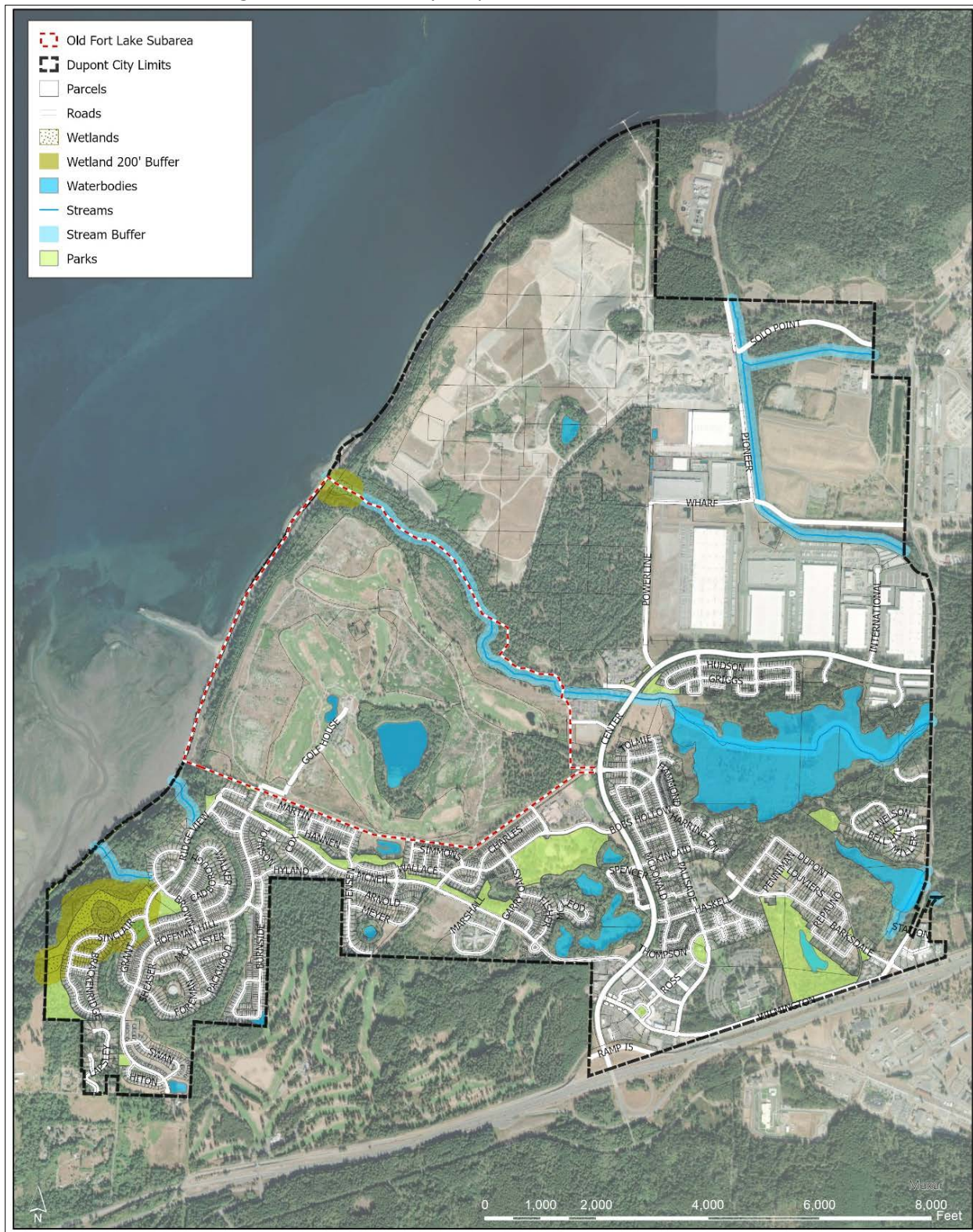


Figure 1-2 Vicinity Map Old Fort Lake Subarea within DuPont



Source: Raedeke Associates, Inc., Wetlands, Plants and Animals, and Fisheries Impact Assessment Report dated August 21, 2024

1.1 ALTERNATIVES

The Old Fort Lake Subarea is located in the City of DuPont in an area bounded on the west by Puget Sound, on the north by Sequelitchew Creek, on the east by properties outside of the Subarea that front on Center Drive (including residential and civic uses), on the south by existing largely residential development of the Northwest Landing Planned Community.

The Old Fort Lake Subarea was the main manufacturing area for the I.E. DuPont de Nemours Company explosives manufactured from 1909 to 1975. It was purchased by Weyerhaeuser and the property was subject to hazardous materials cleanup and remediation that designed the property for commercial and industrial use.

Two alternatives are analyzed in this Draft Environmental Impact Statement.

1.1.1 No Action/Existing Subarea Plan and Zoning

The Old Fort Lake Subarea was subject to a Comprehensive Plan update in 2017 which designed the area as a Mixed Use Village with the primary goal of creating opportunities for jobs and employment.

The plan also allowed up to 100 single-family units and up to 1,000 multifamily units, while recognizing that the property is subject to Department of Ecology restrictions that do not allow such uses. It was anticipated that owners would undertake additional hazardous materials cleanup and remediation to allow such uses.

The plan designates four major Focus Areas:

Mixed-Use Focus Area: In the western part of the Subarea, the development blocks near the bluff are envisioned as a Mixed-Use Focus Area to provide uses complementary to the golf course, the bluff, and adjacent neighborhoods including commercial, business, residential, and community uses.

Business / Industry Focus Area: The eastern and central portion of the Subarea adjacent to Old Fort Lake Subarea are envisioned as the Business/Industry Focus Area planned to support a variety of employment uses in a business park setting.

Work/Live Focus Area: The area located parallel to Sequelitchew Creek is envisioned as the Work/Live Focus Area planned to support future employment uses, cultural facilities, and complementary workforce housing.

Open Space Focus Area: The golf course and several conservation blocks are envisioned to comprise the Open Space Focus Area and are envisioned to remain as unimproved open spaces or recreational assets. The areas along the bluff, along Sequelitchew Creek, and around Old Fort Lake will remain passive open space. The golf course and related properties are designated as the recreational centerpiece for the Subarea.

1.1.1.1 Land Use Code

The city created a new set of regulations in a new subsection of the Land Use Code for the Old Lake Subarea that implemented the Subarea Plan. The Mixed Use Village designations include:

MUV-1: This subdistrict in the northwest corner of the Subarea is intended to support a mix of uses that includes neighborhood-oriented commercial/restaurant uses, hotel, housing, public/community uses, office, light manufacturing, and research and development.

MUV-2: This subdistrict in the west central and southwesterly area is intended to support a mix of uses that includes neighborhood-oriented commercial/restaurant uses, hotel, housing, office, light manufacturing, and research and development.

MUV-3. This subdistrict in the south central area is intended to support a mix of uses that includes neighborhood-oriented commercial/restaurant uses, multifamily housing, public/community uses, office, light manufacturing, and research and development.

MUV-4. This subdistrict in the southeast portion of the area is intended to support smaller-scale employment and neighborhood-oriented commercial/restaurant uses. The subdistrict is intended to develop with appropriate buffering and building-scale limitations to ensure compatibility with the nearby residential and school properties.

MUV-5. This subdistrict in the southeastern, eastern, and central portion of the site is intended to be a primary employment area that allows office, light manufacturing, and research and development.

MUV-6. This small subdistrict in the north central part of the site is intended to be a primary employment area that allows office, light manufacturing, and research and development. This subdistrict also supports specialty commercial/restaurant uses.

MUV-7. This subdistrict in the northeasterly portion of the area adjacent to Sequalitchew Creek is intended to support a mix of uses that includes neighborhood-oriented commercial/restaurant uses, community/cultural uses, office, light manufacturing, and research and development.

MUV-8. This subdistrict in the north central portion of the area adjacent to Sequalitchew Creek is intended to be an employment area with supportive residential that allows office, light manufacturing, research and development, community/cultural uses, and multifamily housing.

MUV-9. This subdistrict primarily in the central portion of the site includes the existing golf course is intended to support active recreation and supporting land uses such as commercial/restaurant, administrative office, and hotels.

Land use regulations allowed office and research and development uses in all districts in accordance with the focus of the area, allowed retail and service in fewer and allowed residential uses only in the far westerly Mixed-Use Focus Area/MUV-1, 2 and the far northerly Work/Live Focus Area/MUV-7.

Single-family residences were limited to 100 units at three dwelling units per gross acre. Multifamily residences are limited to 1,000 units at a maximum density of 32 units per acre. No specific geographic locations are designated.

Nonresidential uses were limited to a maximum Floor Area Ratio (FAR) of 0.30. FAR is the ratio of building area to site area. For example, a 10,000 square foot site would allow 3,000 square feet of building floor area.

Dimensional standards were adopted that were similar among most of the zoning districts, but based on use with specific transition standards for uses adjacent to existing residential districts and the golf course.

1.1.2 Proposed Subarea Plan and Zoning Amendments

This alternative includes a set of integrated amendments to the Subarea Plan policies and Land Use Code regulations.

The Plan Update is the result of a City Council moratorium on development in the Subarea which in part was intended to consider additional housing to meet city's regional housing target, area for parks and recreational uses, and design standards.

The major emphasis of the Proposed Subarea Plan Amendments and Zoning Revisions is to develop the Subarea as a residential community rather than as primarily an employment center.

Subarea plan designations include the following land use categories that are implemented in the Land Use Code. The plan provides for:

- 70 acres of single-family residential,
- 94 acres of middle housing,
- 34 acres of Multifamily,
- 10 acres of General Commercial,
- 7 acres of Neighborhood Business,
- 20 acres of an Entertainment district,
- 10 acres of Civic designation which is anticipated to be a school site, and
- 329 acres of Parks, Recreation and Open Space designation.

1.1.2.1 Land Use Code

The Zoning districts within the Subarea include:

Single-Family (SF): This zoning designation intends to provide for detached single-family and duplex uses at a base density of two units per lot. Attached units can be on their own fee-simple lot, or all on one lot. 70 acres within the city are designated for SF zoning, with a presumed density of eight units per acre, resulting in a total projected unit count of 560.

Middle Housing (MH): This zoning designation intends to provide for attached housing types from two to six units that meet the definition of Middle Housing in DMC 25.10 Definitions. Attached units can be on their own fee-simple lot, or all on one lot. 94 acres within the city are designated for MH zoning, with a presumed density of 20 units per acre, resulting in a total projected unit count of 1,860.

Multifamily (MF): This zoning designation intends to provide for higher density housing in buildings greater than six units. The buildings can be a maximum height of 45 feet, not including underground parking structures. 34 acres within the city are designated for MF zoning, with a presumed density of 40 units per acre, which could yield a high-end unit count of 1,360.

Neighborhood Business (NB): This zoning designation is intended to provide for smaller scale commercial type uses that serve the Subarea and city residents, such as retail and restaurants, personal service uses, light manufacturing buildings no greater than 50,000 SF, professional and medical offices, and banks and credit unions. Seven acres within the city are designated for NB zoning.

Commercial (COMM): This zoning designation is intended to provide for higher intensity commercial uses such as retail spaces, restaurants, and commercial recreation that may draw from a larger region. 10 acres within the city are for COMM zoning designated.

Entertainment (ENT): This zoning designation is intended to provide for entertainment and recreation type uses such as hotels, commercial recreation, retail, restaurants, community and cultural centers. These uses may draw visitors from the region and serve to be supportive of the adjacent golf course use. 20 acres within the city are designated for ENT zoning.

Civic (CIV): This zoning designation is intended to provide for public and quasi-public uses such as schools, public parks, convention centers, community and cultural centers, churches and public utilities. 10 acres within the city are designated for CIV zoning.

Parks, Recreation and Open Space (PROS): This zoning designation is intended to provide for recreational uses and open space that implement the goals and policies of the Subarea Plan.

In addition, approximately 46 acres of land within the Subarea is owned by the Nisqually Tribe and has not been allocated a future land use or zoning designation. When development of the Tribe's property is planned, the Old Fort Lake Subarea Plan will need to be amended, and a zoning designation determined through a public process.

Dimensional standards include a maximum building height of 35 feet for Single-Family (SF), Middle Housing (MH), and Parks, Recreation and Open Space (PROS); 50 feet for Multifamily (MF); 45 feet for Commercial (COMM), Entertainment (ENT), and Neighborhood Business (NB), 45 feet; except for hotels in the ENT district which are allowed a maximum height of 50 feet. Setbacks are largely determined by design standards.

Community Design Regulations address street frontage, through-block connections, parks, and trails, streetscape classifications and regulations, maximum block size, parks, trails, onsite parking and other features.

1.2 LAND USE

1.2.1 Affected Environment

The Old Fort Lake Subarea is currently undeveloped except for the Home Course golf course located in the center of the Subarea.

1.2.2 Impacts – No Action/Existing Subarea Plan and Zoning

Under the existing Subarea Plan and zoning, which is focused primarily on employment, 1,100 residential units are allowed, which would result in a projected population of 2,330.

This population, combined with the existing neighborhoods to the south would support approximately 95,000 to 125,000 square feet of retail and service uses. If half the market demand from the balance of the city population of 3,070 were captured by retail in the Old Fort Lake Subarea, this could support an additional 20,000 to 30,000 square feet of retail and service uses plus several restaurants with a total floor area of 10,000 square feet. A moderate size hotel with 90 rooms is estimated to be oriented primarily to demand from the golf course.

The area available for office and research and development uses totals approximately 1.7 million square feet. Attracting such magnitude of these uses would involve companies currently in the region relocating to DuPont and/or attracting new companies not currently located in the region. Both of these scenarios are possible, but somewhat unlikely considering that the following 10-year regional projections were made for manufacturing uses: no increase in employment; regional office growth projections are for approximately 8,100 new employees countywide and projections for research and development uses are approximately 4,500 new employees countywide.

1.2.3 Impacts - Proposed Subarea Plan and Zoning Amendments

The proposed Subarea Plan and zoning amendments designate 70 acres for single-family development, which is presumed to develop at 8 units per acre, resulting in 560 additional units with a projected population of 1,512. Middle housing, which consists of townhouses or similar development, is designated for 93 acres at 20 units per acre, resulting in 1,860 units and a projected population of 4,278. Multifamily development is designated for 34 acres with a presumed density of 40 units per acre, resulting in 1,360 units and a projected population of 2,992. The total population of the Subarea would be 8,782 which compares with the existing city population of approximately 9,955 (2022 American Community Survey 5-Year Estimates).

The proposed amendments designate about 50 acres to commercial, neighborhood commercial and entertainment districts. It is not possible to accurately predict the mix of uses that landowners and developers may choose to implement in the future and the market conditions that may support a particular mix of uses. The projections of non-residential uses within the Subarea under the proposed amendments were developed in conjunction with the owners regarding their objectives and broad analysis of market trends. It is estimated that the population of the Subarea and the rest of the city could support 211,000 to 284,000 square feet of retail, service and related uses and 125,000 to 200,000 square feet of other uses.

Table 1.2.3-1 Projected Unit and Population Increase by Development Type

Projected Unit and Population Increase by Development Type				
	Designated Acres	Density	Total Additional Units	Total Population
Single-Family	70 acres	8 units per acre	560 units	1,512
Middle Housing	93 acres	20 units per acre	1,860 units	4,278
Multifamily Development	34 acres	40 units per acre	1,360 units	2,992
Total				8,782

An additional component of projected market support is envisioned to come from amenity-based demand largely focused around the golf course that could attract a range of amenity related uses including restaurants, specialty retail, hotels and other uses.

1.2.4 Mitigation

Mitigation is not considered necessary for land uses that emphasize alternative policy goals of the city's comprehensive plan or may change those goals and policies.

1.2.5 Unavoidable Adverse Impacts

Permanent change in land use will occur within the Subarea under any planning and regulatory scenario. Such impact will preclude alternative lands uses.

1.3 AESTHETICS

1.3.1 Affected Environment

The existing characteristics of the Subarea include landscape features of the golf course surrounded by limited areas of mature forest, located primarily in open space areas. Additionally, a mixture of recent growth of small evergreens and scotch broom has been present in this area since the majority of the site was excavated for hazardous materials cleanup and remediation.

1.3.2 Impacts - No Action/Existing Subarea Plan and Zoning

The major features of the existing Subarea Plan and zoning which emphasizes the area as an employment center would be of office, research and development, and light manufacturing buildings up to a maximum height of 65 feet with some retail and service uses.

In addition, up to 100 single-family units would be allowed. Although no specific location is designated, they are limited to the westerly and northerly portions of the site. It is presumed they would be developed in high amenity locations, such as along the bluff overlooking Puget Sound or adjacent to the

golf course. The 1,000 multifamily units allowed also would be presumed to be located in similar high amenity areas in the westerly and northerly portions of the Subarea.

Single-family development likely would be considered compatible in scale with existing single-family development to the south of the Subarea and generally compatible with the golf course, since residential development adjacent to golf courses is a common feature.

The scale of multifamily would generally be considered out-of-scale with adjacent single-family residential areas, where they are allowed adjacent to the southerly boundary of the Subarea. Non-residential development with a maximum height of 65 feet would also generally dominate views from existing residential neighborhoods, since non-residential uses have no restrictions on building width and could present large expanses of building frontage adjacent to existing residential areas. The existing land use code does restrict height to 35 feet within 150 feet of residential areas, but the mass of buildings would remain out of scale and the large-scale buildings beyond the setback would still be at a much greater scale, particularly if developed as light manufacturing uses with little building detail.

The views of large-scale urban development at the allowed height and bulk would not interfere with the views of Mount Rainier, the most prominent feature visible from the golf course to the southeast. The framing of the golf course with surrounding buildings being a maximum height of 65 feet without horizontal bulk limitation likely would be perceived as out-of-scale and as a visual intrusion not compatible with the landscape features of the golf course. The limiting of height to a maximum of 35 feet within 50 feet of the golf course would accomplish little reduction in bulk and scale impacts, considering the bulk currently allowed beyond that boundary.

The provision of landscape buffers likely would have limited effect on perceptions of building bulk since planted trees would not grow to a height to effectively screen or provide an alternative focus to views for decades after planting.

1.3.3 Impacts - Proposed Subarea Plan and Zoning Amendments

The proposed amendments to the Subarea Plan and zoning will place single-family and middle housing adjacent to existing residential development on the southerly boundary of the Subarea with buildings that likely will be considered compatible in scale by most existing residents.

The golf course is adjacent to middle housing along most of its boundary. A somewhat smaller portion of the boundary is abutted by single-family uses. It is likely that golfers will consider such uses to be compatible, given the common location of residences adjacent to golf courses.

Multifamily development is proposed along golf course fairways 11 and 12 for about 1,400 linear feet. There is no specific setback provided for multifamily development, but a landscape buffer would be required. The fifty-foot building height maximum, the bulk and small setbacks from the golf course provide for the potential of these buildings to dominate views from the green of Fairway 11 and the tee of Fairway 12.

Fairway 8 of the golf course is bordered on the south by about 1,300 feet of neighborhood business and entertainment zoning. This area has a 45-foot building height maximum, with the exception of hotels, which allow for a maximum of 50 feet. There is no required setback from the golf course, however, landscape buffers would be required, and it is probable that buildings in these non-residential areas would be separated from the golf course property line by parking lots and landscape buffers. The larger scale of these buildings is likely to be viewed as a visual intrusion to players on the golf course.

In areas of multifamily, commercial and entertainment designations, facade articulation is required by proposed regulations that might provide some scale benefits when viewed from close-up within the

urban area, however, when viewed at a greater distance, they likely would not be effective in breaking up the perceived scale of the buildings.

The lack of imposition of any specific provisions for transitions from the golf course in the proposed Subarea Plan and zoning amendments would likely create two adjacent landscapes with a definitive and abrupt boundary between the two with entirely separate dominant features. There are few specific provisions proposed that would make the transition more gradual or soften the visual prominence of the urban landscape from the relatively natural landscape of the golf course. Overall, the sensitivity of site and building design would depend on design decisions made at the implementation stage depending on the design sense of design professionals and city review staff, but not necessarily guided by specific proposed standards.

1.3.4 Mitigation

Compatible building bulk can be addressed by placement of buildings in relation to areas with less density, or areas of open space such as natural areas or the golf course such that building scale does not overwhelm the character of adjacent areas. This can be done by a variety of approaches:

- Providing lower building height adjacent to less intense uses which are less prominent due to their scale and therefore don't present as great of a contrast.
- Establish greater setbacks such that the relative height of more intensive use is attenuated by distance.
- Provide effective landscape screening such that intrusive features are blocked or shielded. This is often problematic because even the largest available nursery stock often takes several years, or decades to provide an effective screen, especially of taller or larger scale buildings.
- Retain, if available, large specimen vegetation that not only may screen new development but may provide features that are taller and therefore become the dominant element of a view, rather than buildings.
- Locate required park and recreation dedications to increase buffers or setbacks, possibly in conjunction with trails and other facilities to provide a managed landscape designed to incorporate many of the strategies above and provide land usable for multiple functions.
- Establish building façade articulation that effectively breaks up the perceived scale of a building including substantial upper floor setbacks that reduce the apparent building height, often combined with features such as balconies that add complexity and therefore reduce monumental scale. Provide substantial vertical articulation that is read as breaking buildings into recognizable smaller units, rather than simply providing variety. The effectiveness of such measures is enhanced by the other measures listed above.

1.3.5 Unavoidable Adverse Impacts

Permanent change in land use and changes in the aesthetic or visual environment will occur within the Subarea under any planning and regulatory scenario. Such impact will preclude alternative lands uses that may have different and possibly more compatible aesthetic results.

1.4 LIGHT AND GLARE

1.4.1 Affected Environment

Lighting on the site is limited to street, parking lot and building lighting related to the existing golf course and is largely not visible from the perimeter of the site.

1.4.2 Impacts

Under both proposed alternatives impacts would be similar. Light sources from both alternatives would include street and/or sidewalk lights, building-mounted lights, and interior lights. There would likely be a greater number of sources in the proposed development than currently exist in the Subarea, which could result in an overall increase in ambient lighting or diffuse brightness.

The most significant light and glare impacts would be to viewers from the south, particularly the pedestrian trail and the first row of houses as well as on the hill west of Hoffman Hill Boulevard in locations where greenbelts do not block views. Headlights from cars leaving the site on the proposed roadway aligned with Palisade Boulevard will sweep across the sides of the existing final residences at the west end of the existing street as cars turn right or left.

1.4.3 Mitigation

For both alternatives, source shielding for exterior lights may be used to reduce the visibility of light from residential areas and limit spillover light.

1.4.4 Unavoidable Adverse Impacts

Permanent changes on-site to land use and light and glare levels will occur within the Subarea under any planning and regulatory scenario. Such impacts are typical of urban areas.

1.5 HAZARDOUS MATERIALS

1.5.1 Affected Environment

Weyerhaeuser, as successor to ownership of the portions of the site that had been used for explosives manufacturing, undertook cleanup and remediated between the mid-1970s and 2007. A variety of cleanup methods were used, including:

- Large-Scale Excavation involved excavation of one foot of soil over large areas of the site where elevated levels of arsenic and lead were present.
- Localized removal at miscellaneous small units was employed where isolated, small occurrences of hazardous materials were found in subsurface soil at a depth greater than one foot.
- On-site deposition with a cap/cover at the golf course was used for the majority of the contaminated soil excavated from the site.
- Tree root zone remediation was used to preserve selected trees within the future golf course.

A covenant was placed on the property (AFN 200611010855) that limits the property to "...commercial use as allowed under the City of DuPont zoning regulations and Comprehensive Plan and under MTCA, provided, however, that the Property shall not be developed and used for any of the following: residential uses, schools, daycare, parks, recreational uses (with the exception of potential future golf course expansion) or any other use in which the likelihood of children having sustained access to soils can reasonably be anticipated."

1.5.2 Impacts - No Action/Existing Subarea Plan and Zoning

The city changed its zoning regulations and Comprehensive Plan in 2017, after the October 2006 imposition of the covenant by Ecology limiting uses. The current zoning allows the following uses that are not within the terms of the covenant and would require Ecology approval of a modification of the covenant and possibly additional cleanup and remediation: commercial recreation facilities such as golf, tennis, swimming and all indoor commercial recreation facilities; multifamily residences; single-family

residences; family day care; public uses other than parks and K-12 schools; cultural/community center; and educational institutions. The land use code notes that “These uses may be further restricted based on a State of Washington Department of Ecology Consent Decree and/or private restrictive covenant. These uses may only be allowed when not prohibited/restricted by a consent decree and/or restrictive covenant. The applicant shall demonstrate compliance as part of the land use and/or building permit review.”

In order to allow the proposed residential and recreational uses in the proposed amendments to the Old Fort Lake Subarea Plan and zoning regulations, additional cleanup or remediation will be required where sampling indicates that materials exceed the levels deemed to be safe to protect human health and specifically where there is a likelihood of children having sustained access to soils.

The responsibility for cleanup of this site to allow for residential uses (unrestricted per Ecology nomenclature) would be the responsibility of the owner proposing the use. No proposals for such use have been proposed and no specific cleanup or remediation actions have been proposed.

1.5.3 Impacts - Proposed Subarea Plan and Zoning Amendments

The proposed amendments to the Subarea Plan and zoning allowing primarily residential uses have the concomitant measure of requiring cleanup or remediation of much of the site.

The technology and practices required to accomplish cleanup or remediation to such levels is not particularly unusual; it can, however, be costly.

The effort is likely to require refined sampling in any future residential exposure units that have no sample data and/or in areas with exceedances to ensure that adequate documentation of exceedances of standards is known. The spacing of existing sampling may not be sufficient to identify all “hot spots” where contaminants may exceed the levels required for residential use.

The requirements for residential (or unrestricted) use would require areas where there are current exceedance of levels approved for unrestricted use either be remediated to levels allowing unrestricted use or would require avoidance of those areas through various actions such as isolating those areas under paved parking areas or other barriers that preclude human contact, or by effectively precluding access through fencing or other controls, particularly by children.

The level of remediation will be determined by the Washington Department of Ecology. It is unknown whether they will impose a uniform standard for all areas with residential use or impose specific standards for specific use areas based on the plans developed for specific site and building plans. Strategies for different types of residential use may vary depending on the ability to control use and exposure.

Single-family and middle housing/townhouse areas likely will require cleanup of the entire lot area outside of impervious surfaces of road surfaces and sidewalks because it is difficult or impossible to reliably predict or restrict human access to the entire lot area.

Multifamily use may include specific designation of different activity areas with different sampling and remediation requirements for areas where exposure to soils can be isolated such as multifamily parking areas where contaminants can be isolated by pavement.

Commercial and entertainment areas may require a specific level of remediation based on the specific uses proposed and whether they include recreation or education facilities that might expose children to soils.

1.5.4 Mitigation

The measures outlined above would constitute mitigation for exposure to hazardous materials.

1.5.5 Unavoidable Adverse Impacts

Some inadvertent exposure to hazardous materials may occur to workers and the public during cleanup and remediation. Inadvertent exposure may occur due to sampling that misses some hot spots of contamination.

1.6 TRANSPORTATION

1.6.1 Affected Environment

The City of DuPont transportation circulation system includes vehicular and non-motorized transportation systems that currently provide adequate function and meet the city's level of service standards.

The major vehicular circulation routes in the city include the DuPont-Steilacoom Road at the easterly boundary of the city which extends from I-5 on the south to the City of Steilacoom located five miles to the north and continues along Joint Base Lewis McChord (JBLM) for approximately three miles. The other major arterial is Center Drive, which connects to I-5 about a mile and a quarter southwest of the DuPont-Steilacoom Road interchange and loops to the west and north to connect to DuPont-Steilacoom Road about a mile north of the I-5 interchange. Wilmington Drive connects the two and is generally parallel to I-5 and provides the only other east-west connection across the city besides Center Drive. The majority of residential and commercial development in the city is oriented to Center Drive.

The truck route in the city is limited to DuPont-Steilacoom Road as through truck traffic is prohibited on Center Drive south of Palisade Boulevard. The major destination for truck traffic in the city is the warehouse area near the intersection of DuPont-Steilacoom Road and Center Drive.

DuPont is served by two regional commute bus routes; ST 592 and ST 594, operated by Sound Transit which serve the transit center adjacent to I-5. There are no internal transit routes in DuPont.

All signalized intersections in DuPont meet the city's Level of Service (LOS) D standards. Most operate at LOS A or B during peak hours.

The DuPont Six Year Transportation Improvement Plan includes the following projects:

- Powerline Road Improvements – From Center Drive to Wharf Road, design and construct new arterial roadway along Powerline Road.
- Center Drive Traffic Signal Coordination – From I-5 Exit 118 to DuPont-Steilacoom Road, wireless connection of eight traffic control lights on Center Drive.
- I-5 Exit 119 Reconstruction – Reconstruct interchange at DuPont Steilacoom Road to include two separate interchanges, one connecting directly to DuPont Steilacoom Road and one at the existing interchange location at Barksdale Avenue.
- DuPont Steilacoom Road Improvements – Roadway improvements, including improvements at the intersection of DuPont Steilacoom Road and Center Drive.
- McNeil Street and Ridge View Drive Reconfiguration – Reconfigure the roundabout at this intersection.

1.6.2 Impacts – No Action/Existing Subarea Plan and Zoning

The first step in impact analysis was identifying “Background Growth” which consists of regional growth in traffic and “pipeline” projects in DuPont that would add trips to the vehicular circulation system.

Nine pipeline projects were identified and include approximately 280 new households and between 1,200 and 1,600 new jobs. Adding these trips to local roads resulted in virtually no change in LOS at any intersection.

Trip Generation from projected uses allowed by existing zoning and judged to be probable uses that may develop on the site (see land use analysis) results in 37,353 daily trips, 3,031 AM peak hour trips, and 3,676 PM peak hour trips added to the system. This results in eight intersections decreasing in LOS function during at least one of the peak hours.

1.6.3 Mitigation – No Action/Existing Subarea Plan and Zoning

Mitigation to bring intersections operating at worse than LOS D to that standard would include:

Center Drive & McNeil Street (Int 2)

- Construct a dual left-turn for the northbound left-turn movement and extend left turn storage lanes.
- Construct a second receiving drop lane (at least 300 feet) on the eastbound approach to the intersection to receive northbound left-turning traffic.
- Offset the southbound and westbound approaches as needed to align with the adjusted eastbound and northbound approaches.

Center Drive & Palisade Drive (Int 4)

- Construct dual left-turn (with protected phasing), dual right-turn and a separated through lane for the eastbound approach to the intersection.
- Construct a dual left-turn for the northbound left-turn movement with protected phasing.
- Implement an eastbound right-turn overlap phase with the northbound left-turn protected phase.
- Offset the southbound and westbound approaches as needed to align with the adjusted eastbound and northbound approaches.

DuPont-Steilacoom Road & Center Drive (Int 6)

- Construct a dual left-turn for the northbound left-turn movement.

McNeil Street & Bobs Hollow Lane (Int 8)

- Change the intersection control from a side-street stop-control to a single lane roundabout.

Hoffman Hill Boulevard & McNeil Street (Int 9)

- Change the intersection control from a side-street stop-control to an all-way stop-control
- Implement the following turn storage lanes, by approach and movement:
 - Northbound right-turn
 - Southbound left-turn
 - Westbound left-turn and right-turn
- Alternatively, a single-lane roundabout could be considered at this location.

Internal Intersections within the Subarea that would require mitigation include:

OFL Loop Roads East Section East-West Road & OFL North Connection at Boundary

- Signalize this intersection, offsetting signal timing from the nearby Center Drive & Palisade Boulevard intersection to facilitate east-west throughput. This may require signal coordination between these two intersections.
- Construct an eastbound left-turn storage lane with permitted phasing
- Construct separated southbound left-turn and right-turn lanes.
- Construct three through lanes in each direction for the eastbound and westbound approaches.
- Offset this intersection as far west as possible from the Center Drive & Palisade Boulevard intersection to build in adequate storage capacity.

OFL Loop Road East-West Road & OFL Loop Road North-South Road

- Signalize this intersection.
- Construct an eastbound left-turn storage lane with permitted phasing.
- Construct a dual left-turn for southbound left-turn movement, in addition to a separated southbound right-turn lane.
- Construct a separated westbound right-turn lane.
- Construct two through lanes in each direction for the eastbound and westbound approaches.

Hoffman Hill Boulevard & OFL Loop Road East-West Road (Int 104)

- Construct a single-lane roundabout.

Undesirable features of potential mitigation, particularly at Center Drive and McNeil Street include:

- Implementing dual left turns would require expansion of travel lanes and would encroach upon other elements of the right-of-way important to the city's desired street design including provision of a multi-purpose trail on the east side of the street and provision of a stormwater swale and trail on the west side.
- It would encourage additional traffic on McNeil Street, which is contrary to city policy of limiting traffic growth on this street:
 - While the McNeil Street corridor is attractively designed, the entirety of the Hoffman Hill neighborhood relies on this corridor for access. This creates high peak-hour flows on McNeil Street, with a steady stream of cars – more than what would be expected in a residential area. An alternate vehicular route is planned to link Hoffman Hill Village through the Old Fort Lake Subarea to bypass Yehle Park Village.
 - The mitigation measure of avoiding improvements and shifting traffic to other locations would address both of these undesirable features.
- An alternative mitigation is to make no improvements and presume that sufficient drivers will make the choice to avoid congestion and delay by bypassing this left turn and forgoing the opportunity to travel via McNeil Street:
 - Drivers re-routing would presumably continue north on Center Drive to less congested intersections with less delay.
 - This option would be enhanced by the additional mitigation measures described below of rerouting Civic Drive to provide a second access for the Subarea to Center Drive and

therefore reducing left turn volumes at other intersections and providing for less congestion along the entire Center Drive corridor.

- It is also possible that the city could make an exception to the LOS standards to allow more congestion at this intersection as a trade-off to reducing traffic on McNeil Street and the resulting impact on the residential neighborhood through which it passes.

1.6.4 Impacts - Proposed Subarea Plan and Zoning Amendments

Trip Generation from projected uses allowed by existing zoning and judged to be probable uses that may develop on the site (see land use analysis) results in 47,062 daily trips, 3,152 AM peak hour trips, and 4,232 PM peak hour trips added to the system. This represents a 25 percent increase in daily trips compared to the existing zoning, but only a four percent increase in AM peak hour trips and a 15 percent increase in PM peak hour trips. This results in eight intersections decreasing in LOS function during at least one of the peak hours, exactly the same impacts as for existing zoning.

1.6.5 Mitigation - Proposed Subarea Plan and Zoning Amendments

Mitigation to bring intersections operating at worse than LOS D to that standard would be the same as for existing zoning, above.

1.6.6 Unavoidable Adverse Impacts

Permanent change in land use and change in the trip generation with resulting additional traffic on elements of the circulation system will result in changes in operational conditions under any development alternative.

1.7 NOISE

1.7.1 Affected Environment

Noise disturbance affects receiving populations according to both the sensitivity of the individual and the sensitivity of specific activities to noise. Noise levels sufficient to interfere with hearing others speak at normal distance and volume can include disturbance of normal domestic or educational activities dependent on receiving spoken communication. Noise interference with sleep is one of the most thoroughly researched and documented noise effects and has far reaching implications due to the importance of sleep to many physiologic and mental processes.

Since the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent rating that relates noise to human hearing sensitivity, the A-weighted decibel (dBA) scale, is used. This scale accounts for the human perception of a doubling of loudness as an increase of 10 dBA. Therefore, a 70-dBA sound level will sound twice as loud as a 60-dBA sound processes (EPA 1981). People generally cannot detect differences of 1 to 2 dBA between noise sources of a similar nature (e.g., an increase in traffic noise compared to existing traffic noise); differences of 2 or 3 dBA can be detected by some people. Most people under normal listening conditions would probably perceive a 5-dBA change in noise of a similar nature. However, if an intruding noise is of a different nature than background noise (e.g., backup alarms in a quiet neighborhood), many people can perceive the intruding noise even if it increases the overall dBA noise level by less than 1 dBA.

DuPont has noise regulations that establish limits on sounds crossing property boundaries based on the environmental designation for noise abatement (EDNA) of the noise source and receiving property. This is generally applicable to stationary sources of noise and since particular uses with particular sound generation can't reliably be predicted at the planning stage, impacts can be predicted.

Noise from train operations results from the Burlington Northern Santa Fe (BNSF) mainline along Puget Sound at the bottom of the bluff and from the Sound Transit owned bypass line along I-5 which currently serves Amtrak trains and is projected to serve Sound Transit commuter trains starting in 2024. Noise from trains results from engine exhaust, steel wheels on steel tracks, and locomotive horns. Typical noise levels from engine exhaust and wheel noise range between 85 and 90 dBA at a distance of 50 feet from the source. Locomotive horns are sounded at rail crossings of public streets and at other crossings. Locomotive horns typically have a sound level of about 110 dBA at crossings, 107 dBA 1/8 mile from crossings, and 101 dBA 1/4 mile from crossings. Amtrak trains use their horns at the at-grade crossing at Barksdale Avenue but generally do not sound horns further to the south. The closest public road crossings that would result in BNSF freight horn sounding is at the Solo Point Beach access which is 2.25 miles to the north of the Subarea. For the Subarea, the sound of rail operations are a background level of noise but are not at a level that would affect daily activities.

Sensitive noise receptors in the Old Fort Lake vicinity are residential uses and schools. Pioneer Middle School is adjacent to the Subarea to the southeast on Center Drive. The existing residences most affected are adjacent to the Subarea to the south and southeast.

Existing noise levels were measured at four representative locations for short-term noise levels (ST) and at two locations for 24-hour long-term (LT) sound level measurements.

- Two monitoring locations were located near the intersection of Center Drive and Palisade Boulevard. SLM-ST1 was located at the northeast corner of Center Drive and Palisade Boulevard. Traffic noise was the predominant noise source at this location. One-hour average Leq levels were 66 dBA, and maximum levels were 76 dBA. A long-term 24-hour measurement SLM-LT2 was located northwest of the intersection of Center Drive and Palisade Boulevard at a similar distance from traffic lanes as SLM-ST1. The daytime average was 58 dBA, likely related to the longer averaging time. The daytime maximum of 76 dBA was the same as the short-term reading. Nighttime levels of a one-hour average 52 Leq and maximum of 66 dBA likely indicates that traffic volumes continue to be the major source of noise. Sound levels were higher than the noise limits of 55 to 60 dBA generally accepted as appropriate for residential receiving properties and higher than the peak-hour traffic noise level of 66 dBA (Leq) or greater at the exterior outdoor use area of a dwelling defined as adverse by the Federal Highway Administration (FHWA). This may be used as a guideline for nationally accepted standards for noise but it is not an adopted standard for the city.
- SLM-ST2 was located along the eastern boundary of the Subarea north of the future access road aligned with Palisade Boulevard. One-hour average Leq levels were 49 dBA and maximum levels were 54 dBA, reflecting the distance from sound sources and may be regarded as typical existing sound levels in the Subarea.
- SLM-ST3 was located along the southern boundary of the project site, near Simmons Street and Ogden Avenue adjacent to the residential area. One-hour average Leq levels were 46 dBA and maximum levels were 54 dBA, typical of a quiet residential area.
- A 24-hour measurement site SLM-LT1 was located near the southern boundary of the project site, at Wren Road north of Charles Street and generally represents sound exposure of nearby residents and

the Pioneer Middle School. Similar to the results for SLM-ST3, the daytime one-hour average was 48 dBA. The daytime maximum of 74 dBA relates to the longer measurement period capturing a larger sample and may be attributed to school busses leaving the middle school site or a random event. Nighttime levels of a one-hour average 40 Leq and maximum of 48 dBA are typical of a quiet residential neighborhood.

- SLM-ST4 was located approximately 0.5 miles northeast, adjacent to the entrance of an Amazon Fulfillment Center and was selected to capture noise associated with large truck traffic entering and exiting the facility on Center Drive. One-hour average noise levels were 61 Leq while maximum noise levels were 69 dBA. This was lower than at Center Drive at Palisade Boulevard and may reflect lower traffic volumes at the 11:30 am monitoring time.

1.7.2 Impacts

During construction of future development allowed by the Subarea Plan and Land Use Code amendments, there would be a temporary increase in sound levels due to the use of heavy equipment and the hauling of construction materials. The increase in noise levels would depend on the type of equipment being used, and the amount of time it is in use.

Construction noise levels are generally highest for activities associated with clearing and grading for public and private access roadways and parking and building foundations. Construction of building structures is generally less, and interior construction is also less based on equipment used and attenuation by building walls. Construction will be intermittent and limited in duration. All construction will be required to comply with the city's noise regulations, although noise from construction activities are not required to comply during daytime hours of 7am to 10pm. Generally, construction noise is viewed as a tolerable temporary disturbance.

To estimate the future noise levels related to increases in traffic volumes, the Federal Highway Administration (FHWA) Traffic Noise Model Version 3.2 was used to forecast existing and future noise levels during peak traffic hours. Noise analysis was performed for the Proposed Subarea Plan and Zoning Amendments Alternatives as traffic projections were slightly higher. The results would be virtually the same as the No Action/Existing Subarea Plan and Zoning Alternative.

Model location R1 to the northeast of the corner of Center Drive and Palisade Boulevard (equivalent to short-term measurement location SLM-ST1) and R2 at the southwest corner of the same intersection (at a similar distance as long-term measurement location SLM-LT2) provide modeled peak-hour traffic noise levels one-hour average at buildout of the Subarea of 64 dBA as compared to the modeled existing level of 60 dBA. The modeled existing level of 60 compares to the measured level of 66 at SLM-ST1. Based on modeled results, there is a 4 dBA increase which at modeled 64 dBA would be higher than generally desirable in a residential neighborhood. If the 4 dBA increase is added to the existing measured level of 66 Leq, it results in a one-hour average noise level of 70 dBA, which is high for a residential neighborhood and above the FHWA criteria of approaching 67 dBA as an adverse impact as is the case for the existing measured level of 66 Leq. The model does not predict maximum noise levels. If one were to use the FHWA criteria for an adverse impact of approaching 67 Leq, the area experiences are adverse

but it does not meet the FHWA criteria for a significant increase over existing levels which is defined as 10 dBA increase.

Modeled locations in the vicinity of Wren Road and Pioneer Middle school include location R3 at the east end of the school, location R4 at the property boundary adjacent to the trail at Wren Road north of Charles Street and location R5 at the west corner of the school. The modeled results for traffic related noise at Subarea buildout are 54 Leq at the east end of the school, compared to modeled existing levels of 48 Leq; 58 at the west end of the school, compared to modeled existing levels of 39; and modeled levels of 62 Leq at Wren Road north of Charles Street. None of these locations meet the FHWA criteria of approaching 66 dBA as an adverse impact on sensitive uses, but the west end of the school (R5) and Wren Road (R4) experience increases of 10 dBA and 14 dba, respectively. These meet the FHWA criteria of a significant increase based on a 10 dBA increase. The noise levels at the school are not at a level where they would interfere with educational activities. Noise levels at residences, although higher than existing, are outside levels which will be limited to several hours during peak traffic and are not at levels where they are likely to disturb common residential outdoor activities. These noise levels represent the level at the nearest residences adjacent to Wren Road and the noise levels will decrease for residences at further distances.

Further west along the Subarea boundary at location R-6, near Ogden Avenue south of Simmons Street the future sound levels are predicted to be 58 dBA compared to measured existing levels of 46 dBA. This results from traffic on the internal loop road east-west portion which is near the Subarea boundary in that area. This sound level is well below the FHWA criterion of approaching 66 dBA as an adverse impact on sensitive uses. However, the predicted level is a 12 dBA increase from existing conditions, which meets the FHWA criteria of a significant increase based on a 10 dBA increase. Noise levels at residences, although higher than existing, are outside levels which will be limited to several hours during peak traffic and are not at levels where they are likely to disturb common residential outdoor activities. These are the predicted levels at the nearest residences adjacent to the Subarea boundary and these levels will decrease for residences at further distances.

Rail related noise from freight trains on the BNSF railroad at the foot of the Puget Sound bluff will remain a part of the sound environment in the Subarea and will be a periodic source of relatively low levels of noise due to distance, attenuation by blockage from the topography, and scattering due to mature vegetation.

1.7.3 Mitigation

State and local regulations exempt construction noise during daytime hours. Construction noise could be reduced by using enclosures or walls to surround noisy stationary equipment, installing mufflers on engines, substituting quieter equipment or construction methods, minimizing time of operation, and locating equipment as far as practicable from sensitive receivers. To reduce construction noise at nearby receivers, the following mitigation measures could be incorporated into construction plans and contractor specifications:

- Locate stationary equipment away from receiving properties.

- Erect portable noise barriers around loud stationary equipment located near sensitive receivers.
- Turn off idling construction equipment.
- Require contractors to rigorously maintain all equipment.
- Train construction crews to avoid unnecessarily loud actions (e.g., dropping bundles of rebar onto the ground or dragging steel plates across pavement) near noise-sensitive areas.

The potential impacts to existing residential uses from construction truck turning movements exiting the Subarea making eastbound or northbound left turns from a stop may be mitigated by requiring construction trips to use Civic Drive. This could be accomplished in two alternative configurations. There is a north-south street right-of-way at the eastern boundary of the site that connects the main access extension of Palisade Boulevard with Civic Drive, which trucks could be required to use. Entrance trips would involve a right turn at Civic Drive, a left turn at the new north-south street and a right turn onto the main access road. Exiting trips would involve a left turn at the main access road, a right turn on Civic Drive, and a left turn northbound onto Center Drive. A second option is the re-routing of Civic Drive along Fairway 8 to access the main north-south roadway within the Subarea. The operational characteristics of such routings are discussed in the transportation section. This routing would not change noise levels, and might increase overall noise somewhat at the intersection, however it would avoid the sensitive residential receptors at Center Drive and Palisade Boulevard as the adjacent uses are open space, mixed use, or governmental with the closest residences about 250 feet from the travel lanes as opposed to about 70 feet at Palisade Boulevard.

1.7.4 Unavoidable Adverse Impacts

Permanent change in land use will add sound based on the activities associated with each use. Sound levels that constitute disturbance, and therefore are defined as noise, are generally unavoidable to some extent in an urban setting.

1.8 CULTURAL RESOURCES

1.8.1 Affected Environment

There have been 52 cultural resources studies previously conducted in, and within one mile of, the Subarea. Of these, twelve have been completed within the Subarea. Specific information about sites is available from DAHP only to qualified professionals to preserve resources.

Archaeological and ethnographic site types that could be encountered include seasonally occupied base camps, short-term field camps, and seasonally utilized resource- procurement and processing loci focused on specific resources such as salmonid procurement, game hunting sites, plant gathering areas, felling trees for planks, canoe building, bark removal, localities where flaked and groundstone material sources, trails linking villages or accessing resource procurement loci, rock art, culturally modified trees, and burials.

Archaeological sites dating to the historic period result from early/modern Euro-American settlement activities, including the original homesteading infrastructure, timber harvesting and processing, and transportation facilities. The primary commercial activity in this area revolved around the DuPont Company's Powder Works Plant.

The fact that most of the site subject to future development was the subject of ground disturbance due to hazardous materials remediation excavation of about one foot of soil over large areas of the site where elevated levels of arsenic and lead were present does not obviate the likelihood that additional cultural resources remain below the depth previously excavated.

1.8.2 Impacts

Based on the number of cultural resources previously recorded, and the character of the site, it is likely that a wide range of cultural resources are present on the site, but undiscovered. It is likely that a range of resources will be encountered during further development of the site under either the existing Subarea plan and zoning or proposed amendments to the plan and zoning. It is particularly likely that deeper excavation for utilities and foundations will be the practices most likely to encounter cultural resources.

1.8.3 Mitigation

The city recognizes the need to enter into an updated Memorandum of Agreement (MOA) with the Nisqually Tribe and the Department of Archaeology and Historic Preservation (DAHP) to update the 1989 MOA to provide clear procedures for assessing cultural resources and clear avenues to coordinate with the tribe and DAHP to assure adequate assessment, protection and conservation of cultural resources.

Based on the potential for cultural resources on site, development projects within the Subarea should involve a robust investigation of each site for resources, including a plan developed for each site subject to permits that includes a range of activities that may include, but is not limited to development of a detailed investigation report that prior to disturbance that details appropriate field surveys for reconnaissance and intensive studies, which may be phased. Specific standards are included in the DAHP Standards for Cultural Resources Reporting. Requirements may include a variety of measures that may be implemented.

A variety of measures may be implemented for mitigation for discovered cultural resources, which may include, but are not limited to: in-situ preservation; moving and/or salvage; reburial of human remains; museum exhibits; interpretive signage or other on-site or near-site information; general dissemination of information through publication including websites, guidebooks, school curriculum and other means.

An archaeologist should monitor all earth disturbance, particularly the installation of infrastructure and building foundations. The Nisqually Tribe shall be notified and invited to participate/observe all ground disturbing activities. If cultural resources were encountered during construction, notification and evaluation procedures would be implemented to consult with the state Department of Archaeology and Historic Preservation and the Nisqually Tribe to determine appropriate next steps.

1.8.4 Unavoidable Adverse Impacts

Construction of infrastructure and buildings has the potential to disturb unidentified archaeological and historic resources. Some resources may be inadvertently destroyed due to inattention or lack of recognition of importance. Permanent change in land use and alteration of the landscape will preclude some of the characteristics of the land that Native Americans view as central to their cultural and spiritual heritage.

1.9 AIR QUALITY/GREENHOUSE GASSES/CLIMATE CHANGE

1.9.1 Affected Environment

The Puget Sound area and the City of DuPont are in compliance with air quality standards for relevant pollutants including carbon monoxide, ozone for which the area is subject to a maintenance program scheduled to expire in 2024, particulate matter for which there is a maintenance area which is north of and does not include the City of DuPont.

Climate change concerns the issue of how emissions from human activities may affect the global climate and has been the subject of extensive international research during the past several decades. There is now a broad consensus among atmospheric scientists that emissions caused by humans have already caused measurable increases in global temperature and are expected to result in significantly greater increases in temperature in the future.

Carbon dioxide (CO₂) is the primary greenhouse gas emitted through human activities. The main human activity that emits CO₂ is the combustion of fossil fuels (coal, natural gas, and oil) for energy and transportation. Certain industrial processes and land-use changes also emit CO₂. The main sources of CO₂ emissions in the United States are the combustion of fossil fuels such as gasoline and diesel to transport people and goods accounting for 35% of total U.S. CO₂ emissions and 28% of total U.S. greenhouse gas emissions; electricity generated by the combustion of fossil fuels accounting for 30% of total U.S. CO₂ emissions and 24% of total U.S. greenhouse gas emissions, industrial processes that emit CO₂ through fossil fuel consumption or produce CO₂ emissions through chemical reactions.

Impacts to the Puget Sound are projected to include a suite of long-term changes that are consistent with those observed globally as a result of climate change impacts caused by human activity. These include increasing air temperatures, a longer frost-free season, nighttime warming, and a possible increase in the intensity of heavy rainfall events, continued increases in average annual and seasonal air temperatures, as well as increases in extreme heat.

1.9.2 Impacts – No Action/Existing Subarea Plan and Zoning

Under the existing Subarea Plan and zoning which emphasizes the Old Fort Lake area as a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses, it is projected 100 single-family units and 1,000 multifamily units would be developed. Additionally, approximately 1.6 million square feet of office and research and development use (or about 800,000 square feet of office and 800,000 square feet of light manufacturing if the vested Founders Ridge proposal was built), about 70,000 square feet each of retail and service uses (a moderate sized hotel, and several restaurants) would be developed.

The major contributor to air quality issues results from the Employment Center provided for in the existing Subarea Plan and zoning is from transportation related carbon monoxide (CO) emissions. The Puget Sound Regional Council (PSRC) Air Quality Conformity analysis has documented that the regional transportation system and the region-wide trip generation is in conformance with air quality standards. The projected trip generation of the Old Fort Lake Subarea under the existing Subarea Plan and zoning is around 37,000 daily trips and are a miniscule component of the existing 14 million total regional trips and is well within the margin of error of the models used. There will be no discernable impact on regional air quality from development under the existing Subarea Plan and zoning.

The construction phase of development of residential, commercial and manufacturing uses includes numerous tasks, each generating a variety of potential air quality pollutants. Land clearing and excavation would expose land to wind erosion leading to entrained soil particulates in the air. Contractors would have to comply with regulations requiring all reasonable precautions be taken to

minimize fugitive dust emissions. Construction activities would likely require the use of diesel-powered, heavy trucks and smaller equipment that would emit air pollutants that could slightly degrade local air quality in the immediate vicinity of the activity. However, these emissions would be temporary and localized, and the resulting construction emissions would likely be far outweighed by emissions from existing traffic around the construction area.

Contribution to climate change and greenhouse gasses will result from the construction and ongoing use of the proposed residential, commercial and manufacturing uses. The development and continuation of these uses will contribute to climate change largely through carbon released into the environment; greenhouse gas emissions, as the result of embodied emissions in materials used in buildings; emissions related to construction; emissions related to use; and emissions related to decommissioning and reuse of components.

Single-family dwellings would embody 61,000 pounds, or 30 tons, of carbon in building materials, with 3,060 tons for 100 residences. Typical energy use for electric heated homes is about 14,726 pounds of carbon per year and generates about 250 tons of carbon per year due to travel. The 1,000 multi-family residences allowed would generate approximately 12,000 tons of carbon in materials, approximately 5,100 tons carbon per year due to occupancy, and approximately 2,500 tons per year due to travel. Non-Residential uses of about 1,764,300 square feet of building space would have about 4,200 tons of carbon in building materials, would generate about 10,600 to 15,000 tons of carbon per year in operations, and generate about 32,560 tons of carbon per year in transportation for annual carbon emissions of about 43,200 to 47,560 tons of carbon per year.

1.9.3 Impacts - Proposed Subarea Plan and Zoning Amendments

Under the proposed amendments to the Subarea Plan and zoning changes, the emphasis in the Old Fort Lake area is to develop a primarily residential area with a projected 560 single-family residences, 1,860 middle-housing, and 1,360 multifamily units and approximately 410,800 square feet of non-residential uses including retail, restaurants, services, a school, and other uses.

The projected trip generation of the Old Fort Lake Subarea under the proposed Subarea Plan and zoning is around 47,000 daily trips. This is a miniscule component of the existing 14 million total regional trips and is well within the margin of error of the regional models used to predict air quality conformance. There will be no discernable impact on regional air quality from development under the proposed Subarea plan and zoning amendments. The difference between the existing plan and zoning and the proposed Subarea plan and zoning amendments is minor.

As discussed above for the existing plan and zoning, the construction phase of development of residential, commercial and manufacturing uses includes numerous tasks, each generating a variety of potential air quality pollutants. Similar to the impacts of existing zoning, land clearing and excavation would expose land to wind erosion leading to entrained soil particulates in the air. Construction would involve the use of diesel-powered equipment that would emit air pollutants that could slightly degrade air quality in the immediate vicinity of the activity. However, these emissions, would be temporary and localized.

Contribution to climate change and greenhouse gasses will result from construction and ongoing use of the residential, commercial and other uses. The development and continuation of these uses will contribute to climate change largely through carbon released into the environment; greenhouse gas emissions; as the result of embodied emissions in materials used in buildings; emissions related to construction; emissions related to use; and emissions related to decommissioning and reuse of components.

Single-family dwellings in proposed plan and zoning scenario would generate the same greenhouse gasses as discussed above. The projected 560 single-family residences would generate about 16,800 tons of carbon in materials and about 4,140 tons of carbon per year due to occupancy and about 1,400 tons of carbon per year due to travel. Middle housing would have almost the same greenhouse gas emissions, except that embodied carbon in building materials would be less because of presumed smaller building size. The projected 1,860 middle housing units would generate approximately 34,177 tons of carbon in materials, approximately 8,700 tons of carbon per year due to occupancy, and approximately 4,950 tons per year due to travel. Multifamily dwellings would have the same carbon footprint as discussed above under the existing Subarea Plan and zoning scenario. The projected 1,360 multifamily residences would generate approximately 16,300 tons of carbon in materials, approximately 7,000 tons carbon per year due to occupancy, and approximately 3,680 tons per year due to travel.

Non-Residential uses including retail, services, office, and entertainment uses serving the local community and a larger regional market are projected to have approximately 5,000 to 7,800 tons of carbon embodied in building materials. (Goldstein 2020) Typical greenhouse gas emissions for retail use would total approximately 3,080 to 4,900 tons of carbon per year with somewhat lower emissions for services, office and entertainment uses. Transportation emissions would result in approximately 21,000 tons of carbon per year. The annual carbon emissions would total approximately 24,080 to 25,900 tons of carbon per year.

Under the proposed Subarea Plan and Zoning amendments the Subarea would generate approximately 62,430 to 66,070 tons of carbon per year. The existing Subarea zoning generates approximately 62,286 to 71,146 tons of carbon per year, which is not substantially different from the proposed tons of carbon to be generated.

1.9.4 Mitigation

Much of the mitigation to reduce air quality and greenhouse gas emissions is taking place on the national level. As emissions standards for vehicles has been the major factor in reducing pollution from that source, the fleet fuel standards adopted at the federal level and programs to encourage electric vehicles are the likely major contributors to reducing greenhouse gas emissions from that source. Similar programs at the state level support such fleet emissions reductions.

Increasing density of housing generally contributes to reduction of embodied greenhouse gasses if units incorporate less embodied emissions in manufacture of materials, in more efficient transportation of materials to sites, and in more efficient heating and cooling.

Higher density development may reduce emissions if greater use of transit or other more efficient travel modes are employed. In DuPont, any such efficiencies would require considerable expansion of the transit network.

Various building methods and materials can make homes more energy efficient, and, by extension, generate less greenhouse gas emissions. In addition to tight building envelopes, buildings that maximize insulation and passive solar gains can be more efficient. Use of electricity for heating and air conditioning for all buildings, particularly the use of heat pumps, can lead to a substantial reduction in emissions. Residences use of electricity for clothes drying, heating water, and cooking, can reduce emissions compared to on-site gas combustion systems, if electric generation is through sources other than fossil-fuels, which is addressed by Washington State standards for utilities.

Installation of photovoltaic systems can reduce consumption of energy produced off site and reduce greenhouse gas emissions.

An integrated strategy at all levels of the economy together is the most effective means to reduce greenhouse gas emissions and consequent climate change processes and impacts.

1.9.5 Unavoidable Adverse Impacts

Permanent change in land use will add carbon in the form of greenhouse gasses both in construction and use, based on current technology. The extent of greenhouse emissions may be affected by the type and density of development. Future activities may have reduced greenhouse emissions based on changes in technology.

1.10 PUBLIC SERVICES

1.10.1 City Provided Services

1.10.1.1 Affected Environment

Public services provided by the city include general government, police, fire, development services, parks and related activities and streets.

A summary of the city's 2024 operational budget is provided below.

Table 1.10.1-1 2024 Operations Expenditures

OPERATIONS EXPENDITURES 2024

Department	Department Budget	Percent of Overall Budget
Mayor/Council	\$ 139,494	1.25%
Executive	\$150,855	1.35%
City Clerk	\$395,308	3.54%
Human Resources	\$378,405	3.39%
Legal	\$146,836	1.31%
Finance	\$364,079	3.26%
Central Services	\$47,100	0.42%
Information Technology	\$112,000	1.00%
Non-Departmental	\$519,754	4.65%
Police Department	\$3,240,153	29.01%
Fire Department	\$2,911,803	26.07%
Community Development	\$945,252	8.46%
Parks, Facilities & Greenways	\$1,224,915	10.97%
Public Works - Streets	\$583,404	5.22%
Debt Service-General Obligation	\$600	
Transportation Benefit District	\$9,078	
Total Operations Expenditures	\$11,169,034	100.00%
PROPRIETARY EXPENDITURES		
Water Utility	\$2,319,973	
Stormwater Utility	\$1,162,243	
Total Proprietary Expenditures	\$3,482,216	
Total Operating Expenditures	\$14,651,250	

1.10.1.2 Impacts - No Action/Existing Subarea Plan and Zoning

Impacts have been assessed on a per-capita basis according to the growth in population. For non-residential uses, the public service demands are related to the particular use proposed and generally must be assessed on a case-by-case basis.

For the existing Subarea Plan and zoning the additional 100 single-family residences allowed and 1,000 multifamily residences allowed would increase city population by 23 percent and are presumed to increase staffing levels and other expenses by a proportional amount. Based on the city's current 2024 budget of \$10,061,076 this would result in an annual increase of \$ 2,315,00 in constant 2024 dollars at the time of buildout of the Subarea, or a total city budget, in constant dollars, of \$12,375. The burden would fall approximately equally on most governmental functions, although the planning and building

functions would experience a large increase during the development process in permit administration and inspection, which is presumed to be covered in fees rather than tax revenue.

1.10.1.3 Impact - Proposed Subarea Pan and Zoning Amendments

For the proposed Subarea amendments, the increase in single-family residences is projected to be 560 units with a population of 1,512. Middle housing is projected to be 1,860 units with a population of 4,278. Multifamily development is projected at 1,360 units and a population of 2,992 acres. The total population of the Subarea would be 8,782 which would be an 88 percent increase over the existing city population of approximately 10,080 (2022 American Community Survey 5-Year Estimates). This would result in annual increase of \$8,753,100 in constant 2024 dollars at the time of buildout of the Subarea, or a total city budget, in constant dollars, of \$18,814,200. As with existing zoning, the burden would fall approximately equally on most governmental functions, although the planning and building functions would experience a large increase during the development process in permit administration and inspection, which is presumed to be covered in fees rather than tax revenue.

Details for each department or division in the city is discussed in greater detail in the body of the EIS.

1.10.1.4 Mitigation

Mitigation of operating expenses is dependent on General Fund Revenue from property taxes, sales taxes, Business and Occupation taxes, Utility taxes and other revenue sources keeping pace with general governmental expenses. Washington State does not provide taxing authority for cities that would vary tax rates between the Subarea and other parts of the city if expenses were related to specific growth within the Subarea. To a large extent, additional taxes from development in the Subarea generally can be presumed to keep pace with population-based demands on services.

Capital expenses could not be mitigated by impact fees in accordance with RCW 82.02.090(7) for public streets, roads, and bicycle and pedestrian facilities; publicly owned parks, open space, and recreation facilities; fire protection facilities and school facilities. A Community Facilities District under RCW 36.145 could be formed to finance public facilities. Payments for impacts on public services could potentially be required as mitigation for environmental impacts under the State Environmental Policy Act supplementary authority in RCW 43.21C.060. Such mitigation could be included in the anticipated Planned Action Ordinance as a condition to be met in order to avoid additional environmental review. Developers could also enter into voluntary agreements with the city to provide funds for this and other city costs.

The city also could allocate funds collected by the Real Estate Excise Tax (REET) which is currently placed in a Capital Projects Fund for acquisition, design, construction and any other expenditures related to capital projects including public buildings, facilities and parks. This tax, which is levied on all sales of real estate, is likely to be substantially augmented by sales related to new development in the Old Fort Lake Subarea. These taxes could continue to be pooled citywide, or the component related to the Old Fort Lake Subarea could be tracked geographically and considered as a mitigation source for expenses arising from development of the Subarea.

Additional detail for each department or division in the city is discussed in greater detail in the body of the EIS.

1.10.1.5 Unavoidable Adverse Impacts

Additional population and other activities on site will require support of a variety of public services. The extent and character of such services is dependent on choices made by decision-makers, but change in the extent, cost and character of services will occur.

1.10.2 Schools

1.10.2.1 Affected Environment

The Steilacoom Historical School District No. 1 (District) is the public school district that serves the City of DuPont and also the City of Steilacoom, Anderson Island, and portions of the City of Lakewood and unincorporated Pierce County.

The District's 2023 total enrollment was 2,835, with elementary school enrollment of 1,305 students in grades K-5, middle school enrollment of 745 in grades 6-8, and 785 FTE (headcount of 913 students) in high school enrollment in grades 9-12. Overall enrollment grew from 2,600 in 2003 to 2,835 students in 2023, an increase of approximately ten percent over a 20-year period. These enrollment numbers include only students who physically attend District schools and exclude students who are enrolled in full time running start programs or skills center programs off campus. There has been fluctuation over the past five years but there is no clear trend of increase. The Covid 19 pandemic disrupted patterns of school enrollment throughout the state and a new equilibrium has not been re-established in many cases. The District's schools have varying grade configurations models to address variations in school student populations within their attendance areas and make the best use of facilities.

Currently all K through third grade students in DuPont attend Chloe Clark Elementary School and all fourth and fifth graders are bussed to Saltar's Point Elementary School in Steilacoom. All students attend middle school in DuPont and high school in Steilacoom. This grade configuration model provides flexibility in housing elementary students as enrollment changes due to growth and demographic factors.

The District acquired a 10-acre site in the City of DuPont located on McNeil Street adjacent to Marshall Circle and intends to construct the next elementary school on this site. The construction of this school would allow all DuPont elementary students in grades K through 5 to attend school in DuPont.

The district's current Capital Facilities Plan defines facility capacity, current enrollment, and projected facility need as follows:

- Currently, Saltar's Point Elementary, Chloe Clark Elementary and Cherrydale Primary are all over capacity based on Service Standards.
- The District's current plans are to construct a new elementary school in DuPont, add capacity at Pioneer Middle School, and add capacity at Steilacoom High School, within the planning period of the district's current Six-Year Capital Facilities Plan. The district may also add portable facilities as needed to provide interim capacity at all grade levels.
- The District has current capacity in the middle school and high school to meet the current projection of demand through 2028/2029.
- The District collects impact fees for capital facilities for elementary school expansion costs. The district does not currently collect impact fees for middle school and high school because their current projections do not document a need for expansion.

The District uses a student generation rate as one of the factors in projecting future enrollment. This is based on District records of average actual student generated rates for new developments constructed in the District. Using only development within the District presumes that existing demographic characteristics within a district will continue in the future and that the demographic character of past development (particularly household size and age of children) will continue.

The current Student Generation Factors developed for the District for single-family development for elementary school is 0.018 per grade and 0.108 for all six grades; for middle school it is 0.025 per grade and 0.739 for all three grades; for high school it is 0.020 per grade and 0.080 for all four grades. The Student Generation Factors for townhouse development for elementary school is 0.602 per grade and 0.1370 for all six grades; for middle school it is 0.031 per grade and 0.093 for all three grades; for high school it is 0.028 per grade and 0.111 for all four grades. The Student Generation Factors for multifamily development for elementary school is 0.062 per grade and 0.01 for all 6 grades; for middle school it is 0.010 per grade and 0.031 for all three grades; for high school it is 0.006 per grade and 0.025 for all four grades.

1.10.2.2 Impacts

Assessment of impacts on school enrollment and facility needs involves the following general steps:

- Population and dwelling unit projections.
- Student generation by dwelling unit type.
- Assignment of new students to grade levels (including cohort progression of new and existing students through grade levels).
- Assessment of the need for new or altered facilities produced by additional enrollment.

No Action/Existing Subarea Plan and Existing Zoning

The existing Subarea Plan and zoning allows up to 100 single-family dwelling units and up to 1,000 multifamily dwelling units. Only the residential component of growth would result in new students enrolling in the district.

Several scenarios were developed based on different potential student generation rates based on surveys by the Steilacoom School District and several other comparable districts in the Puget Sound region.

Low Student Generation Rates

The resulting increase in enrollment in the Steilacoom District of both background growth and growth from new in housing units in the Old Fort Lake Subarea under existing zoning for a low student generation rate scenario based on the first or lowest quadrant of student generation rate of several Puget Sound school districts results in a 2044 increase in enrollment from the existing 3,085 in 2023 (10-year average of past enrollment) to 3,736, or about a 21 percent increase. About 55 percent of this increase results from background growth, about 41 percent results from Old Fort Lake Subarea growth and the remainder results from cohort progression.

Average Student Generation Rates

The resulting increase in enrollment in the Steilacoom District of both background growth and growth in housing units in the Old Fort Lake Subarea under existing zoning and the average student generation scenario results in a 2044 increase in enrollment to 3,815, about a 24 percent increase. About half of this increase results from background growth, and about half results from Old Fort Lake Subarea growth, with an additional contribution from cohort progression. The greater contribution to growth by the growth of

units in the Subarea results from a higher student generation rate in this scenario for both single-family and multifamily development.

Steilacoom District Student Generation Rates

The district contracted for a survey of student generation rates in 2024 which included a separate rate for townhomes which was substantially greater than the multifamily rate and similar to the highest single-family rates recorded for other districts. The multifamily rate alone was much lower than that recorded for other districts. Under this scenario, shown in Table 3.9.8-9, future enrollment projections at buildout of the Old Fort Lake Subarea projected in 2044 results in an increase in enrollment from the existing 3,085 (10-year average of past enrollment) to 3,625, or an approximately 17 percent increase. About two thirds of this increase results from background growth, and about one third results from Old Fort Lake Subarea growth, with an additional contribution from cohort progression. The results are almost the same as the “Average Student Generation Rates” above, because the greater student generation rate for townhomes is not included, as no townhomes are presumed under the existing zoning.

Capital Facilities

Capital facility needs include the full range of facilities and equipment needed to accomplish the educational goals of the district. In the simplest measure it includes the space needed to accommodate students in classrooms together with a range of facilities to serve related functions.

In general, the magnitude of needed facilities under existing zoning at buildout of the Old Fort Lake area, projected for 2044, generally consists of:

- Additional Elementary School capacity equivalent to 17 to 28 classrooms compared with its existing 60 teaching stations among all schools. This alone (without other facilities and programs) would increase the overall size of the three existing Elementary Schools by approximately 30 to 40 percent, or more realistically require an additional school, or some combination with expansion of existing schools.
- Additional middle school capacity equivalent to five to seven classrooms compared to 31 existing teaching stations among all schools. This alone (without other facilities and programs) would increase the capacity needed to serve middle school students by approximately 16 to 23 percent.
- Additional high school capacity equivalent to two to four classrooms compared to 41 existing teaching stations among all schools. This alone (without other facilities and programs) would increase the capacity needed to serve high school students by approximately 5 to 10 percent.

Proximity Impacts

Under existing zoning regulations and the existing Subarea Plan, which outlines the road system configuration, the main access roadway to the Old Fort Lake area which aligns with Palisade Boulevard is adjacent to Pioneer Middle School athletic fields near the intersection with Center Drive. Due to the configuration of the site and the roadway, it is about 350 to 400 feet from the existing buildings which is set back about 50 feet from the northerly property line. In addition, there is an 80-foot-wide trail and electric transmission line easement between the school property and the Old Fort Lake Subarea. Most of the area adjacent to the athletic field within the Subarea would remain as open space to meet tree retention requirements. Mature trees in the developable portion of the site adjacent to the building would be required to be retained within setback areas and would tend to soften building scale, in addition to newly planted landscaping.

Overall, the middle school would experience some visual impacts in the change from undeveloped land to a site accommodating large scale buildings designed to accommodate office park, research park, or light industrial uses. There are no anticipated impacts to the character of the school within the school campus or on activities associated with the school. Noise from the main access roadway in the Subarea is likely to be at low levels because traffic approaching the intersection will be travelling at slower speeds. Given the existing traffic on Center Drive, additional noise from roadways within the Subarea is not likely to be discernable from the school.

The safety of students travelling to the school will be impacted by an additional arterial intersection. Crosswalks will be provided with demand activated signals which would provide for safe crossing. Most students served by the school are either on the east side of Center Drive and would cross Center Drive at signal-controlled crosswalks or are west of the school and would access by Bobs Hollow Lane or local streets. Safety of students likely would be enhanced by crosswalks and signals at intersections.

Housing in the Subarea will be located primarily in the western portion of the Subarea, as residential uses are not permitted by the zoning districts in the eastern portions of the Subarea. Students living in the Subarea would likely access the school via Wren Road on the west side of the school campus. Walking access would be provided by sidewalks or trails along roadways in the Subarea.

No adverse impacts are projected for continuing operation of the Pioneer Middle School.

Other schools in the DuPont area are at a distance from the Subarea, including Chloe Clark Elementary School located at the intersection of Palisade Boulevard and Montgomery Street, about a half mile southeast of the Subarea. The site for the new elementary school is located at the intersection of McNeil Street and Bobs Hollow Lane, about a quarter mile south of the Subarea. Neither of these schools are likely to be affected by future development of the Subarea under existing zoning.

Proposed Subarea Plan and Zoning Amendments

Under the proposed Subarea Plan and zoning amendments, the Old Fort Lake Subarea would accommodate up to about 3,800 dwelling units; a population of 8,782; and approximately 409,800 square feet of retail, service, and restaurant uses; and two hotels serving both local residents and as a destination for golf and other amenity-oriented tourism activities. Only the residential component of growth would result in new students enrolling in the District.

Student generation is based on the different family size and student generation rates for different types of housing. Several scenarios were developed based on different potential student generation rates based on surveys by the Steilacoom School District and several other comparable districts in the Puget Sound region.

Low Student Generation Rate

The low student generation rate scenario is based on the first or lowest quadrant of student generation rate of several Puget Sound school districts. This rate results in an increase in enrollment from 3,085 in 2023 (10-year average of past enrollment) to 4,716 in 2044, an approximately 50 percent increase from existing enrollment and about a 25 percent increase from the same student generation scenario under existing Subarea Plan and zoning. About 20 percent of this increase results from background growth, about 65 percent results from Old Fort Lake Subarea growth, and the remainder results from cohort progression.

Average Student Generation Rates

This scenario is based on the average student generation rate of several Puget Sound school districts. Under this scenario, future enrollment projections at buildout of the Old Fort Lake Subarea results in an increase in enrollment from 3,085 to 5,002 in 2044, an approximately 62 percent increase. It is a 31 percent increase over the projected conditions for 2044 under the existing Subarea Plan and zoning. About 15 percent of this increase results from background growth, and about 65 percent results from Old Fort Lake Subarea growth, with an additional contribution from cohort progression.

Steilacoom District Student Generation Rates

The student generation rates for the district are based on a 2024 survey that included a separate rate for townhomes, which was substantially greater than the multifamily rate recorded for other districts. Because the townhome rate is higher and townhomes (or “middle housing”) is the predominant proposed land use under the proposed Subarea Plan and zoning amendments, the increase under this student generation scenario is much higher. Future enrollment projections at buildout of the Old Fort Lake Subarea results in an increase in enrollment from 3,085 to 5,284 in 2044, about a 71 percent increase, as shown in Table 3.9.8-16. The increase as compared to the existing zoning scenario is about 45 percent greater. About 12 percent of this increase results from background growth, and about 70 percent is from Old Fort Lake Subarea growth, with an additional contribution from cohort progression.

Capital Facilities

Capital facility needs include the full range of facilities and equipment needed to accomplish the educational goals of the District: the space needed to accommodate students in classrooms together with a range of facilities to serve related functions.

In general, the magnitude of needed facilities under existing zoning at buildout of the Old Fort Lake area, projected for 2044, generally consists of:

- Additional Elementary School capacity equivalent to 50 to 63 classrooms compared with its existing 60 teaching stations among all elementary schools. This alone (without other programs) would increase the overall size of the three existing Elementary Schools by approximately 80 to slightly more than 100 percent, or more realistically require one or two additional schools, or some combination of new schools and expansion of existing schools.
- Additional middle school capacity equivalent to 15 to 21 classrooms compared with its existing 41 teaching stations among all middle schools. This alone (without other programs) would increase the needed capacity of the existing Middle School by approximately 50 to 67 percent.
- Additional high school capacity equivalent to 14 to 19 classrooms compared to its existing 41 teaching stations among all high schools. This alone (without other programs) would increase the needed capacity of the existing high school by approximately 33 to 47 percent.

Proximity Impacts

Overall, the middle school would experience some visual impacts in the change from undeveloped land to a site accommodating “middle housing” consisting largely of townhomes. The scale of the proposed residential buildings would be much smaller in scale than the development allowed under the existing plan and zoning which consists of large-scale buildings designed to accommodate office park, research park, or light industrial uses. The proposed residential plan designation and zoning is not likely to have an effect on the character of the school within the school campus or on school activities. Noise from the main access roadway in the Subarea is likely to be at low levels because traffic approaching the intersection will be travelling at slower speeds. Given the existing traffic on Center Drive, additional noise from roadways within the Subarea is not likely to be discernable to users of the school during normal school hours.

The safety of students travelling to the existing middle school will be impacted by an additional arterial intersection leg for the new roadway at Palisade Boulevard. Crosswalks will be provided with demand activated signals which would provide for safe crossing. Most existing students served by the school are either on the east side of Center Drive and would cross Center Drive at signal-controlled crosswalks or are west of the school and would access by Bobs Hollow Lane or local streets. Safety of students likely would be enhanced by crosswalks and signals at intersections.

Students accessing the existing middle school site from the residential units within the Subarea would walk along trails or roadways in the Subarea. Students would likely access the middle school via Wren Road on the west side of the school campus.

No adverse impacts are projected for continuing operation of the Pioneer Middle School.

The Subarea Plan includes a proposed 10-acre site for a new elementary school in the western portion of the Subarea. The proposed school site is abutted on the west by the main north-south arterial in the westerly portion of the Subarea. It will be abutted on the east by proposed “middle housing” townhomes. Access to the site will likely be from the adjacent arterial. Pedestrian access likely will include signal-controlled crosswalks. Students accessing the existing school site from the residential units within the Subarea would walk along sidewalks or trails along roadways in the Subarea.

It is not likely that traffic on the adjacent arterial or noise from the arterial will adversely impact the future school. The townhouse development to the east between the golf course and the school is not likely to have adverse impacts on the future school. The golf course at a distance of about 300 feet from the school site is not likely to adversely affect the future school.

Other schools in the DuPont area are at a distance from the Subarea, including Chloe Clark Elementary School located at the intersection of Palisade Boulevard and Montgomery Street, about a half mile southeast of the Subarea. The site for the new elementary school is located at the intersection of McNeil Street and Bobs Hollow Lane, about a quarter mile south of the Subarea. Neither of these schools are likely to be affected by future development of the Subarea under the proposed Subarea plan and zoning amendments.

1.10.2.3 Mitigation

The State Environmental Policy Act (SEPA) in RCW 43.21C.060 provides substantive authority in addition to code-based regulatory authority to condition or deny a proposal to ensure identified environmental impacts can be sufficiently offset. This authority can be used to mitigate impacts identified in environmental documents. Conditions required under SEPA substantive authority may be included as conditions on a permit, license, or approval. The specific content of conditions need not be included in environmental documents but the impact which they address must be identified.

Capital expenses in the form of additional school facilities can be mitigated by impact fees because they are specifically included in the listing of public facilities in RCW 82.02.090(7) which includes school facilities. School impact fees must be used for “school facilities” that are addressed by a capital facilities plan element of a Comprehensive Plan adopted under the GMA (RCW 82.02.050(4) and RCW 82.02.090(7)). In the case of the City of DuPont, the School District’s capital facilities plan is adopted by reference. Typically, school impact fees apply only to residential construction, or the residential portion of a mixed-use building or development since normally only residential uses generate students.

Districts have a variety of other sources of funding including bond issues for school capital facilities that are paid by a tax imposed on all properties in the district. To the extent the same facilities are included in an impact fee and bond issue, the fee must give credit for the revenues from that source.

The State of Washington has a Common School Construction Fund to pay a portion of school costs. The Office of the Superintendent of Public Instruction (OSPI) had determined that the school district funding assistance rate is 52.15 percent for eligible expenses. Many school facility improvements may not, however, qualify for state funding. If such funding is available in the future, credit must be given against impact fees.

The Steilacoom Historical School District has extensive experience in school facilities planning and development of impact fees that meet statutory requirements. During the process of development, they can be expected to monitor and update student generation rates and other factors and develop fees that will provide resources for school facilities in accordance with statutory requirements.

1.10.2.4 Unavoidable Adverse Impacts

Additional population will result in demand for additional educational services. The extent and character of such services is dependent on choices made by decision-makers, but change in the extent, cost, and character of services will occur.

1.11 UTILITIES

1.11.1 Water

1.11.1.1 Affected Environment

A detailed inventory of city water system facilities is included in the City of DuPont Water System Plan 2018 Update.

Water Supply

The system uses only groundwater sources for its water supply. The Hoffman Hill Wells Nos. 1 and 2 are situated in the southwest corner of the city's service area. Both wells utilize a single water right and have been added to the system to increase capacity. Under normal operating conditions, the Hoffman Hill well(s) act as the primary source for the water system.

Water Storage

The City of DuPont currently owns and operates two storage facilities: the 1.0 million gallon (MG) reservoir located at Bell Hill and the 3.5 MG Hoffman Hill Reservoir. The reservoirs both serve the main 400-foot HGL pressure zone.

Water Rights

According to the 2018 Water System Plan the City of DuPont has adequate water rights to meet projected 6-year growth demands of the system. However, in planning for buildout, the City of DuPont will pursue transferring existing water rights from the Historic Village and the Weyerhaeuser golf course wells from one point of withdrawal to another.

1.11.1.2 Impacts - No Action/Existing Subarea Plan/Existing Zoning

The allowed development of 100 single-family units and 1,000 multifamily units resulting in a residential population of about 2,300 is fairly straightforward in projecting Equivalent Residential Units (ERU). A factor of 1 for single-family and 0.70 for multifamily results in a ERU of 800 per day. The current ERU for DuPont is 231 gallons per day.

The projected office and research and development uses at 0.07 ERU per 1,000 square feet would equal to about 107 ERU. If a substantial component of that was light manufacturing and utilized processed water, the water consumption would have to be calculated on a case-by-case basis. Industrial water use

includes water used for such purposes as fabricating, processing, washing, diluting, cooling, or transporting a product; incorporating water into a product; or for sanitation needs within the manufacturing facility.

The city's existing Water System Plan provides for a growth from the current 7,238 ERU to 10,770 ERU. That increase of 3,532 ERU is well within projections of additional water demand under the existing Subarea Plan and Zoning.

1.11.1.3 Impacts - Proposed Subarea Plan and Zoning Amendments

The projected 560 single-family and 1,860 middle housing/townhomes at an ERU of 1 would be projected to result in 2,420 ERU. The 1,360 projected multifamily at a projected ERU of 0.70 would be projected to result in 952 ERU. The 175,000 square feet of retail use and 40,000 square feet of service uses at an ERU of around 0.185/1,000 square feet would be expected to produce around 40 ERU. The 61,500 square feet of restaurant use at 1.788 ERU/1,000 square feet would produce about 109 ERU. The 20,000 square feet of projected light industrial use at about 0.168 ERU/1,000 square feet would produce about 4 ERU. Hotels with a total of 200 rooms at 0.473 ERU/1,000 square feet would produce about 45 ERU. The 500 student school at about 0.042 ERU per student would produce about 22 ERU. Other non-residential uses totaling about 73,000 square feet are projected to have an ERU of around 0.185/1,000 square feet and would be expected to produce around 14 ERU.

The total water demand of the development of the proposed Subarea Plan and Zoning amendments with the projected resulting uses as above would result in a range of 3,406-3,964 ERU. The city's adopted Water System Plan projects growth from the current 7,238 ERU to 10,770 ERU, which represents an increase of 3,532 ERU. In comparing the Available water vs. Water Needs, the total need for ERUs under the Moderate and High Alternatives results in a water availability deficit of 169 ERUs for the Moderate Alternative and 727 ERUs for the High Alternative.

The city water system appears to have the capacity to support the demand of the proposed Subarea Plan and zoning amendments with mitigation to provide adequate storage capacity for water availability. In order to provide adequate storage capacity for the Moderate and High alternatives, the city could address this by requiring additional storage with a new reservoir and booster pump station. Another option is to reduce the maximum operation interval of its water storage reservoirs to from a five foot operating interval to three vertical feet. Both options are discussed below under Mitigation and in Tables 3.9.1-5 and 3.9.1-5a.

1.11.1.4 Mitigation

As discussed under Impacts above, under existing operating conditions the city has a deficit of water for the proposed amendments to the Subarea Plan and zoning. The city can provide more effective (or available) storage capacity by providing additional storage of 33,800 gallons for the Moderate Alternative and 145,400 gallons for the High Alternative with a new reservoir and booster pump station or reducing the maximum operation interval of its water storage reservoirs from a five (5) foot operating interval to three (3) vertical feet. Tables 3.9.1-5 and 3.9.1-5a includes comparisons of available water and water needs.

The Old Fort Lake Subarea is projected to build-out over a 15-to-20-year period. The city will have the opportunity during that timeframe to review facilities and operations to determine the best mix of facility and operational strategies to address additional demand. There are a wide range of options in addition to that outlined above, for example the city might decide to add additional storage to serve the

higher Hoffman Hill pressure zone to reduce the reliance on booster pumps to serve that area, which also would make additional storage capacity available for future development.

1.11.2 Stormwater Management

1.11.2.1 Affected Environment

The City of DuPont maintains a stormwater system consisting of a combination of ditches and hard piped conveyance systems, biofiltration swales, and infiltration ponds and trenches. Stormwater is infiltrated or discharged directly to natural water bodies. A large part of the city is underlain by Spanaway soils, which are excessively drained and allow infiltration to be used as a primary means of stormwater management.

The city has adopted a Stormwater Management Program (SWMP) in 2024 which is designed to satisfy the Western Washington Phase II Municipal Stormwater Permit (Permit) requirements. The purpose of the SWMP is to reduce the discharge of pollutants from the municipal stormwater system to the maximum extent practicable and to protect water quality. The program includes procedures for reporting and correcting or removing illicit connections, spills and other illicit discharges; public information and regulations. The city has adopted the Washington Department of Ecology 2019 Stormwater Management Manual as its regulatory mechanism.

1.11.2.2 Impacts

All new development and redevelopment within the City of DuPont must provide stormwater quality and/or quantity control as required by the Department of Ecology 2019 Stormwater Management Manual. Each applicant must prepare a Stormwater Site Plan.

Projects in the Subarea can achieve the Low Impact Development Performance Standards by use of full infiltration of runoff from all impervious areas on-site which is a preferred method of stormwater management. Runoff treatment standards require each project site to comply to Basic Treatment standards requiring runoff from pollutant generating surfaces such as parking lots to be routed to a basic water quality facility which can be chosen from a variety of options including biofiltration swales, filter strips, wetponds, wet vaults, treatment wetlands, sand filters and other facilities. Each project will be required to provide a detailed plan prepared by a qualified engineer which will be reviewed and approved by city staff.

Maintenance of facilities may be provided by the city and financed through stormwater fees, which is the case for most single-family areas on public streets. Commercial and multifamily developments are often responsible for maintenance of their facilities, subject to city oversight and inspection. This is determined by the city at the time of approval of stormwater plans.

1.11.2.3 Mitigation

Compliance with the Department of Ecology 2019 Stormwater Management Manual will provide mitigation for stormwater impacts.

1.11.3 Sewer

1.11.3.1 Affected Environment

The City of DuPont does not own or maintain any sanitary sewer system components. Sanitary sewer services are provided by the Pierce County Sewer Utility (Utility). The city has interlocal agreements for the provision of sewer service with the Utility. The main sewer system in DuPont is the gravity line which follows McNeil Street from the westerly boundary of the city, then Bobs Hollow Lane, Center Drive,

Powerline Road and ends at a pump station on Wharf Road that discharges to the ULID 90-4 Interceptor which consists of 25,687 lineal feet of twin 22-inch pressure sewer pipelines to the Lakewood West Sub-basin to the north. Sewage is treated at the Chambers Creek Sewage Treatment Plant. The 2010 Pierce County Unified Sewer Plan includes the DuPont-Lakewood Bypass Interceptor scheduled for completion by 2035. It would be a 42-inch gravity pipeline extending 4,800 feet providing a more direct route to the sewage treatment plant (Pierce 2010).

1.11.3.2 Impacts

Sewer service to the Subarea would be provided by new facilities provided by the developer(s). The Pierce County 2010 Unified Sewer Plan envisions a gravity system discharging to a pump station near the center of the Subarea, then discharging to the gravity sewer in Center Drive (Pierce 2010). The existing ULID 90-4 Interceptor has adequate capacity for near-term to middle-term demand. The utility will monitor trends and ensure that new capacity comes on line prior to the existing system exceeding capacity. The future DuPont-Lakewood Bypass will be funded by utility charges and connection charges (Bedi 2024).

1.11.3.3 Mitigation

The Old Fort Lake Subarea is projected to build-out over a 15 to 20 year period. Pierce County Utilities will have the opportunity during that timeframe to review facilities and operations to determine the best mix of facility and operational strategies to ensure adequate facilities to address and serve additional demand.

1.11.4 Energy

1.11.4.1 Affected Environment

Electrical utilities in DuPont are provided by Puget Sound Energy (PSE), a private utility company providing electric and natural gas service to customers in the Puget Sound region.

Electric service to customers in DuPont is provided by the DuPont Substation on Wharf Road. The substation is served by a 115kv transmission line from the St. Clair Substation near Lacey and a 115kv transmission line from the Gravelly Lake Substation in Lakewood to the north. Together the transmission lines provide a n-1 level of reliability, which means if one transmission line source is not available the other source is sufficient to serve current demand.

1.11.4.2 Impacts

The PSE electric transmission facilities and substation serving the City of DuPont have capacity to serve additional demand from development of primarily residential use in the Subarea for the next 15 to 20 years. The utility will monitor system demand and capacity and plan for future system improvements to serve additional demand in DuPont and throughout the system.

If any components of the existing system need to be upgraded in the future to provide additional capacity, the most likely strategies include updating transmission line capacity through higher capacity conductors which may be accommodated on existing poles or might need higher poles to serve the larger capacity conductors. Electrical capacity strategies are based on the entire system needs which includes service areas outside of DuPont and may lead to improvements to meet needs beyond the needs of customers in DuPont. It is likely that any increase in distribution capacity in DuPont can be met by expanding the existing substation which has unused area within the existing property that can be

used for additional facilities. Additional distribution lines may be needed, which would involve trenching and conduits for new underground lines to access the Subarea.

1.11.4.3 Mitigation Measures

It is anticipated that normal systems planning and systems upgrades will provide adequate energy resources as the project builds out. No specific measures besides expansion of the substation within the existing property or additional distribution lines have been identified.

1.11.5 Unavoidable Adverse Impacts for All Utilities

Additional population and other activities on site will require support of a variety of public utilities. The extent and character of such services is dependent on choices made by decision-makers, but change in the extent, cost and character of services will occur.

1.12 ECONOMY, SOCIAL FACTORS, SOCIAL POLICY

1.12.1 Affected Environment

Subsection 23.01.110 of the DuPont Municipal Code provides in additional elements to be covered in an EIS. Pursuant to WAC 173-806-125, the following additional elements are part of the environment for the purpose of EIS content, but do not add to the criteria for threshold determinations or perform any other function or purpose under this chapter: (a) Economy, (b) Cultural factors, (c) Social policy analysis.

Economy

For the purposes of this analysis: Economy will be assessed in terms of the economic base of the city, as the effects on public services are assessed separately in this EIS.

The economy in the City of DuPont reflects its current predominantly residential character. Most residents of DuPont must work outside of the city, given limitations in employment within the city. The largest employers in DuPont are warehouse uses, including Amazon, that are estimated to employ between 1,00 and 2,500 with higher seasonal employment in peak periods. DuPont is close to the largest employer in Pierce County: Joint Base Lewis-McChord with 54,000 full-time employees. A substantial number of DuPont residents are believed to be both active-duty personnel and civilian employees. The 2020 census category of “Mean travel time to work” of 25.3 minutes indicates that work locations of DuPont residents are fairly evenly distributed throughout Pierce County and the region.

The current Comprehensive Plan provides for a major employment center in the Old Fort Lake Subarea. The Comprehensive Plan notes that the city faces intense competition from other communities investing in education, job training, infrastructure, planning, and policies to attract economic growth and development. In the approximately 17 years since it has been available for development there has been limited interest and the value of the land has declined by 85%, according to county sales information. An economic assessment of a recent development proposal concluded that there was little or no demand for additional light manufacturing uses in Pierce County and a very limited demand for new office and research park space (BST 2023).

Cultural Factors

Cultural factors generically include the social behavior, institutions, and norms found in human societies, as well as the knowledge, beliefs, arts, laws, customs, capabilities, and habits of the individuals in these groups. This analysis does not include historic and cultural preservation as provided for in WAC 197-11-144(2)(b)(iv) which is assessed separately.

The Comprehensive Plan includes guiding concepts for cultural factors discussed in greater detail under impacts, below.

Overall, the extent to which the current designation of the Subarea as an employment center affects Comprehensive Plan guiding concepts may depend more on the layout and design of future development than the range of allowed uses.

Social Policy

Social policy analysis is the study of courses of action with the goal of preventing and addressing social problems. DuPont's Comprehensive Plan vision statement includes "protection of the natural, social, and economic environments". The plan also provides for encouraging a mix of generations within the social fabric of the city. Generally, social issues distinguish the personal lives of individuals and affect the well-being of identifiable groups. (Kulic 2024). For the purpose of this analysis, this will be considered equivalent to an "Environmental Justice" analysis as provided for in RCW 70A.02.010(8) and (9), as addressing disproportionate impacts on vulnerable populations and overburdened communities, the equitable distribution of resources and benefits, and eliminating harm.

Approximately 40 percent of the population of DuPont is part of a minority group, but it is unknown whether these groups are economically disadvantaged specifically in DuPont, as the differences in income between the average citywide income is less pronounced for all groups, except Asian. There is no data available that provides an explanation for that pattern. The average household income of some of these groups are available from the census and are presented in Table 3.23-2, above.

As summarized above, the percentage of residents in DuPont living in poverty in 2022 were 4.2% overall (3.1% for White Non-Hispanic residents, 2.1% for Black residents, 2.0% for Hispanic or Latino residents, 10.5% for other race residents, and 4.7% for two or more races residents). In Pierce County the poverty rate was 8.0%, while the state of Washington was 10%. The National Poverty Rate was 11.6%.

1.12.2 Impacts – No Action/Existing Subarea Plan and Zoning

Under the existing Subarea Plan and zoning, the Old Fort Lake Subarea is designated as a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses.

Economy

The existing Old Fort Lake Subarea Plan is intended to "Leverage the opportunity created by the city's largest area of undeveloped commercial/light manufacturing land to create well-paying employment opportunities."

Overall, the city has had limited success in attracting employment except for warehouse units as discussed in Affected Environment, above. It would appear that the City of DuPont and the Subarea have a number of characteristics that appear to favor the city as an employment center. However, over the last several decades, office and research and development uses have not become established within the city as envisioned. It appears doubtful after several decades of unsuccessful establishment of those uses that the city can effectively compete with existing employment centers for those uses. The existing Subarea plan and zoning provide the theoretical opportunity for a more balanced employment and residential structure for the city, however market forces do not appear to favor the employment component and therefore the existing plans and codes do not accomplish that goal.

Cultural Factors

The Old Fort Lake Subarea is intended to "protect and integrate existing open space, critical areas, cultural resources, and views; plan for future amenities that enhance the neighborhood; stay true to

DuPont's community character and quality of life; and focus on creating dynamic streetscapes, landscaping, trails, gathering places, and living/commercial environments."

The existing Subarea Plan generally furthers the cultural goals of the city:

- Neighborhoods are not isolated and have a distinct focal point and short walking connections to other neighborhoods, services, public features, and jobs.

The Old Fort Lake Subarea is connected to the balance of the city through one major new road connection to Center Drive and two smaller connections to neighborhood streets to the south. The plan includes an extensive trail network that connects areas within the Subarea and connects to neighborhoods to the south. The existing plan does not include a specific requirement for a focal point. It is possible that the wider range of uses in the westerly portion of the Subarea and the wider range of retail uses allowed could result in a commercial area as a focal point.

- There is a broad range of housing opportunities mixed into neighborhoods.

Except for a small residential component in the westerly portion, the Subarea, cannot be considered a residential mixed use neighborhood, and therefore this guiding concept does not apply.

- Residential and commercial buildings are designed to a variety of styles from the 1900- 1940's.

The zoning in the Subarea provides for the city-wide design standards for commercial and multifamily development. There are no design standards for light industrial uses beyond bulk standards such as height and setbacks.

- There is a single, diverse, lively, commercial area, which includes a major public space, retail, office, and residential use.

The city Comprehensive Plan describes DuPont Station at the intersection of Central Drive and Wilmington Drive as the center of the city with a large mixed-use area intended for a variety of commercial/retail uses with high density/multifamily residential land uses integrated with public spaces. The Old Fort Lake Subarea retail and office use would be clearly secondary to this center.

- There is a civic center containing government, recreational and cultural services.

The city has established such an area on Civic Drive which presently includes government services and is anticipated to serve recreation and cultural services in the future.

- Environmentally sensitive areas are preserved.

The city has Critical Area code provisions that regulate development of sensitive areas.

- Heritage of the early settlements (American Indian, Hudson Bay, and DuPont Company) is featured with development, not obscured.

The Subarea Plan envisions opportunities for these sites to become signature cultural destinations through permanent structures and informational signage to educate visitors and celebrate the historical significance. This could be integrated with any development within the Subarea.

Overall, the current designation of the Subarea as an employment center effect on Comprehensive Plan guiding concepts depends more on the layout and design of future development and how it provides connections to these sites. Such policies are minimally affected by the range of currently allowed uses.

Social Policy

Social policy from the perspective of protecting vulnerable populations and overburdened communities as well as the equitable distribution of resources and benefits, and eliminating harm, requires “environmental justice” review and understanding of the social groups within the city.

Approximately 40 percent of the population of DuPont is part of a minority group, but it is unknown whether these groups are economically disadvantaged specifically in DuPont, as the differences in income between the average citywide income is less pronounced for all groups, except Asian. There is no data available that provides an explanation for that pattern.

The lands in the City of DuPont are part of the traditional homeland of the people of the Nisqually Tribe. The Nisqually people have a strong relationship with traditional lands, recognize deep spiritual connections between people and nature, and respect and honor all living things. The city’s land use code in DMC 25.80.040 provides for review of development for cultural, historic, and archaeological resources and provides for coordination with the State Historical Preservation Office and the Nisqually Indian Tribe to assure that such resources are protected, preserved, or collected.

The existing Subarea Plan and zoning, if implemented would not displace or result in proximity impacts that would affect overburdened communities. The zoning would provide a range of employment opportunities that could benefit a range of populations. As there are no identified vulnerable or overburdened communities in DuPont, it probably would provide few, if any benefits. To such communities elsewhere in the region, the greater distance to DuPont compared to other existing employment centers likely would provide few benefits to those populations. The allowed multifamily housing might provide some residential opportunities for such communities and could provide added benefits if employment were available, however the goal of providing office, light manufacturing, and research and development uses generally involves employees with a high degree of education or training which would tend to exclude vulnerable and overburdened communities.

The proposed amendments will not affect the cultural sites currently owned by the Nisqually Tribe, including the midden site in the southwest corner of the Subarea, and the cemetery located between the golf course Fairway 1 and the designated loop road. The tribe also owns a 46-acre parcel adjacent to Sequelitchew Creek.

1.12.3 Impacts - Proposed Subarea Plan and Zoning Amendments

Under the proposed Subarea Plan and zoning amendments, the Old Fort Lake Subarea is designated as a primarily residential area with supporting retail and service uses and regional oriented entertainment uses. This Subarea is projected to accommodate, under a higher intensity scenario, up to about 3,800 dwelling units, a population of 8,782, and approximately 409,800 square feet of retail, services, restaurants, and two hotels serving both local residents and as a destination for golf and other amenity-oriented tourism activities.

Economy

The proposed land use map designates specific areas for different intensities of residential uses and designates three retail areas and two areas for entertainment and related uses.

The Subarea Plan and zoning amendments that would make the area primarily a residential area would provide limited opportunities for employment and relatively few opportunities for “well-paying employment opportunities,” which is an objective of the existing plan.

The existing plan and zoning provide the theoretical opportunity for a more balanced employment and residential structure for the city; however, market forces do not appear to favor the employment component. It appears doubtful after several decades of unsuccessful establishment of those uses that the city can effectively compete with existing employment centers for those uses. The majority of

employment centers developed in the city have been relatively low-paying warehousing and distribution jobs, as discussed in Affected Environment, above.

The proposed Subarea Plan represents a recognition that the city can most effectively play the role of a residential center within the regional economy, rather than an employment center. The plan also recognizes the Home Course golf course as an amenity that can provide opportunities for service-related economic activities.

Cultural Factors

The Old Fort Lake Subarea is intended to “protect and integrate existing open space, critical areas, cultural resources, and views; plan for future amenities that enhance the neighborhood; and stay true to DuPont’s community character and quality of life.” Policy LU 2.8 seeks to “Promote the development of a convention center, cultural/community center, or other public facilities that are desired additions to the commercial and business uses in Old Fort Lake.”

The proposed Subarea Plan and zoning amendments relate to a number of the Comprehensive Plan guiding concepts:

- Neighborhoods are not isolated and have a distinct focal point and short walking connections to other neighborhoods, services, public features, and jobs.

The plan includes an extensive trail network that connects areas within the Subarea and connects to neighborhoods to the south. The proposed plan amendments provide separate retail/service focal points for the easterly and westerly portions of the Subarea which are separated by the golf course in the center of the Subarea.

- There is a broad range of housing opportunities mixed into neighborhoods.

The residential areas designated within the Subarea under the plan and zoning amendments provide for single-family, middle housing (townhome development up to sixplexes) and multifamily development which are likely to provide a wide range of densities and housing types oriented to different lifecycles, economic status and lifestyle preferences of residences.

- Residential and commercial buildings are designed to a variety of styles from the 1900’s to 1940’s.

The zoning in the Subarea provides for shared design standards for single-family and middle housing and separate standards for multifamily and non-residential uses. They are more contemporary in style.

- There is a single, diverse, lively, commercial area, which includes a major public space, retail, office, and residential use.

The city Comprehensive Plan describes DuPont Station at the intersection of Central Drive and Wilmington Drive as the center of the city with a large mixed-use area intended for a variety of commercial/retail uses with high density/multifamily residential land uses integrated with public spaces. The Old Fort Lake Subarea retail and office uses would be secondary to this center and would provide for a local market area for residents as well as for a regional customer base attracted to the specific amenities of the Subarea.

- There is a civic center containing government, recreational and cultural services.

The city has established such an area on Civic Drive which presently includes government services and is anticipated to serve recreation and cultural services in the future. This is not directly affected by the Subarea and zoning changes proposed for the Old Fort Lake Subarea.

- Environmentally sensitive areas are preserved.

The city has Critical Area code provisions that regulate development of sensitive areas and will protect steep slopes along Puget Sound, Sequelitchew Creek and Old Fort Lake as well as related habitat and other resources.

- Heritage of the early settlements (American Indian, Hudson Bay, and DuPont Company) is featured with development, not obscured.

The Subarea includes known cultural sites. The Subarea Plan envisions opportunities for these sites to become signature cultural destinations through permanent structures and informational signage to educate visitors and celebrate the historical significance. This could be integrated with any development within the Subarea.

Overall, the proposed designation of the Subarea as a primarily residential area affects Comprehensive Plan guiding concepts for cultural factors more based on the layout and design of future development. Such policies are minimally affected by the range of allowed uses.

Social Policy

Social policy from the perspective of protecting vulnerable populations and overburdened communities as well as the equitable distribution of resources and benefits, and eliminating harm requires an “environmental justice” review and understanding of the social groups within the city.

The proposed amendments to the Subarea Plan and zoning are likely to lead to a more diverse economic status of the residential population because of the wider range of housing densities and types provided.

The proposed amendments to Subarea Plan and zoning, if implemented would not displace or result in proximity impacts that would affect overburdened communities. The zoning would provide a range of employment opportunities that could benefit a range of populations. As there are no identified vulnerable or overburdened communities in DuPont, it probably would provide few, if any benefits. To such communities elsewhere in the region, the greater distance to DuPont compared to other existing employment centers likely would provide few benefits to those populations. The permitted multifamily residential uses might provide some residential opportunities for such communities and could provide added benefits if employment were available, however the goal of providing office, light manufacturing, and research and development uses generally involves employees with a high degree of education or training which would tend to exclude vulnerable and overburdened communities.

The proposed amendments will not affect the cultural sites currently owned by the Nisqually Tribe, including the midden site in the southwest corner of the Subarea and the cemetery located between the golf course Fairway 1 and the designated loop road. The tribe owns a 46-acre parcel between Sequelitchew Creek and Fairways 4 through 7 of the golf course. This area is not included in Subarea Plan amendments and is designated for future negotiation of uses between the tribe and the city. Development in the area has the potential to displace unknown archaeological resources of importance to the tribe. The city’s land use code in DMC 25.80.040 will continue to provide for review of development for cultural, historic and archaeological resources and provides for coordination with the State Historical Preservation Office and the Nisqually Indian Tribe to assure that such resources are protected, preserved or collected.

1.12.4 Mitigation

Mitigation is not considered necessary for land use alternatives that emphasize different sets of policy goals of the city’s comprehensive plan or may change those goals and policies. Set asides for affordable

housing could benefit vulnerable or overburdened communities that experience lack of housing opportunities because of income constraints.

1.12.5 Unavoidable Adverse Impacts

Additional development in the Subarea will have economic, cultural and social impacts on future population on-site and existing and future populations off-site. Changes will be affected by public and private choices on the details of future development and activities that will affect the extent to which housing and other uses have an effect on vulnerable populations and overburdened communities.

1.13 EARTH, SOILS, AND GEOLOGY

1.13.1 Affected Environment

From a regional geologic perspective, the project area is located in the Puget Sound lowlands, which is a north-south trending structure that is a topographic trough. Glacial deposits consist of recessional outwash and till that unconformably overlay bedrock. Outwash generally consists of sands and gravels deposited by melt-water streams as glaciers receded to the north from the Puget Sound region.

Topography and Soils

The Site is situated on a glacial outwash plain that slopes gently from an elevation of about 230 to the east at Center Drive and decrease slightly to about 210 at the top of the bluff above the Burlington Northern Santa Fe Railroad (BNSF) and Puget Sound.

The small kettles that formerly were numerous on the site, have largely been covered by the golf course or were excavated and back-filled as part of hazardous materials remediation. The largest kettle lake in the approximate center of the Subarea is Old Fort Lake in a steep-sided depression about 60 feet deep. The Subarea is bounded on the north by the east-west trending Sequelitchew Creek canyon.

Soils on the site formerly were characterized by forest duff. Native soils remain largely within open space areas such as surrounding Old Fort Lake or on the margins of the golf course. Most of the site was excavated to a depth of approximately one foot for hazardous materials remediation. Greater depths of excavation occurred at building foundations and areas where hazardous materials were found. Such excavated areas were filled with clean materials either from on or off-site, but it is unknown whether they meet specifications for structural fill.

Geology

The four major stratigraphic units beneath the Subarea, from the top down include Steilacoom Gravels, Vashon Till, the Olympia Beds, the Double Bluff Drift sequence (DBD-OB) (formerly known as the Kitsap Formation), and the Salmon Springs Glaciation (formerly known as the Salmon Springs)(DNR 2003).

Groundwater

The general hydrogeologic setting within the project area consists of an upper, unconfined water table aquifer within the Steilacoom gravel and glacial drift units which varies in depth from about 20 to 40 feet below the surface in the easterly and central portion of the Subarea and around 100 to 200 feet deep in the deep Steilacoom gravels in the westerly portion of the site west of the Olympia Beds Truncation; an aquitard formed by the fine- grained DBD-OB sequence; and a lower, semi-confined to unconfined sea-level aquifer within the Salmon Springs unit.

The deeper sea level aquifer is effectively isolated from shallower groundwater by the intervening aquitards of dense, largely impervious deposits. The City of DuPont's four primary water supply wells are developed in the Salmon Springs aquifer upgradient of the Subarea and due to the location and aquitard are not affected by shallow groundwater underlying the Subarea.

Old Fort Lake is completely landlocked and has no surface water source except possible runoff routed to the lake from the detention pond at Jenson Avenue and Ogden Avenue. An overflow pipeline was

installed during development of the residential area to the south. The lake has no outlet. The water in the lake is controlled by regional groundwater conditions and has been observed to vary up to eight feet seasonally which corresponds with variation in ground water levels recorded in monitoring wells (Hart Crowser 1986).

The permeability of the Steilacoom gravels is generally sufficient to provide for infiltration of precipitation without observable overland flow. There are a few localized areas where standing water has been observed after rainfall. It isn't known whether these are areas of native ice contact deposits with associated localized fine deposits or whether they are areas that have been excavated and filled as a result of hazardous materials remediation.

Geologically Hazardous Areas

Geologically hazardous areas (GHA) are defined in Chapter 25.105 of the DuPont Municipal Code (DMC). GHAs are defined as being susceptible to erosion, landsliding, seismic hazards, and other hazardous geological events.

Generally, the geology of the area does not meet the functional based criteria of a landslide hazard such as slopes that have shown sloughing or calving or have parallel or sub-parallel planes of weakness. The steep slopes along the Puget Sound are almost entirely Steilacoom gravels that are homogenous and lack bedding planes or fault planes.

The setbacks from landslide hazard areas in DMC 25.105.040(3)(c) are to be "based on the findings of a qualified professional and shall minimize the risk of property damage, death, or injury resulting from landslides both on and off the property." Additional site-specific investigation and investigation in relation to specific proposed developments would be required to establish the extent of setbacks that might be required.

Seismic Hazards

Seismic hazard areas are defined in DMC 25.105.020.313 as "...areas subject to severe risk of damage because of seismic induced ground shaking, slope failure, settlement, soil liquefaction or surface faulting. Ground shaking is a primary risk, followed by slope failure. Soils on slopes greater than 40 percent that are expected to be seasonally or perpetually saturated pose a specific risk of settlement, movement, or liquefaction. When saturated, these soils tend to be cohesionless and are unsuitable for foundations.

It is unlikely that there are risks of slope failure during seismic events except on steep slopes adjacent to Puget Sound and Sequelitchew Creek. Slope failure in the area was not reported as a result of the Nisqually Earthquake in 2001, although Burlington Northern/Santa Fe Railroad Estimated track repairs, in the Nisqually area were approximately \$200,000, due to shifting buckling damage (Highland 2003). The water table at a considerable distance below the surface.

Erosion Hazards

In addition to the general definition of a geologically hazardous area (GHA) in DMC 25.105, the provisions of DMC 25.105.030.130 define erosion hazard area as those areas containing soils which, according to the USDA Soil Conservation Service, may experience severe to very severe erosion. Spanaway gravelly sandy loam, the predominant soil in the area exhibits slight erosion potential when disturbed (USDA NRCS 2024). The sloped terraces above Puget Sound bluffs within the developable areas of the Subarea, however, may be subject to erosion because of the inclination of the slope and the presence of fined silts and sands, if existing vegetation is removed or the slopes are regraded.

1.13.2 Impacts

Potential impacts of development of the Subarea under the existing Subarea Plan is similar enough to the proposed amendments not to warrant separate analysis.

Buildings and Earthwork

The impacts of future development on earth resources and groundwater are likely to be similar. The size of buildings is likely to generally be greater under existing zoning which allows office, research and development and manufacturing uses over a larger area than the commercial and entertainment areas designated in the proposed Subarea Plan and zoning. The character of residential development is likely to be similar, except that a much larger area would be devoted to residential uses under the proposed amendments and a much larger component of middle housing/townhomes would be developed.

Standard building foundations are likely to be appropriate in areas where existing soils have not been excavated or filled. In areas of landfills with a variety of debris that were not considered hazardous and were not remediated may require structural fill to be developed as middle-housing/townhomes, or other open space or recreational uses may be considered.

Utilization of infiltration for storm water management is generally suitable due to the permeability of the Steilacoom gravels. Because there are a few areas where standing water has been observed after rainfall and because perched groundwater has been observed at a few locations, detailed investigation of proposed infiltration facilities should be performed, and design parameters adjusted accordingly. Because infiltration is the most likely mechanism used for stormwater management, the additional impervious surfaces from buildings, parking areas, streets and other impervious surfaces is not likely to affect the amount of groundwater recharge or patterns of groundwater movement.

Landslide Seismic and Erosion Hazards

As discussed above, the geology of the area does not meet the functional based landslide risk criteria such as slopes that have shown sloughing or calving or have parallel or sub-parallel planes of weakness. The steep slopes along the Puget Sound are almost entirely Steilacoom gravels that are homogenous and lack bedding planes or fault planes. Nevertheless, this is a slope in excess of 40 percent which is not bedrock or engineered and is therefore a geologically hazardous area and may be subject to some risk.

Areas regulated as within 300 feet of 40 percent slopes should have additional review by qualified professionals and specific development proposals evaluated as to whether they meet the criteria in DMC 25.105.040(3)(d) for stability and avoidance of risk.

Erosion and Sedimentation

Redevelopment of the project site would include clearing, grading, excavating, and filling portions of the site. Vegetation would be cleared within the construction footprint, and existing buildings would be demolished on the site prior to grading. These construction activities may cause erosion. Given the very permeable character of the Steilacoom gravels, it is unlikely that surface water would be carried any distance over most of the Subarea. The sloped terraces above Puget Sound bluffs are likely to be subject to erosion because of the inclination of the slope and the presence of fine silts and sands, if existing vegetation is removed or the slopes are regraded. Wind erosion during dry seasons can produce dust. If soils are trucked off-site or if fill is transported into the project area, some soil may be blown off trucks while in route. Standard building foundations are likely to be appropriate in areas where existing soils have not been excavated or filled.

Utilization of infiltration for storm water management is generally suitable due to the permeability of the Steilacoom gravels. Because there are a few areas where standing water has been observed after rainfall and because perched groundwater has been observed at a few locations, detailed investigation of proposed infiltration facilities should be performed, and design parameters adjusted accordingly.

1.13.3 Mitigation

Earthwork, Erosion, and Sedimentation

Site work should be phased to minimize the amount of exposed soils to the areas that are under construction. The permeability of Steilacoom gravels limits some impacts related to surface water and to storm events carrying materials overland and into streams. There are, however, localized impact that can occur during severe storm events and there are potential impacts particularly when development is in proximity to steep slopes. Standard Best Management Practices (BMPs) should be implemented to limit erosion. Compliance with building code standards for seismic conditions should be required to minimize adverse effects when seismic events occur.

1.13.4 Unavoidable Adverse Impacts

Additional development in the Subarea will displace, reconfigure and remove elements of the earth substrate. The extent to which they may be adverse will depend on more detail of potential limitations for urban development and the design and construction details of man-made alterations and additions.

1.14 PLANTS AND ANIMALS

This section discusses impacts on terrestrial plants and animals as well as aquatic species. Additional detailed discussion is found in Appendices D and E.

1.14.1 Affected Environment

The Old Fort Lake Subarea is characterized by several distinct habitats that include:

Mature Coniferous Forest

Approximately 22 acres of mature forest is located in the eastern portion of the project site.

Early Successional Forest

The majority of the site was cleared, and soil was removed to a depth of about one foot as part of hazardous materials mitigation for contaminants. In the approximately two decades since the clearing occurred and early successional forest has been established primarily dominated by dense stands of Douglas fir saplings, with occasional madrone (*Arbutus menziesii*, N.L.) and black cottonwood (*Populus balsamifera*, FAC) saplings. Patches of Scotch broom are also present throughout the site.

Old Fort Lake is a large glacial kettle wetland in the south-central portion of the project site with a mixed coniferous and deciduous forest in the steep slope that surrounds the lake. Dominant vegetation includes an overstory of Douglas fir, with interspersions of occasional western red cedar (*Thuja plicata*) and bigleaf maple (*Acer macrophyllum*). Areas of Oregon White Oak are present closer to the edge of the shoreline, primarily along the southern, western, and eastern portions of the lake. The forest around the lake provides valuable nesting, breeding, roosting, denning, and foraging habitat for a variety of birds, owls, bats, mammals, amphibians, and invertebrates.

Old Fort Lake consists of palustrine scrub-shrub (PSS) and palustrine emergent (PEM) vegetation classes, in addition to open deep-water habitat. Aquatic vegetation within Old Fort Lake consists of a variety of wetland and aquatic vegetation.

Oak Woodlands

A 1996 survey showed several oak woodlands within the Subarea. Four of the areas are generally intact. The mixed conifer and oak forests in the vicinity of the project site lack the mature forest stands required to provide the adequate canopy cover required for secure nest sites. Western gray squirrels are not expected to be in the vicinity of the project site due to lack of mature forest, small size of oak forests, prevalence of invasive species, such as Scotch broom and presence of humans. The city codes require preservation of oak habitat that meets certain criteria.

Golf Course

A central part of the Subarea is an active golf course that consists of maintained lawn areas, with man-made water features and various paved paths. There are minor patches of mature madrone and Douglas fir trees. The golf course provides limited habitat value due to its heavy, regular use by humans, its lack of structural diversity, and limited food resources for most species. However, the golf course area may be used at night for minor foraging and as a transit corridor by wildlife species.

Sequalitchew Creek Ravine

The northern boundary of the Subarea is the Sequalitchew Creek ravine. Vegetation in the ravine is characterized by a canopy of Douglas fir with patches of western hemlock (*Tsuga heterophylla*, FACU), and bigleaf maple, with an understory of oceanspray, dull Oregon grape, beaked hazelnut, and sword fern. As mentioned above, a mixed oak woodland mapped by Jones & Stokes (1996) is present in the eastern portion of the ravine. The canopy in this area consists of Oregon white oak, bigleaf maple, and Douglas fir, with an understory of trailing blackberry (*Rubus ursinus*) snowberry (*Symphoricarpos albus*), vine maple (*Acer circinatum*), and sword fern.

Puget Sound Shoreline and Bluff

The Puget Sound Shoreline is located west of the Subarea and is separated from the Subarea by a chain-link fence, a soft-surface pedestrian trail, a steep forested slope, and the BNSF railroad track. The forested slope is dominated by Douglas fir, Pacific madrone, oceanspray, holly-leaf Oregon grape (*Mahonia aquifolium*), and Scotch broom. The shoreline provides forest, beach, estuarine, and marine habitat which provides nesting, breeding, roosting, foraging, perching, and resting areas for a variety of avian, terrestrial, and marine wildlife species.

Rare Plants and Plant Communities

The WDFW Priority Habitats and Species map identifies the onsite wetlands and a biodiversity area along Sequalitchew Creek as priority habitats. An estuarine and marine wetland is mapped within the nearshore areas of Puget Sound. Other priority habitats that are present but not mapped include the instream and riparian habitats along Sequalitchew Creek. (WDFW 2023b)

Endangered, Threatened, Sensitive, and Other Priority Wildlife Species

The WDFW (2023b) Priority Habitats and Species database and the NWIFC (2022) Statewide Integrated Fish Distribution map show no known occurrences of endangered or threatened wildlife species within the Subarea.

None of these areas are within the portions of the subarea designated for development. Threatened and endangered plants that occur in Pierce County are not identified within the subarea.

1.14.2 Impacts

Impacts of both alternatives would be similar as the extent and boundaries of disturbance would be virtually the same.

1.14.2.1 Impacts to Wetlands

No direct impacts to wetlands or their associated buffers are anticipated. All the wetlands on the site are located within Parks, Recreation, and Open Space (PROS) designated areas. Clearing and grading outside of the wetland buffers has the potential to result in an increase in sediment reaching the wetlands if stormwater runoff were to reach the wetlands, however, because stormwater management would be by infiltration, this is unlikely. Best management practices would be employed to control erosion and sediment in the vicinity of the wetlands, and it is unlikely any significant impact to the wetlands would occur under the proposed alternative.

Operational impacts on wetlands would likely be minor. Wetlands would be subject to City of DuPont critical area regulations. Encroachment on wetlands and wetland buffers from buildings, landscaped areas, and access roadways would not be allowed. Some increase in human access to the wetlands and associated disturbance would be anticipated because of increased human activity in the vicinity. This disturbance is not expected to be significant compared to existing conditions.

1.14.2.2 Impacts to Fish and Aquatic Habitat

Both alternatives would retain Sequelitchew Creek, its associated riparian and estuarine wetlands, and Old Fort Lake and habitat within dedicated open space. An adjoining area of managed open space would be retained as well, allowing only recreational activities, such that no residential, commercial, or civic development would occur within at least 100 feet of the stream or wetlands. Thus, no direct impacts to aquatic and fish habitat would occur. No surface waters are known to occur on the Subarea so future development is unlikely to impact aquatic habitats. No direct impacts to riparian habitat on Sequelitchew Creek or the Puget Sound will occur, and infiltrated stormwater will not have a measurable direct effect on the Sequelitchew Creek or the Puget Sound. Thus, impacts to fish and associated habitat should be minimal under both Subarea alternatives. An increased local population could have indirect impacts on riparian and shoreline habitats. Trails proposed near Sequelitchew Creek and Old Fort Lake would likely increase human presence near those aquatic habitats which may increase disturbance, noise, erosion, and trash in the area. The existing trail near Puget Sound will likely see an increase in usage as the local population increases.

1.14.2.3 Impacts to Stormwater Management and Water Quality Treatment

Development will follow erosion control measures as directed in the Stormwater Management Manual for Western Washington (and associated regulations for the City of DuPont). All stormwater will be infiltrated. As no other stream channels occur on site, infiltration of stormwater will result in no stormwater runoff discharges to Sequelitchew Creek or Old Fort Lake during construction.

1.14.2.4 Impacts to Vegetation

Development of the Old Fort Lake Subarea site under the proposed alternative would convert much of the existing early successional forest vegetation communities. Existing vegetation would be replaced by buildings, roads, and other impervious surfaces, as well as non-native plantings. The proposed development under this alternative would result in disjunct patches of native forest, increasing forest fragmentation on the site and leaving these retained open space areas within or between the various development areas to become more isolated. The retained forest along Sequelitchew Creek would remain connected to off-site forest areas.

The retained open space areas on site would include a network of trails and associated active and passive features such as interpretive signs. These soft surface trails will be added near or within the buffer around Old Fort Lake and Sequelitchew Creek which may require clearing of vegetation. The trails

will increase human disturbances in the areas. Oak woodlands are located within these areas and may be damaged by human disturbances. The existing trail through the shoreline forest will likely be expanded and paved which will result in clearing and increased human disturbances.

1.14.2.5 Impacts to Wildlife

Impacts of construction of either Subarea alternative includes both temporary impacts during construction and longer-term impacts of habitat alteration. Construction related impacts include increases in noise, dust, human activity, temporary disturbance of vegetation for staging areas, potential erosion and sediment transport from exposed soils, and other potential water quality impacts. These can alter animal behavior, causing avoidance of adjoining habitats, alteration of movement and dispersal patterns, abandonment of nest sites, reduced breeding success, and increased mortality.

Direct alteration (removal) of the existing mixture of vegetation communities resulting from construction of these developed areas and associated facilities would affect the distribution and composition of wildlife populations on the project area and vicinity. As previously mentioned, at buildout, the proposed development and associated facilities would remove existing habitat available for wildlife across the project area within areas that are currently early successional forest.

There are several terrestrial state priority habitat and species mapped by WDFW as being located within the city limits: the big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifungus*), and Yuma myotis (*Myotis yumanensis*). There is no evidence that they are present within the subarea.

The species typically favored in urban or urbanizing environments are habitat generalists, some of which are invasive exotic species. Planted ornamentals often support far fewer insect species per unit area than native vegetation due to a smaller amount foliage (less foliage volume) and simpler vegetation structure. Birds in the urban environment primarily forage on the ground while birds in the nearby forest primarily forage in the tree canopy. Landscaped areas along the roadways throughout the development would likely be managed to limit the growth of tall woody vegetation.

Developed landscapes can often facilitate the spread of exotic invasive species (both plants and animals), especially along a linear corridor. No invasive species would be included in the proposed landscaping of the development.

Species that dwell primarily in forested habitats, but can persist in partly urbanized environments, such as chickadees, squirrels, shrews, garter snakes, and some species of amphibians, may persist in the larger open space areas of the site near the Sequalitchew Creek and its associated wetlands as well as near Old Fort Lake, but in smaller numbers. Other native species adapted to a wide range of habitats, or urban environments, such as American robin, American crow, hummingbirds, bushtit, dark-eyed junco, song sparrow, raccoon, and coyote may increase in abundance on the site, especially in developed areas.

Animals that are least tolerant of human disturbance, such as ground- and shrub-nesting birds, ground-dwelling mammals, and carnivores, would be most affected by the proposed development. For areas of native habitat that remain (such as in the open space areas near Sequalitchew Creek and Old Fort Lake), studies have shown that some species may not be able to consistently produce young due to competition from urban-adapted species, habitat fragmentation, or increased exposure to edges (e.g., Donovan et al. 1995, Friesen et al. 1995). Species which tend to occupy forest interior settings may be adversely affected by predation, nest parasitism, and competition with other species under the proposed development.

Populations of reptiles and amphibians, which rely on forest duff, downed logs, snags, and wetlands, would be substantially reduced within developed areas across the site. Existing wetlands and streams on the site will remain intact, but other special habitat features throughout the site and some local dispersal habitat would be eliminated due to increased fragmentation of retained habitats and the introduction of roadways throughout all the dwelling areas.

The clearing, grading, and construction relating from development would separate habitat areas and increase fragmentation. This, together with increased disturbance (e.g., vehicular traffic, human presence throughout the trail systems) may affect movement patterns of some wildlife species, creating a barrier to movements of small mammals, reptiles, and amphibians.

The introduction of a large number of dwellings and activity centers will result in an increased amount of human activity throughout the project site. This includes human presence on trails, driving through the site on developed roads, increased noise at the dwellings, and introduction of foreign materials by occupants. All these activities could lead to avoidance by local wildlife populations and even mortality due to interactions such as vehicular strikes. In addition, an increase in the presence of domestic pets would increase the likelihood of disturbance of retained habitats and potentially affect movements and activities of animals on site. Native species can be adversely impacted by domestic cats and dogs, which can act as “super-predators,” (Leu et al. 2008, Odell and Knight 2001, Penland 1984), particularly with a greater human population at full buildout.

Materials brought on-site by new occupants could have potentially detrimental impacts on local wildlife populations. The use of insecticides by homeowners has been shown to reduce the food resource of insectivorous animal species (Penland 1984), and the introduction of features such as birdfeeders could also lead to an increase in generalist bird species that could compete with previously present populations.

1.14.3 Mitigation

Measures to minimize impacts to wetlands, water quality, and associated vegetation and fish and wildlife habitats both during and after construction include a variety of Best Management Practices (BMPs):

- Designation of construction limits, including staging areas being clearly marked in the field prior to beginning construction activities.
- Marking the limits of wetland buffer areas and designated open space areas on construction plans and in the field to prevent unauthorized damage to critical areas during construction.
- Construction staging areas would be located outside of stream and wetland buffers to minimize impacts to vegetation.
- Avoiding vehicle re-fueling and maintenance activities within wetland and stream buffers, or within at least 100 feet of wetlands and streams.

Long-term mitigation may include:

- Designation of animal movement corridors between areas of retained vegetation can reduce the effects of habitat fragmentation. The golf course can be incorporated into these corridors, especially for nighttime movement. Although the golf course has limited habitat value, it can function as a movement corridor.
- Provision of landscape strips within the road corridors may also include native plants that have some value for wildlife cover and food, where feasible, given considerations of maintaining adequate sight distance for public safety and other applicable road standards.

- All hiking trails could be located outside the wetland and stream buffers and at the edges of large blocks of mature vegetation to avoid further human disturbance to species that remain in those areas.

1.14.4 Significant Unavoidable Adverse Impacts

Removal of a substantial area of the existing native and non-native vegetation and soils and replacement by non-native communities or impervious surfaces outside of the critical areas and their buffers would result in a reduction in the local populations of most native wildlife species in the area, and continuation of a shift in species composition to favor species more adapted to urban environments; those animals displaced from the site would likely perish; and

An increase in disturbance of adjoining areas of native forest and riparian habitat and on adjacent lands as a result of increased human activity, including vehicular traffic, will reduce the productivity of such areas for species that may find them suitable habitat.

Such impacts are typical and unavoidable in the context of urban development.

2. ALTERNATIVES

Two alternatives are proposed to be analyzed for the existing Subarea Plan and Zoning and the Proposed Amendments as recommended by the DuPont Planning Commission as of July 2024.

2.1 NO ACTION/EXISTING SUBAREA PLAN AND ZONING

This alternative presumes continuation of the Existing Comprehensive Plan Subarea policies and Land Use Code regulations. The existing Subarea Plan was adopted in 2017 and is available at:

<https://wa-dupont2.civicplus.com/DocumentCenter/View/6350/Comprehensive-Plan---2017-Appendix-E---Old-Fort-Lake-Subarea-Plan>

The existing zoning for the Subarea is the Mixed Use Village regulations, found in:

<https://www.codepublishing.com/WA/DuPont/html/DuPont25/DuPont2541.html#25.41>

The existing Old Fort Lake Subarea Plan was last amended in 2017 and is included as Appendix E to the Comprehensive Plan.

2.1.1 Existing Subarea Vision and Guiding Principles

The vision for the Old Fort Lake Subarea is to create a mixed-use district that provides a spectrum of future services, recreation, employment, and living options for City of DuPont residents.

The city envisions an Old Fort Lake district that provides additional land use options, protects natural resources, and seamlessly integrates into the city as a whole.

The Subarea Plan was pursued by following specific guiding principles to keep the long-range plan true and aligned to the project vision. These principles were applied to plan elements and helped guide decision making for the Subarea Plan.

- Create opportunities for jobs and employment – The Old Fort Lake area will be developed as an important employment center. Future businesses will provide quality and diverse job opportunities for the DuPont residents.
- Explore opportunities/feasibility for housing – The Subarea is a potential location for residential uses to address future housing needs for the City of DuPont. Housing may be planned within close proximity to future employment uses.
- Recognize and protect existing property rights – The Subarea Plan will acknowledge and retain much of the land use potential established in the 2014 Comprehensive Plan.
- Protect and enhance natural resources – The Subarea plan will inventory existing natural resources and employ protection measures to ensure conservation and enhancement. The Subarea will be responsive to these natural features and will showcase open space areas.
- Protect and provide access to cultural resources – The Subarea Plan will identify known cultural resources and design a community plan that provides conservation and access to these resources. The plan will include protection policies for all cultural resources.
- Recognize and respond to the historical presence of contaminants – The Subarea Plan will acknowledge the presence of site contaminants that were created from previous manufacturing activity. The process will also consider the existing Consent Decree and Restrictive Covenants that

affect future land uses in the Subarea. Some uses are allowed and will develop irrespective of the Restrictive Covenants.

- Provide for complementary uses – The Subarea Plan will identify land uses and amenities that complement future employment uses. Complementing uses could include open space, recreation, and neighborhood commercial.
- Create an interconnected and safe transportation network – The Subarea will be planned with a multi-modal transportation system that is integrated into the existing network of streets, trails, and other facilities. Facilities will be designed to provide for safe connections within the Subarea, adjacent districts, and the region.
- Protect and buffer existing neighborhoods – The Subarea planning process will be mindful to protect existing neighborhoods. In doing so, the plan will apply land use designations, buffer standards, and other development controls to ensure neighborhood compatibility. The plan should manage transportation impacts onto neighborhoods.
- Engage property owners and neighborhoods in the planning process – The planning process will include a community engagement strategy to provide a working partnership with property owners, stakeholders, and the general public.

2.1.2 Geographic Focus Areas

The plan designates four major focus areas shown in Figure 2-1 and described below.

Mixed-Use Focus Area

In the western part of the Subarea, the development blocks near the bluff are envisioned as a Mixed-Use Focus Area to provide uses complementary to the golf course, the bluff, and adjacent neighborhoods. The Mixed-Use Focus Area is planned to support a variety of commercial, business, residential, and community uses. The area will develop with a community character and building design style that are sensitive to views around the golf course and the bluff. The desire is for a portion of the Mixed-Use Focus Area to develop as a walkable neighborhood center with a cluster of retail stores, dining, employment, service, and multifamily uses. Other portions of the area may develop as independent employment campuses and modestly sized residential neighborhoods. The Mixed-Use Focus Area provides access to the open space areas lining the bluff.

Business/Industry Focus Area

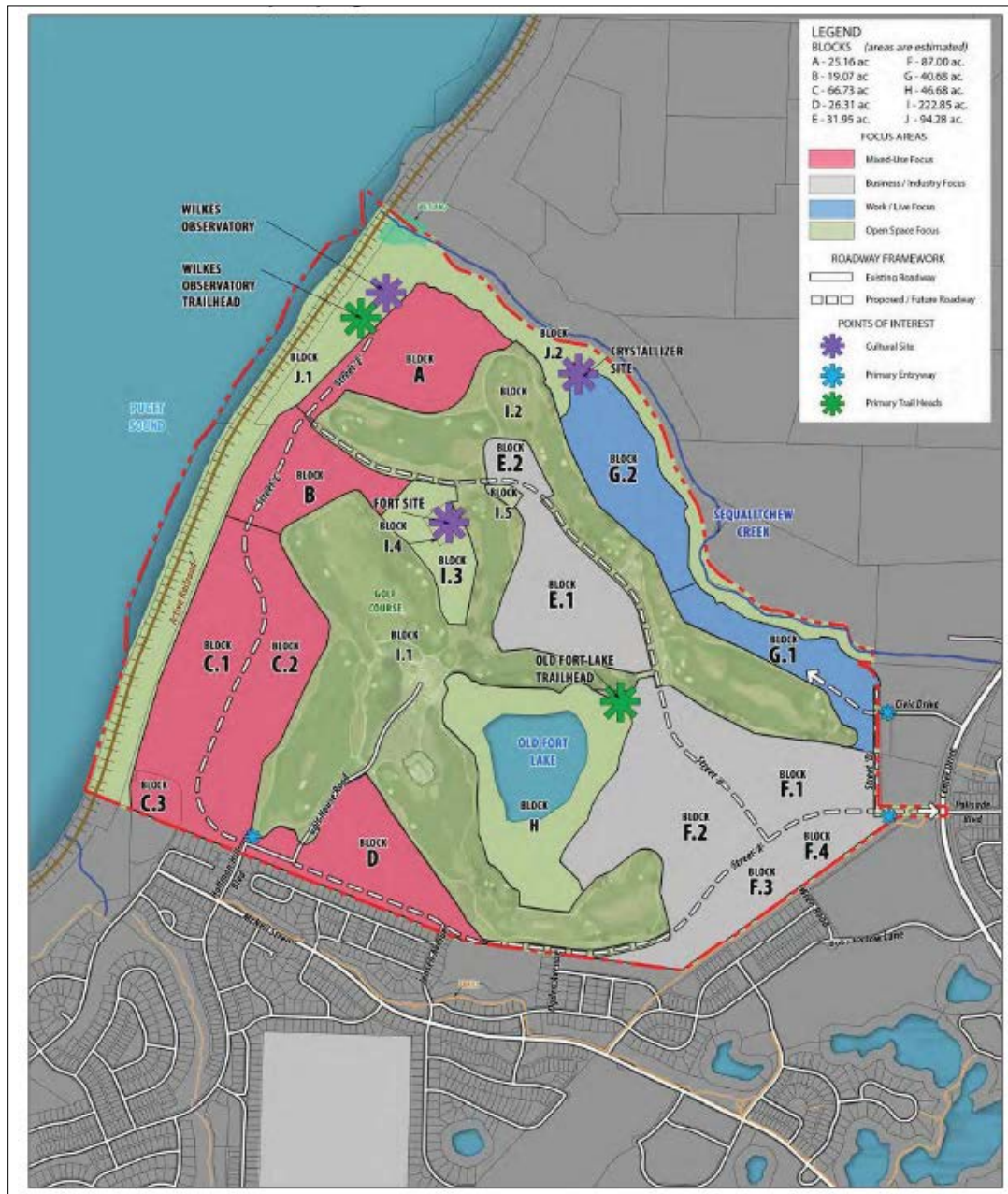
The eastern and central portion of the Subarea adjacent to Old Fort Lake Subarea are envisioned as the Business/Industry Focus Area, given its transportation access and buffering potential from surrounding neighborhoods. The Business/Industry Focus Area is planned to support a variety of employment uses. The area will develop as a business park setting with planted landscape buffering and well-designed buildings with street-facing facades. The Business/Industry Focus Area provides access to the open space areas surrounding Old Fort Lake.

Work/Live Focus Area

The development blocks located parallel to Sequatchew Creek are envisioned as the Work/Live Focus Area. This focus area is planned to support future employment uses, cultural facilities, and complementary workforce housing for the Subarea. The Work/Live Focus Area is adjacent to the Civic Center and a future mixed-use district. Some commercial uses may complement and act as an extension to these adjacent areas. The Work/Live Focus Area provides access to the open space areas lining the creek.

The golf course and several conservation blocks are envisioned to comprise the Open Space Focus Area. These areas are envisioned to remain as unimproved open spaces or recreational assets. The areas along the bluff, along Sequelitchew Creek, and around Old Fort Lake will remain passive open space. The golf course and related properties are designated as the recreational centerpiece for the Subarea. The Open Space Focus Area anticipates that the city's cultural sites, the Wilkes Observatory and Fort Nisqually, may be enhanced with historical markets, shelters, and/or informational centers to showcase their significance to DuPont's heritage and culture.

Figure 2-1 Existing Subarea Plan



2.1.3 Housing

The plan recognized an opportunity to introduce additional housing in the Subarea to complement the future employment uses that will occupy the site, despite the fact that the plan acknowledged that the Subarea is presently limited by a consent decree and restrictive covenants that place a prohibition on residential, school, and parks development in the Subarea. The city envisioned that future discussions to applicable parties to lift some of the restrictions on the Old Fort Lake Subarea would result in making it possible to include housing and parks in the Subarea making the area more consistent with the rest of the city's development patterns. The city also established separate density limits for multifamily and single-family as part of new land development regulations.

2.1.4 Existing Subarea Plan Goals

Land Use

- Goal LU-1 Strategically plan for growth so that as Old Fort Lake develops, it continues the small-town character of the city by protecting and enhancing development patterns.
- Goal LU-2 Plan for a wide variety of mixed uses while preserving access and views of the bluffs, Puget Sound, and natural areas.
- Goal LU-3 Provide family wage employment by promoting industrial facilities in the Subarea.
- Goal LU-4 Provide future employment uses and housing for the Old Fort Lake Subarea.
- Goal LU-5 Establish/amend land development standards to implement the vision for Old Fort Lake.

Open Space and Recreation

- Goal OSR-1 Evolve Old Fort Lake into a centerpiece of the Old Fort Lake Subarea and a premier recreational opportunity for DuPont residents.
- Goal OSR-2 Create a high quality, attractive, and well-connected trail system that is highly accessible to the DuPont community.
- Goal OSR-3 Preserve and enhance open space areas.

Historic and Cultural Resources

- Goal CR-1 Protect cultural resources by implementing regulations that ensure cultural resources will not be destroyed, damaged, or disregarded during the development process.

Transportation

- Goal T-1 Provide a robust multi-modal transportation network that serves a variety of users.
- Goal T-2 Provide excellent street design that complements desired future land uses and reflects community values.
- Goal T-3 Plan a well-connected and efficient road network.

Capital Facilities and Utilities

- Goal CF-1 Plan for the provision and development of roads, water system, wastewater and storm drainage systems, parks, civic facilities and police and fire protection that are adequate to meet the needs of the Subarea at full development.
- Goal CF-2 Ensure that public facilities necessary to support new development are available and adequate concurrent with the development.
- Goal CF-3 Celebrate the Subarea's cultural sites through enhancement and education.

- Goal U-1 Ensure utilities are available for development.
- Goal U-2 Provide adequate sanitary sewer system concurrent with development.
- Goal U-3 Provide potable water to the Subarea.
- Goal U-4 Minimize erosion by enforcing stormwater management from start of development through completion of development.

Community Character

- Goal CC-1 Develop buildings that are attractive and project a welcoming appearance to pedestrians, customers, and the residents of DuPont.
- Goal CC-2 Create attractive streetscapes that accommodate a variety of users including motorists, bicyclists, and pedestrians.
- Goal CC-3 Create signage and wayfinding with the Subarea that has a coordinated, thematic design that provide helpful and effective orientation to site amenities and destinations.

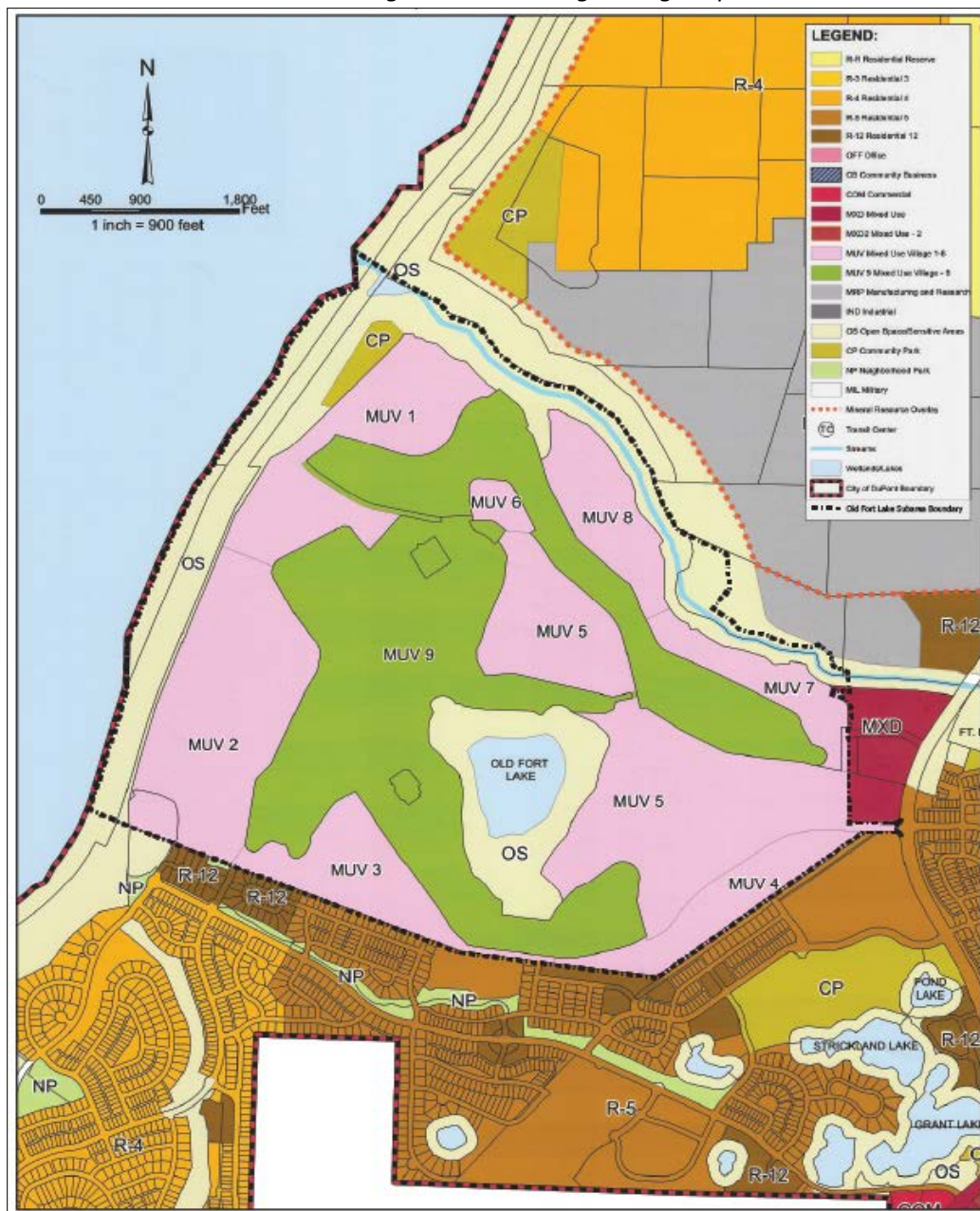
2.1.5 Land Use Designations

The city created a new set of regulations in a new subsection of the Land Use Code for the Old Lake Subarea that implemented the Subarea Plan. The Mixed Use Village designations were created and designated in the map in Figure 2-2.

- (1) MUV-1: This subdistrict is intended to support a mix of uses that includes neighborhood-oriented commercial/restaurant uses, hotel, housing, public/community uses, office, light manufacturing, and research and development.
- (2) MUV-2. This subdistrict is intended to support a mix of uses that includes neighborhood-oriented commercial/restaurant uses, hotel, housing, office, light manufacturing, and research and development.
- (3) MUV-3. This subdistrict is intended to support a mix of uses that includes neighborhood-oriented commercial/restaurant uses, multifamily housing, public/community uses, office, light manufacturing, and research and development.
- (4) MUV-4. This subdistrict is intended to support smaller-scale employment and neighborhood-oriented commercial/restaurant uses. The subdistrict is intended to develop with appropriate buffering and building-scale limitations to ensure compatibility with the nearby residential and school properties.
- (5) MUV-5. This subdistrict is intended to be a primary employment area that allows office, light manufacturing, and research and development.
- (6) MUV-6. This subdistrict is intended to be a primary employment area that allows office, light manufacturing, and research and development. This subdistrict also supports specialty commercial/restaurant uses.
- (7) MUV-7. This subdistrict is intended to support a mix of uses that includes neighborhood-oriented commercial/restaurant uses, community/cultural uses, office, light manufacturing, and research and development.

- (8) MUV-8. This subdistrict is intended to be an employment area with supportive residential that allows office, light manufacturing, research and development, community/cultural uses, and multifamily housing.
- (9) MUV-9. This subdistrict is intended to support active recreation and supporting land uses such as commercial/restaurant, administrative office, and hotels.

Figure 2-2 Existing Zoning Map



Allowed use regulations allowed office and research and development uses in all districts in accordance with the focus of the area, allowed retail and service in fewer and allowed residential uses only in the far westerly Mixed-Use Focus Area/MUV-1, 2 and the far northerly Work/Live Focus Area/MUV 7.

Table 2-1 25.41.020(a) Existing Old Fort Lake Subarea Allowed Use Table

LEGEND: P = Permitted Use C = Conditional Use A = Accessory Use Blank = Use Not Allowed									
NOTES: (a) - Uses may be further defined, restricted, and/or limited in an approved master plan.									
Land Use MUV Subdistrict	MUV-1	MUV-2	MUV-3	MUV-4	MUV-5	MUV-6	MUV-7	MUV-8	MUV-9
Open space/passive recreation ⁽¹⁾	A	A	A	A	A	A	A	A	P
Commercial recreation facilities such as golf, tennis, swimming and all indoor commercial recreation facilities ⁽¹⁾	P	P	P	P	A	P	P		P
Service businesses	P	P	P	P	P	P	P		A
Retail trade (individual tenant spaces up to 20,000 sf)	P	P	P	P	A	P	P	A	A
Retail trade (individual tenant spaces over 20,000 sf)	C	C	C	C		C	C		C
Restaurant and drinking establishments	P	P	P	P	A	P	P		A
Hotel (up to 150 rooms)	P	P							P
Hotel (over 150 rooms)	P	P							C
Multifamily residences ⁽¹⁾	P	P	P					P	
Single-family residences ⁽¹⁾	P	P							
Family day care	P	P	P						
Child day care centers ⁽¹⁾	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C	
Home occupations	A	A	A					A	
Convention center	P		P						A
Cultural/community center ⁽¹⁾	P		P	P			P	P	P

LEGEND: P = Permitted Use C = Conditional Use A = Accessory Use Blank = Use Not Allowed									
NOTES: (a) - Uses may be further defined, restricted, and/or limited in an approved master plan.									
Land Use MUV Subdistrict	MUV-1	MUV-2	MUV-3	MUV-4	MUV-5	MUV-6	MUV-7	MUV-8	MUV-9
Public uses other than parks and K-12 schools ⁽¹⁾	P		P	P					A
Office	P	P	P	P	P	P	P	P	A
Light manufacturing (up to 200,000 sf)	P	P	P	P	P	P	P	P	
Light manufacturing (over 200,000 sf)	C	C	C		C	C	C	C	
Research and development	P	P	P	P	P	P	P	P	
Utility facility	P	P	P	P	P	P	P	P	A
Wireless communication facility, attached	A	A	A	A	A	A	A	A	A
Educational institutions ⁽¹⁾	P	P	P	P					A

(1) The following uses and development types are specifically prohibited in all MUV subdistricts:

- (a) Drive-through facilities.
- (b) Gas stations/car washes.
- (c) Fish processing and other animal rendering operations.
- (d) Vehicle sales.
- (e) Service businesses such as wrecking yards, bulk fuel distributors, automotive repair, heavy equipment repair, mini-storage and like uses are prohibited.
- (f) Adult entertainment.
- (g) Warehouse/distribution

2.1.6 Dimensional and Design Standards

Dimensional standards were adopted specific to single-family and multifamily and for non-residential uses floor area ratio (FAR) restrictions were adopted that relate building area to lot area.

25.41.030 Maximum residential density

(1) Multifamily Residences.

- (a) Multifamily residential shall be limited to 24 dwelling units per gross acre. The area used for calculating the allowable density shall be based on the lot/parcel used for the residential development. The community development director, or designee, may interpret the land area used for density calculation. The total MUV subdistricts shall be limited to 1,000 multifamily dwelling units. The city shall maintain a ledger of approved multifamily dwelling units in determining whether multifamily dwelling units are available for future development.

(2) Single-Family Residences.

- (a) Single-family residences shall be limited to three dwelling units per gross acre. The area used for calculating the allowable density shall be based on the lot/parcel used for the residential development; the density calculation may be based on the area prior to platting individual single-family lots. The community development director, or designee, may interpret the land area used for density calculation.
- (b) The total MUV subdistricts shall be limited to 100 single-family dwelling units. The city shall maintain a ledger of approved single-family dwelling units in determining whether single-family dwelling units are available for future development.

25.41.040 Maximum nonresidential floor area ratio (FAR).

- (1) Nonresidential uses shall have a maximum FAR of 0.30.
- (2) The area used for calculating the allowable FAR shall be based on the lot/parcel used for the nonresidential development. The community development director, or designee, may interpret the land area used for calculation.
- (3) For mixed use building, the portions of the building devoted for residential dwellings and their ancillary uses shall be exempt from FAR standards.
- (4) Nonresidential uses may seek an intensity bonus up to a maximum FAR of 0.40 through an approved master plan

Dimensional standards were adopted that were similar among most of the zoning districts, but based on use with specific transition standards for uses adjacent to residential districts and the golf course.

Table 2-2 DMC Table 25.41.050(a) Existing Old Fort Lake Subarea Dimensional Standards

Standard MUV Subdistricts	MUV-1, MUV-2, and MUV-3	MUV-4, MUV-5, MUV-6, MUV-7 and MUV-8	MUV-9
Setbacks: Note: Front setbacks may be reduced or omitted to comply with applicable design regulations and guidelines as set forth in this chapter.	Single-Family: Front: 20 feet Side: 5 feet Rear: 10 feet Abutting a golf course: 20 feet Multifamily: Front: 20 feet Side: 10 feet Rear: 10 feet Abutting a golf course: 20 feet Nonresidential:⁽¹⁾	Nonresidential:⁽¹⁾ Front: 25 feet Side: 25 feet Rear: 25 feet Abutting a golf course: 30 feet <i>PLUS</i> Any building wall over 40 feet high shall be set back at least an additional one foot for each foot in height over 40 feet.	Multifamily: Front: 20 feet Side: 10 feet Rear: 10 feet Abutting a golf course: 20 feet Nonresidential:⁽¹⁾ Front: 20 feet Side: 10 feet Rear: 10 feet Abutting a golf course: 20 feet

Standard MUV Subdistricts	MUV-1, MUV-2, and MUV-3	MUV-4, MUV-5, MUV-6, MUV-7 and MUV-8	MUV-9
	Front: 10 feet Side: 10 feet Rear: 10 feet Abutting a golf course: 20 feet		
Height: Note: Mechanical equipment and its screening shall not be included in height calculation. When considering mechanical equipment, DMC 25.05.040, Rules of interpretation, shall be applied.	Single-Family: Building height shall not exceed 35 feet in height. Multifamily: Building height shall not exceed 55 feet in height. Nonresidential and mixed use buildings: Building height shall not exceed 65 feet in height. <i>PLUS</i> Any portion of a building located within 150 feet of a residential district shall be limited to 35 feet in height. <i>PLUS</i> Any portion of a building located within 50 feet of a golf course shall be limited to 35 feet in height.	Nonresidential: Building height shall not exceed 65 feet in height. <i>PLUS</i> Any portion of a building located within 150 feet of a residential district shall be limited to 35 feet in height. <i>PLUS</i> Any portion of a building located within 50 feet of a golf course shall be limited to 35 feet in height.	Multifamily: Building height shall not exceed 55 feet in height. Nonresidential and mixed-use buildings: Building height shall not exceed 65 feet in height. <i>PLUS</i> Any portion of a building located within 50 feet of a golf course shall be limited to 35 feet in height.
Lot Area:	Single-Family: Minimum 5,000 square feet Multifamily:	Nonresidential: There shall be no minimum lot area.	Multifamily: There shall be no minimum lot area.

Standard MUV Subdistricts	MUV-1, MUV-2, and MUV-3	MUV-4, MUV-5, MUV-6, MUV-7 and MUV-8	MUV-9
	There shall be no minimum lot area. Nonresidential and mixed-use buildings: There shall be no minimum lot area.		Nonresidential and mixed-use buildings: There shall be no minimum lot area.
Lot Coverage:	There shall be no maximum lot area coverage except as necessary to meet setback and landscaping requirements.	There shall be no maximum lot area coverage except as necessary to meet setback and landscaping requirements.	There shall be no maximum lot area coverage except as necessary to meet setback and landscaping requirements.
Notes: ⁽¹⁾ The design standards in DMC 25.41.060 (3) shall apply in addition to the dimensional standards.			

One proposal has been submitted under the existing regulations for four buildings of 723,000 square feet devoted primarily to light manufacturing on 102 acres of the Subarea. The project is vested for consideration under the existing regulations but has not completed review as the applicant has suspended review pending completion of the proposed Subarea Plan and zoning amendments.

2.2 PROPOSED SUBAREA PLAN AND ZONING AMENDMENTS

This alternative includes a set of integrated amendments to the Subarea Plan policies and Land Use Code regulations.

The proposed Subarea Plan is available at:

<https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>

The proposed zoning amendments for the subarea are available at:

<https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>

2.2.1 Moratorium

The Subarea Plan update is the result of a City Council moratorium on development in the Subarea which in part was intended to consider additional housing to meet the City's regional housing target, area for parks and recreational uses, and design standards. The major emphasis of the proposed Subarea Plan and zoning code amendments is to develop the Subarea as a residential community rather than as primarily an employment center.

2.2.2 Proposed Subarea Plan Goals

Land Use

- Goal LU-1 Plan for public amenities such as parks and trails that take advantage of Puget Sound views and provide connections to historic and cultural resource areas. Ensure that the bluff trail and viewpoints are accessible to all.
- Goal LU-2 Strategically plan for a range of sustainable commercial and entertainment-related uses that provide jobs and offer goods and services that respond to the needs of the City's residents while drawing visitors.
- Goal LU-3 Plan for civic and public uses that support the public health, safety and welfare of the Subarea.
- Goal LU-4 Minimize nuisances and impacts to protect residential uses and adjacent properties.
- Goal LU-5 Promote sustainable and energy-efficient site and building design.
- Goal LU-6 Plan for a range of uses in the Subarea while recognizing the environmental constraints associated with the Department of Ecology Consent Decree.

One of the implications of the primarily residential use of the Subarea under the proposed residential and recreational uses in the proposed amendment is that the current restrictive covenants on the property that limit use to non-residential use will have to be revised which indicates that some cleanup and remediation to residential standards will be required where sampling indicates that materials exceed the levels deemed to be safe to protect human health and specifically where there is a likelihood of children having sustained access to soils.

The State Department of Ecology has the jurisdiction to require that a property previously zoned up to industrial standards is cleaned up to a more stringent applicable standard as a condition of conversion to nonindustrial use (RCW 70A.305.030(2)(f)).

The responsibility for cleanup of this site to residential land use (unrestricted per Ecology nomenclature) is solely the responsibility of the owner proposing the use. The City of DuPont has no formal role in such cleanup, however the successful implementation of the plan and zoning amendments require the cleanup and remediation. Refer to the Hazardous Materials section for more detail.

Housing

- Goal H-1 Strategically plan for a range of housing types and densities that meets the state-mandated growth targets while protecting DuPont's high quality of life and community character.
- Goal H-2 Develop new zoning and design standards for housing that conform to the requirements of Washington State legislation while reflecting the City's existing residential character.

The implications of this goal include meeting state law requirements for allowing duplexes on detached single-family lots and in accommodating middle housing, which may include a variety of attached housing types.

Goal H-3 Conform to the DuPont Comprehensive Plan Housing Element Goals and Policies specifically for housing affordability, housing supply and inventory, social equity, and population growth.

Community Character

- Goal CC-1 Promote pedestrian-oriented development that builds on DuPont's existing design character and responds to Old Fort Lake's unique physical, historical, and cultural context.
- Goal CC-2 Create attractive streetscapes that accommodate a variety of multimodal uses.
- Goal CC-3 Create signage and wayfinding with the Subarea that has a coordinated, thematic design that provide helpful and effective orientation to site amenities and destinations.
- Goal CC-4 Encourage the practice and visibility of sustainable approaches to site and building design.

Open Space and Recreation

- Goal OSR-1 Evolve Old Fort Lake into an attractive and usable centerpiece of the Old Fort Lake Subarea for the quiet enjoyment of nature in a way that is respectful to the environment and community.
- Goal OSR-2 Create a high quality, attractive, and integrated multi-modal trail system that capitalizes on view opportunities of the bluff and golf course, connects cultural resource areas, that are highly accessible to everyone and are connected to the DuPont community.
- Goal OSR-3 Develop and improve recreation and open space areas for healthy ecosystem and opportunities for public recreation and enjoyment.

Historic and Cultural Resources

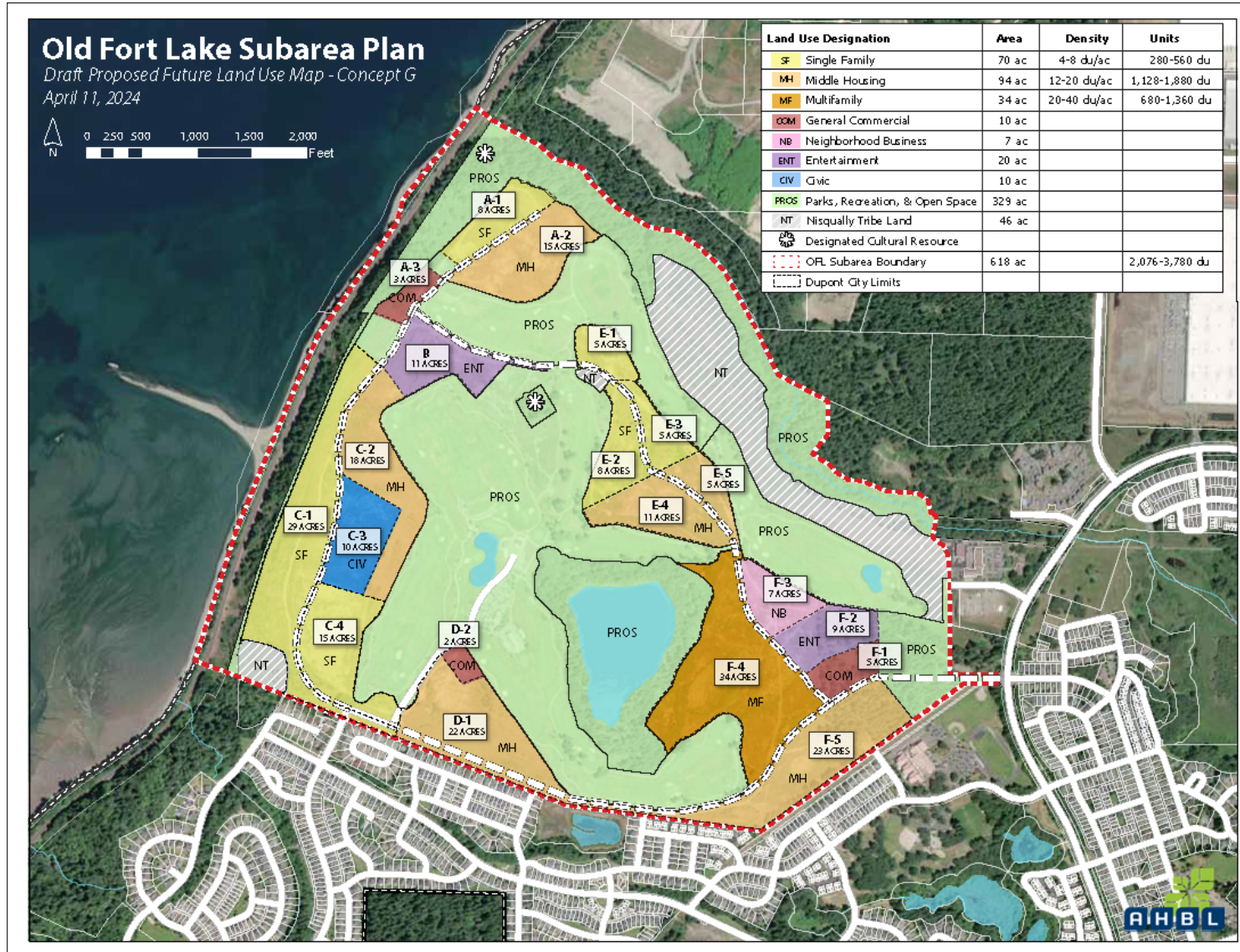
- Goal CR-1 Protect cultural and historic resources within the Old Fort Lake Subarea to ensure cultural resources, historical sites and artifacts will be protected and preserved.
- Goal CR-2 Educate and communicate the Old Fort Lake Subarea's unique and rich history through physical and visual storytelling methods.
- Goal CR-3 Enhance and improve public accessibility and enjoyment of historic and cultural sites.

Utilities

- Goal U-1 Ensure utilities are available for development.
- Goal U-2 Provide adequate sanitary sewer system concurrent with development.
- Goal U-3 Provide potable water to the Subarea.
- Goal U-4 Minimize erosion by enforcing stormwater management from start through completion of development.

Subarea Plan designations are shown on the map in Figure 2-3 and include the following land use categories that are discussed in greater detail below under "Land Use Code." The plan provides for 70 acres of single-family residential, 94 acres of middle housing, 34 acres of multifamily, 10 acres of General Commercial, 7 acres of Neighborhood Business, 20 acres of an Entertainment district and 10 acres of Civic designation which is anticipated to be a school site.

Figure 2-3 Proposed Land Use Designation Map



2.2.3 Land Use Code

The Subarea Plan goals are implemented through DMC 25.58, Old Fort Lake Districts and DMC 25.71 Old Fort Lake Design Standards, new subsections of the DuPont Land Use Code, and are described in the following sections.

25.58.030 Zoning District Descriptions

- 1) Single-Family (SF): This zoning designation intends to provide for detached single-family and duplex uses at a base density of two units per lot. Attached units can be on their own fee-simple lot, or all on one lot.
- 2) Middle Housing (MH): This zoning designation intends to provide for attached housing types from two to six units that meet the definition of Middle Housing in DMC 25.10 Definitions. Attached units can be on their own fee-simple lot, or all on one lot.
- 3) Multifamily (MF): This zoning designation intends to provide for higher density housing in buildings greater than 6 units. The buildings may be no taller than 50 feet, not including underground parking structures. No more than 200 units are permitted per building.
- 4) Neighborhood Business (NB): This zoning designation is intended to provide for smaller scale commercial type uses that serve the Subarea and city residents, such as retail and restaurants, personal service uses, light manufacturing buildings no greater than 50,000 SF, professional and medical offices and banks and credit unions.
- 5) Commercial (COMM): This zoning designation is intended to provide for higher intensity commercial uses such as retail spaces, restaurants, commercial recreation that may draw from a larger region.
- 6) Entertainment (ENT): This zoning designation is intended to provide for entertainment and recreation type uses such as hotels, commercial recreation, retail, restaurants, community and cultural centers. These uses may draw visitors from the region and serve to support the adjacent golf course use.
- 7) Civic (CIV): This zoning designation is intended to provide for public and quasi-public uses such as schools, public parks, convention centers, community and cultural centers, churches and public utilities.
- 8) Parks, Recreation and Open Space (PROS): This zoning designation is intended to provide for recreational uses and open space that implement the goals and policies of the Subarea Plan.

In addition, approximately 46 acres of land within the Subarea is owned by the Nisqually Tribe and has not been allocated a future land use or zoning designation. When development of the Tribe's property is planned, the Old Fort Lake Subarea Plan will need to be amended and a zoning designation determined through a public process. Figure 2-3 contains the map of zoning districts.

25.71.120 Permitted Uses

A. Use Regulations

- 1) Land uses allowed within the Old Fort Lake Subarea are identified in Table 25.58.050(A).
 - (a) A "P" in Table 25.58.050 (a) indicates that the specific use is a permitted use.

- (b) An “A” in Table 25.58.050 (a) indicates that the specific use is permitted as an accessory use to other uses within the district. Where an “A,” a slash (/), and a letter are displayed in the table (e.g., A/P), the use may be permitted as an accessory use or established as a standalone use subject to the corresponding review procedure (indicated by the “P” or “C”).
- (c) A “C” in Table 25.58.050 (a) indicates that the specific use is a conditional use.
- (d) A blank in Table 25.58.050 (a) indicates that the specific use is prohibited in the subdistrict.

Table 2-3 Proposed DMC 25.58.050(A) Old Fort Lake Subarea Permitted Uses

Use Type	Zoning Districts							
	SF	MH	MF	NB	ENT	COM	CIV	PROS
Residential Use Types								
Detached Single-Family	P							
Duplex	P	P						
Accessory Dwelling Unit(s)	P							
Middle Housing		P						
Multifamily (Apartments)(no more than 200 units per building)			P					
Assisted Living facility			C					
Adult retirement community	C	C	P					
Adult Family Homes	P	P	P					
Home occupations	A	A	A					
Family day care	P	P	P					
Civic/Public Use Types								
Schools	C	C	C				P	
Churches	C	C	C				P	

Use Type	Zoning Districts							
	SF	MH	MF	NB	ENT	COM	CIV	PROS
Public Parks, Open Space and Recreation ¹							P	P
Public Uses other than Parks and schools							P	C
Convention Center					A		P	
Community and Cultural Services less than 30,000 SF				P	P		P	C
Electric Vehicle Charging Stations	P	P	P	P	P	P	P	P
Public Utilities	P	P	P	P	P	P	P	P
Quasi-Public Uses				P			P	
Wireless Communication Facilities	C	C	C	C	C	C	C	
Small Cell Facility	C	C	C	C	C	C	C	
Wireless Communication Facilities, attached	A	A	A	A	A	A	A	A
Accessory Wireless Communications Antennas	A	A	A	A	A	A	A	A
Office/Neighborhood Business Use Types								
Light Manufacturing (up to 50,000 SF)				P		C		
Research and Development				P		C		
Nursing Homes with up to 180 beds			C	P				

(1) Parks, recreation, and open space associated/required for residential development per the DMC, are permitted in the associated zoning districts for those types of uses.

Use Type	Zoning Districts							
	SF	MH	MF	NB	ENT	COM	CIV	PROS
Office				P		C		
Clinics				P		C		
Personal Services				P		P		
Automotive Repair				P		C		
Banks and Credit Unions				P		P		
Commercial Use Types								
Commercial Indoor and Outdoor Recreation			C	P	P	P		C
Automobile service station				C				
Retail Establishment (individual tenant				P	P	P	P	
Retail Establishment (individual tenant				C	C	P		
Restaurants				P	P	P	P	
Restaurants with drive thru window (see				C	C	C		
Food/Beverage Truck				P	P	P	P	P
Taverns				P	P	P		
Brewery				P	P	P		
Hotel (up to 150 rooms)					P			
Hotel (over 150 rooms)					C	C		
Child Day Care Centers				A/P	A/P	A/P	A/P	

- (2) The following uses and development types are prohibited in the Old Fort Lake Subarea:
- (a) Drive-through facilities without seating for at least 15 percent of the restaurants total floor area
 - (c) Fish processing and other animal rendering operations.
 - (d) Vehicle sales.

- (e) Businesses such as wrecking yards, bulk fuel distributors, heavy equipment repair, mini-storage and like uses are prohibited.
- (f) Adult motel, adult motion picture theater, or adult cabaret.
- (g) Warehouse/distribution.

2.2.4 Dimensional Standards

New proposed dimensional standards for the Subarea are under DMC 25.58.060 and described below.

Table 2-4 Proposed DMC 25.58.060(A) Old Fort Lake Subarea Dimensional Standards

Zoning District	Maximum Building Height*	Front Yard Setback	Side Yard Setback	Rear Yard Setback
Single-Family (SF)	35 feet	See DMC 25.71.570(5)	See DMC 25.71.570(5)	See DMC 25.71.570(5)
Middle Housing (MH)	35 feet	See DMC 25.71.570(5)	See DMC 25.71.570(5)	See DMC 25.71.570(5)
Multifamily (MF)	50 feet	Depending on block frontage type, see DMC 25.71.310	See DMC Table 25.71.320.A	See DMC Table 25.71.320.A
Neighborhood Business (NB)	45 feet	Depending on block frontage type, see DMC 25.71.310	See DMC Table 25.71.320.A	See DMC Table 25.71.320.A
Commercial (COMM)	45 feet	Depending on block frontage type, see DMC 25.71.310	See DMC Table 25.71.320.A	See DMC Table 25.71.320.A
Entertainment (ENT)	45 feet; Hotels may be 50 feet	Depending on block frontage type, see DMC 25.71.310	See DMC Table 25.71.320.A	See DMC Table 25.71.320.A
Civic (CIV)	45 feet	Depending on block frontage type, see DMC 25.71.310	See DMC Table 25.71.320.A	See DMC Table 25.71.320.A
Parks, Recreation and Open Space	35 feet	Depending on block frontage type, see DMC 25.71.310	See DMC Table 25.71.320.A	See DMC Table 25.71.320.A

*Height of a building does not include underground structured parking. Height is measured as defined in DMC 25.10.080.035. In the Old Fort Lake Subarea, the height of a building is inclusive of rooftop mechanical equipment.

2.2.5 Design Standards

New Subarea design standards are contained in DMC 25.71.200 through 590 and described below. The Subarea design standards (currently in draft form) can be viewed at:

<https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>

Location of Streets, Trails, and Parks

DMC 25.71.200 provides standards for the location of future streets, through-block connections, parks, and trails, and requires they be developed in accordance with the conceptual network mapped in Figure 2-4.

Figure 2-4 DMC Figure 25.71.220.A Street, Trail, and Park Locations Concept Map



Streetscapes

DMC Section 25.71.200 provides regulations for future streetscape design standards. These provisions include street type classifications and cross sections specific to surrounding land uses.

These are available (currently in draft form) at: <https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>

Nonresidential and Multifamily

DMC Section 25.71.300 provide nonresidential and multifamily design standards. These standards are intended to create an integrated neighborhood design for commercial and multifamily development and provide regulations for block frontages, building setbacks and orientation, vehicle parking, landscaping, screening, façade articulation, amenity spaces, pedestrian access and circulation, and lighting.

These are available (currently in draft form) at: <https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>

Single-Family and Middle Housing

Sections 21.70.500 through 21.70.590 address common standards for detached single-family dwellings and middle housing. Middle housing in DuPont consists of buildings that are compatible in scale, form, and character with single-family houses and contain two or more attached, stacked, or clustered homes including duplexes, triplexes, fourplexes, fiveplexes, sixplexes, townhouses, stacked flats, and cottage housing.

Recent state law provides that design regulations for middle housing can't be more stringent than the regulations a jurisdiction places on single-family residential uses. One significant feature of these code provisions is that lot size is defined by maximum lot coverage standards. A house with 1,000 square feet of lot coverage could be located on a lot 2,500 square feet in size. Existing lots in DuPont with zero lot line configurations are typically about 4,000 square feet. Lot sizes for single-family detached homes generally range from about 6,000 square feet to around 9,000 square feet. The same provisions apply to middle housing which generally have smaller per unit footprints and therefore smaller lot area per unit.

Other design standards relate to setbacks, entries and weather protection, driveway access and garage standards, façade design and minimum useable open space in yards for single-family and duplex lots.

3. ELEMENTS OF THE HUMAN ENVIRONMENT

3.1 LAND USE

3.1.1 Affected Environment

Historically, DuPont and the surrounding area have been used by native tribes known collectively as Salish people. The Sequalitchew Band, one of the 13 bands of the Nisqually Tribe, lived where the creek met the Puget Sound. The village consisted of two cedar plank longhouses and had a population of around 50 people, and was located next to freshwater and above the tide line. There is also a midden above the bluff indicating a possible village site at that location. Their burial grounds were further above the bluff. DuPont is a landscape of deep and enduring significance to native peoples including Puget Sound and shorelands and tidelands to the west, forested uplands, glacial outwash prairies, and an interconnected system of glacially created wetlands oriented along Sequalitchew Creek, a salmon bearing stream as well as numerous glacial kettles containing lakes and wetlands. This landscape sustained native people for countless generations through fishing, gathering, and sheltering villages (Lyday 2021).

In 1832 the British Hudson's Bay Company's established a 15 by 20 feet warehouse for blankets, seeds, and potatoes at the mouth of Sequalitchew Creek where there was a native village. In 1833 Fort Nisqually was established as a trading post on the terrace above Puget Sound and south of the creek. In 1840, the Puget Sound Agricultural Company was formed as a subsidiary of the Hudson Bay Company to supply food to Hudson Bay installations and to provide supplies for the Russian-American Company in Alaska. In 1843, the fort was moved 2-miles to the east to be closer to Edmonds Marsh and Sequalitchew Creek for better access to a water source and timber. By 1845 the fort had a herd of cattle of over 2,000 in 1845 and a flock of 6,000 sheep.

In 1839: Nisqually Methodist Episcopal Mission was established north of Sequalitchew Creek bringing the first U.S. citizens into the Puget Sound region near the creek canyon. In 1841 the US Wilkes Exploring Expedition set up an observatory on the bluff near the creek to survey, map and chart the waters of Puget Sound. They joined the Americans at the mission to hold the first Fourth of July celebration west of the Mississippi River.

In 1906, the E.I. du Pont de Nemours Company purchased the Fort Nisqually property and began construction of a munitions and explosives plant, which operated from 1909 to 1976. By 1959, the plant had produced over 1 billion pounds of explosives. Its powders were used for expansion of the railroad system and to clear fields for farming in the region. The company established a company town in 1909 for its workers. The DuPont company owned all the houses in the village until 1951, when the company began selling the houses to the workers. The residents chose to incorporate it as the town of DuPont, Washington.

Camp Lewis was established in 1917 with the passage of a Pierce County bond measure to purchase 70,000 acres (125 square miles) of land to donate to the federal government for permanent use as a military installation. In 1927, Pierce County passed another bond measure to establish a military airfield just north of Fort Lewis. The airfield was renamed McChord Field in 1940. McChord Field was separated from Fort Lewis when the U.S. Air Force was created in 1947, and was subsequently renamed McChord Air Force Base. The two units were merged in 2010 into a Joint Base.

Weyerhaeuser bought the 3,200-acre plant site in 1976 from the DuPont Company, and originally intended to use the property as the site for a wood products export facility. The market for lumber declined in the early 1980s and Weyerhaeuser changed its focus to land development. In 1989, the City Council approved plans for the construction of Weyerhaeuser's Northwest Landing, a residential, commercial and industrial development. Northwest Landing includes many housing types, including single-family homes, zero-lot-line houses, cottages, duplexes, and fourplexes. The design reflects the distinctive northwest cottage style resonant with the historic DuPont Village. Northwest Landing is located in the buffer area maintained by E.I. du Pont de Nemours, outside of the manufacturing area.

The area used for manufacturing included in the Old Fort Lake Subarea was to the south of Sequelitchew Creek and was heavily contaminated both by the residuals of manufacturing and by airborne arsenic and lead from the ASARCO copper smelter in Reston. Weyerhaeuser began the process of cleanup and remediation of hazardous materials on the site in the 1980s with a series of investigations into potential environmental contamination were first completed on the site in the 1980s. In 1985, Weyerhaeuser initiated studies to determine whether hazardous substances were present. Between 1990 and 2001, interim remedial actions (IRAs) were conducted to remove soil and/or debris from 21 areas of the site. The Final Remedial Investigation was completed in 2003, and the Final Cleanup Action Plan (CAP) was then approved by Ecology. The majority of contaminated soil excavated from the Site was deposited in placement areas that were located within the golf course footprint. The contaminated soil was then covered with a cap.

The hazardous materials cleanup and remediation was completed to standards that allow commercial and industrial use. Properties within the cleanup area are subject to a covenant that runs with the land established by the Washington State Department of Ecology and Weyerhaeuser which restricts the use and specifically prohibits development and use for residential uses, schools, daycares, parks, recreational uses (with the exception of golf course uses), or any other use in which the likelihood of children having sustained access to soils can be reasonably anticipated.

The City of DuPont initially zoned the property for industrial use. In 2017 the city adopted a new Subarea Plan and zoning which restricted the range of light industrial use by specifically prohibiting warehouses and added a limited amount of residential use, with the specific provision that recognized that some uses allowed by the city's land use code are further restricted based restrictive covenant and such uses may only be allowed if the Department of Ecology changes restrictions, which may require further hazardous cleanup and remediation.

The sole existing land use within the Subarea is the Home Course, an 18-hole golf course with a driving range and other facilities established in 2007 after completion of hazardous materials remediation. The course is cooperatively owned and operated by the Pacific Northwest Golf Association and Washington Golf (WA Golf).

3.1.2 Impacts – No Action/Existing Subarea Plan and Zoning

The existing Old Fort Lake (OFL) Subarea Plan and zoning focuses on economic opportunity, specifically to leverage the opportunity created by the City's largest area of undeveloped commercial/light manufacturing land to create well-paying employment opportunities; ensure that future uses align with economic development and job creation goals; and establish a neighborhood that is attractive for investment and employers.

The plan designates four focus areas as shown in the map in Figure 2-1 and as reflected in the zoning map in Figure 2-2.

The Work/Live Focus Area is in the northern and northeaster portion of the Subarea and is adjacent to the existing Civic Center and stretches along the top of the Sequelitchew Creek canyon to about 1,00 feet east of the Puget Sound bluff. This Focus Area is planned to support future employment uses, cultural facilities, and complementary workforce housing for the Subarea. Some commercial uses may complement and act as an extension to these adjacent areas. This area is zoned Mixed Use Village 7 and 8 (MUV-7, MUV-8) and are intended to support a mix of uses that includes neighborhood-oriented commercial/restaurant uses, community/cultural uses, office, light manufacturing, and research and development. MUV-7 to the east allows a range of retail and service uses with MUV-8 to the west allowing multifamily residential use. This area is owned by the Nisqually Tribe.

The Business / Industry Focus Area in the development blocks located central to the Old Fort Lake Subarea are envisioned as planned to support a variety of employment uses in a business park setting. This Focus Area is designated Mixed Use Village- 4, 5, and 6. MUV-4, which is between existing development to the south and the proposed loop road, is intended to support smaller-scale employment and neighborhood-oriented commercial/restaurant uses. It is intended to develop with appropriate buffering and building-scale limitations to ensure compatibility with the nearby residential and school properties. MUV-5 is intended to be a primary employment area that allows office, light manufacturing, and research and development uses. In MUV-5 and 6, retail and restaurant uses are allowed only as accessory use, which are subordinate to and incidental to other allowed uses. A vested project has been applied for within the MUV-5 district which consists of four buildings totaling 723,000 square feet, which are proposed for light manufacturing use.

The Mixed-Use Focus Area in the westerly portion of the Subarea is intended to provide a variety of commercial, business, residential, and community uses that are complementary to the golf course, the bluff, and adjacent neighborhoods. The desire is for a portion of the Mixed-Use Focus Area to develop as a walkable neighborhood center with a cluster of retail stores, dining, employment, service, and multifamily uses. Other portions of the area may develop as independent employment campuses and modestly sized residential neighborhoods. This Focus Area is designated Mixed Use Village 1 through 3. MUV-1 through 3 are intended to support a mix of uses that includes neighborhood-oriented commercial/restaurant uses, hotel, housing, public/community uses, office, light manufacturing, and research and development. MUV-2 is slightly more limited in allowed uses in not allowing a convention center, a cultural/community center, and public uses other than parks and K-12 schools. MUV-3 does not allow hotels or single-family residences.

The projection of future land uses under the existing subarea and zoning depends on potential regional demand for allowed uses. A limited number of uses are allowed in the zoning including office, research and development, light manufacturing, retail, services uses, restaurants, hotels are allowed in MUV-1 and 2 and also on the golf course which is MUV-9. Several uses are allowed that would require modification of existing restrictive covenants, as discussed above, including single-family and multifamily residential, commercial recreation and educational institutions. Pierce County population and employment projections have been developed the Washington Employment Security Department, Labor Market and Economic Analysis Branch and the state Office of Financial Management, based on both national and regional trends. A summary of relevant trends related to allowed uses in the OFL Subarea is below:

- Population in Pierce County is projected to increase by 275,668, which would be between 115,000 and 125,00 dwelling units. The 1,100 dwellings allowed by the OFL zoning would be less than one percent of the total growth and can be presumed to be relatively certain of being accommodated.
- The projection for “manufacturing” uses is for no increase in regional employment for the next 10 years. It is unlikely that the limited range of manufacturing uses allowed by the OFL zoning would be attracted to DuPont, given the existing established centers in the region.
- The projections for increase in employment to the types of uses which would fall into the city’s “office” use category (finance and insurance, real estate and rental and leasing, professional, scientific, and technical services, management of companies and enterprises, administrative and support, and others) is approximately 8,100 new employees countywide (out of existing 32,700).
- The projection for increase in employment categories which can be assumed to relate to demand building space) for uses which would fall into the “Research and Development” use category is approximately 4,500 new employees countywide (out of existing 34,900).
- The projection for increase in employment which would fall into the city’s “service” use category is approximately 1,700 new employees countywide (out of 13,800 existing).

This excludes employment categories that are not allowed in the MUV-5 zoning and also excludes government employment, which includes military employment because it is unlikely to be located in DuPont because of capacity at existing locations.

Based on standard multipliers, the building area produced would be approximately as follows:

- Demand for 8,100 new office employees countywide at a standard multiplier of 4 to 5 employees per 1,000 square feet would result in a demand for about 1,600 to 2,000 square feet of building area, countywide.
- Demand for 4,500 new research and development employees countywide at a standard multiplier of 2 to 3 employees per 1,000 square feet would result in a demand for about 1,500 to 2,000 square feet of building area, countywide.
- Demand for 1,700 new service employees countywide at a standard multiplier of 1 to 2 employees per 1,000 square feet would result in a demand for about 850 to 1,700 square feet of building area, countywide.
- The total demand for these uses countywide would be about 4,000 to 6,000 square feet.

The Puget Sound Regional Council (PSRC) estimates that DuPont has 4,200 existing jobs in Office, Manufacturing, Research and Development and Services uses, and projects up to an additional 438 jobs. The PSRC estimates are not given much weight because their methodology assigns future growth based on the share of current uses a jurisdiction currently has. This ignores the supply of developable land which could attract more development than past growth would indicate.

The allowed 1,100 residential units would result in a projected population of 2,330. Combined with the existing neighborhoods to the south, including 1,008 units in Yehle Park Village and the 1,178 units in Hoffman Hills Village would provide a potential market population of 6,289 which would use retail and service uses in this area. Using projections of national multipliers of about 15 to 20 square feet per

capita for retail and service uses within a market (which is down from current 23 per capita) (Berg 2020), the total demand for retail use would be between about 95,000 and 125,000 square feet. If half the market demand from the balance of the city population of 3,070 were captured by retail in the OFL Subarea, this could add 20,000 to 30,000 square feet of floor area. This is estimated to be split between retail and service uses according to the classifications in the DuPont zoning code.

It is estimated that several restaurants could be supported by this population with a total floor area of 10,000 square feet.

A moderate size hotel with 90 rooms is estimated to be oriented primarily to demand from the golf course.

The estimated land area devoted to residential, retail, service, hotel and restaurant use is about 100 acres. With 10 percent of the area devoted to roads, the area available for office and research and development use would be about 40 acres. At a maximum floor area ratio (FAR) of 0.3, this would accommodate about 1.7 million square feet of office and/or research and development uses. Attracting such magnitude of these uses would involve companies currently in the region relocating to DuPont or attracting a company, or companies, not currently in the region. Both of these scenarios are possible, but somewhat unlikely.

3.1.3 Impacts - Proposed Subarea Plan and Zoning Amendments

The proposed Subarea Plan and zoning amendments would shift the Old Fort Lake Subarea from an employment center to a primarily residential neighborhood.

Subarea Plan designations are shown on the map in Figure 2-3, above and include 70 acres of single-family residential, 94 acres of middle housing, 34 acres of multifamily, 10 acres of General Commercial, 7 acres of Neighborhood Business, 20 acres of an Entertainment district and 10 acres of Civic designation, which is anticipated to be a school site.

The proposed zoning code amendments include the following designations parallel to the land use code provisions:

Single-Family (SF): This zoning designation intends to provide for detached single-family and duplex uses at a base density of two units per lot. Attached units can be on their own fee-simple lot, or all on one lot.

Middle Housing (MH): This zoning designation intends to provide for attached housing types from two to six units that meet the definition of Middle Housing in DMC 25.10 Definitions. Attached units can be on their own fee-simple lot, or all on one lot.

Middle housing is defined as buildings that are compatible in scale, form, and character with single-family houses and contain two or more attached, stacked, or clustered homes including duplexes, triplexes, fourplexes, fiveplexes, sixplexes, townhouses, stacked flats, and cottage housing.

Multifamily (MF): This zoning designation intends to provide for higher density housing in buildings greater than 6 units. The buildings may be no taller than 50 feet, not including underground parking structures. No more than 200 units per building are permitted in the Old Fort Lake Subarea.

Neighborhood Business (NB): This zoning designation is intended to provide for smaller scale commercial type uses that serve the subarea and city residents, such as retail and restaurants, personal service uses, light manufacturing buildings no greater than 50,000 SF, professional and medical offices and banks and credit unions.

Commercial (COM): This zoning designation is intended to provide for higher intensity commercial uses such as retail spaces, restaurants, and commercial recreation that may draw from a larger region.

Entertainment (ENT): This zoning designation is intended to provide for entertainment and recreation type uses such as hotels, commercial recreation, retail, restaurants, community and cultural centers. These uses may draw visitors from the region and serve to support the adjacent golf course use.

Civic (CIV): This zoning designation is intended to provide for public and quasi-public uses such as schools, public parks, convention centers, community and cultural centers, churches and public utilities.

Parks, Recreation, and Open Space (PROS): This zoning designation is intended to provide for recreational uses and open space that implements the goals and policies of the Subarea Plan.

The standards for single-family and middle housing are intended to comply with 2023 amendments to the Growth Management Act (GMA) in RCW 36.70A.635 mandating that certain GMA planning cities include middle housing types at minimum densities of 2 du/lot (for cities with population of less than 25,000) and prohibits design and development standards for middle housing that are more restrictive than detached single-unit houses.

Single-family, Middle housing and the Parks, Recreation and Open Space designations are all limited to 35-foot building height. All other districts have a 45-foot height limit, except for hotels in the Entertainment district.

Setbacks for single-family and middle housing includes street or front setbacks of 15 feet, except 10 feet for lots with a unit density of three or more with a greater setback for garages to de-emphasize garages and driveways as major visual elements along the street. Side yards are 5 feet and rear yards are 20 feet without an alley and 15 feet from the centerline of the alley.

Single-family and middle housing density is determined by setbacks and lot coverage. The maximum lot coverage is 40 percent. A single-family detached house of the national average 2,500 square feet with a footprint of 1,000 feet could be located on a lot of 2,500 square feet. Up to two dwellings can be placed on any lot, but lots with more units would presumably have greater coverage and would have to be larger. Smaller lots could be allowed with smaller lot coverage, for example a 1,500 square foot dwelling might have 750 square feet of coverage and would require a lot of 1,875 square feet. Middle housing density would vary by type of building. With townhouse development, multiple units could be located on a single lot or lot lines would pass through walls between units. Size and dimension of typical townhouse units in the region currently varies considerably between about 14-foot width by 24-foot depth to 32-foot width by 40-foot depth. At the smaller end of the range the footprint of a unit would be about 340 feet, and the density could achieve up to a gross density 50 units per acre. At the upper end, the footprint would be about 1,300 square feet and the lot size would be about 3,200 square feet, or a gross density of 14 units per acre. With street dedications and park dedications the actual density would be considerably lower. It is possible that developers would implement larger units on larger lots if they perceived them to be more marketable and provide a higher return. The densities in Table 3.1-1 are based on probable densities based on required dedications and probable market conditions.

The single-family detached units overall unit count within the subarea will depend on the size of dwellings proposed and the extent of provision for two dwellings on a lot. At the minimum lot size allowed by maximum lot coverage and 1,000 square foot coverage, up to 10 units per acre could be developed presuming lots front on both sides of a public street. This could equal up to 770 single-family units within the subarea. With the required park dedication of 4.6 acres per 1,000 units, this would be reduced to about 725. This maximum is considered unlikely to be achieved because of current market expectations of lot size for single-family detached dwellings. A more realistic 6 to 8 units per acre would result in 420 to 560 single-family homes. This would result in lot sizes (presuming frontage on both sides of a street) of 3,000 square feet at 10 units per acre, 4,200 square feet at 8 units per acre and 6,000 square feet at 6 units per acre. In the existing Northwest Landing development in DuPont lot sizes for zero-lot-line single-family dwellings are on lots of about 4,000 square feet and typical single-family detached dwellings are on lots of 6,000 to 8,000 square feet.

Middle housing density is determined by lot coverage also. Up to six units are allowed on a lot, or units can be placed on individual lots. With townhouse development, the size and dimension of townhome units varies considerably between about a 14-foot width by a 24-foot depth to about a 32-foot width by a 40-foot depth. At the smaller end of the unit size range the footprint of a unit would be about 340 feet, lot size per unit at 40 percent coverage would be about 840 square feet and the density that could be achieved would range between about 45 to 50 units per acre. At the upper end of unit size, the footprint would be about 770 square feet, and the lot size would be about 1,920 square feet per unit, or 22 units per acre.

Middle housing zoning has the same dimensional requirements as detached single-family with the same maximum building height of 35 feet. Lot size is determined by setbacks and lot coverage. Up to six units are allowed on a lot, or units can be placed on individual lots. With townhouse development, lot lines would pass through walls between units. Size and dimension of townhome units varies considerably between about a 14-foot width by a 24-foot depth to a 32-foot width by a 40-foot depth. At the smaller end of the unit size range the footprint of a unit would be about 340 feet, lot size per unit at 40 percent coverage would be about 840 square feet and the density could achieve between about 45 to 50 units per acre. At the upper end of the unit size range, the footprint would be about 770 square feet per unit and the lot size would per unit would be about 1,920 square feet per unit, or about 22 units per acre. The area of streets with units on both sides of the street would reduce the density slightly. Fourplexes, similar to those on Simmons Street in Northwest Landing are at a density of approximately 16 units per acre or with street area, approximately 14 units per acre. A developer may choose to build middle housing at a variety of densities and styles of units and may build well below the maximum density depending on market conditions. The projected density in Table 3.1-1 is intermediate in the range of potential densities in the Middle Housing district and reflects implementation of a range of unit size that is presumed to respond to the market for a variety of sizes and types of housing to meet the housing needs of a broad range of income and family status.

Multifamily units are presumed to develop at 40 units per acre on the 34 acres proposed for the use (approximately 1,360 units). There is a maximum limit of 200 units per building. The nationwide average for apartment size is 514 square feet for a studio, 757 square feet for a one-bedroom and 1,138 for a two bedroom. (DeVault 2022). In Pierce County, five percent of apartments are studios, 24 percent are one-bedroom, 43 percent are two bedroom, and 26 percent are larger than two bedroom. The size of unit that is likely to provide the best return is most likely to be developed on the site. The only other density limit is the landscape standard which is 30 percent of the site by general landscape standards,

but which may be reduced by design standards. The 30 percent landscape standard would consume 10.2 acres. Surface parking at one space per unit would consume about nine acres. The park dedication standard, which is 4.6 acres per 1,000 population, would vary slightly by the size of unit and the resulting number of persons per unit and would range from about 7.5 acres for studios to about 13.7 acres for two-bedroom apartments. The net area available for apartment buildings would also vary with the size of units and will ultimately determine the size and number of buildings. To achieve the maximum allowed number of units, with larger units, the entire 34-acre site would be utilized, and some under-building parking may be required.

The proposed residential regulations do not include a specific provision for affordable housing. It is generally believed that increasing housing options that are more affordable to various income levels is critical to achieving the state's housing goals, and there is continued need for the development of housing at all income levels, including middle housing that will provide a wider variety of housing options and configurations. Homes developed at higher densities are more affordable by design in their construction and reduced household energy and transportation costs. The extent of affordability may be gauged by current home value \$539,046 in DuPont, compared to the Pierce County average of \$560,450 (Zillow 2024). It is unlikely that detached single-family homes or middle housing units developed under these regulations would sell in the open market to families in the 50 percent to 80 percent of average income. It is possible that some apartments might rent at rates considered affordable.

Population projections within the subarea have impacts on a wide variety of development parameters including not only park dedication, as discussed above, but also on market demand which may affect the type and scale of development. Household size tends to vary among housing types and between communities. Outer suburbs, as compared to core urban areas, tend to have a greater proportion of children and tend to have a higher proportion of households headed by 25 to 34-year-olds. This is generally interpreted as a tendency for those communities to attract a greater proportion of families with children or who desire children, as opposed to a higher proportion of single persons or couples without children in urban core communities (Fry 2020).

The City of DuPont previously used a single-family occupancy rate of 2.94 persons per unit and a multifamily occupancy rate of 2.76 for planning purposes (DuPont 2015). Examination of these rates reveals that they were based on the 2009-2013 American Community Survey data, for average household size. The problem with using census "household" size is that households are two or more related persons living together, which excludes persons who live alone or share residences with unrelated people. For example, in 2020 DuPont had 4,150 housing units and 4,006 households; 96 percent of housing units were occupied by households. Similarly, Pierce County had 371,205 housing units and 341,783 households; 92 percent of housing units were occupied by households.

The use of a household size for DuPont that is higher than Pierce or King Counties is based on several factors.

- Young, modest-income households with children are more likely to live in new single-family units or "middle housing" townhomes. In the 2020 census, 46 percent of households in single-family homes were married couples with children (26 percent) or without children (20 percent), twice the rate of married couples in newer multifamily (23 percent). In total, 39 percent of households in new single-family dwellings had children, compared with just 14 percent in multifamily dwellings.

- “Middle housing” consisting of townhouse type units of up to six units in a structure is generally thought to likely have occupancy between single-family and multifamily dwellings (Nesbit 2023). There is, however, little specific information on the housing type in census and other data as the US Census classifies them as single-family housing units if they are separated by a ground-to roof wall, have a separate heating system, have individual meters for public utilities, and have no units located above or below. (Census 2023). It has been presumed that this type of housing has more bedrooms and additional amenities that are more likely to attract smaller households than detached single-family and larger households than multifamily units. A recent survey conducted for the Steilacoom school district, however, indicates a higher student generation rate for townhomes than single-family dwellings, which would indicate a larger household size. This may be a statistical anomaly or an indication that more affordable middle housing attracts larger young families because they are more affordable.
- Multifamily dwellings generally are occupied by fewer people than detached single-family homes or middle housing duplexes, triplexes, fourplexes, or townhouses. Units with larger numbers of rooms are more likely to be occupied by larger households. The number of rooms developers plan in new multifamily development is driven both by perceptions of the market and by the rate of return. In DuPont several market conditions are more likely to favor somewhat larger units. There is a smaller population of young single persons, particularly students, which provides a market for very small units such as studios. The average income in DuPont is somewhat higher than the Pierce County average, leading to a likely higher demand for larger units with additional amenities provided by one and two room units. Unfortunately, there is little census data available for DuPont on housing tenure as the more detailed information tends to be generated later in the cycle, but the above factors appear to justify a slightly higher multifamily occupancy.

For the purposes of analysis in this EIS, the following projections of persons per type of housing unit were presumed: single-family: 2.7 persons per unit; middle housing: 2.3 persons per unit; multifamily 2.2 persons per unit. As a sensitivity analysis, increasing the projected middle housing rate of persons per unit to 2.5 would increase projected middle housing population in the subarea by eight percent and the total subarea population by five percent.

The Subarea Plan and zoning permit a range of uses in the Commercial, Neighborhood Commercial, and Entertainment zoning districts. It is not possible to accurately predict the mix of uses that landowners and developers may choose to implement in the future and the market conditions that may support a particular mix of units. The following projections of non-residential uses within the subarea under the proposed amendments were developed in conjunction with the owners regarding their objectives and broad analysis of market trends. Non-residential uses are projected to be supported both by local population within DuPont and by attracting support from the region for some uses. The projected 3,780 new housing units with a projected population of 8,782 would substantially exceed the 1,100 residential units and projected population of 2,330 under the existing plan and zoning. Combined with the existing neighborhoods to the south, including 1,008 units in Yehle Park Village and the 1,178 units in Hoffman Hills Village, this would provide a potential market population of 12,740 that would use retail, and service uses in this area. Using projections of national multipliers of about 15 to 20 square feet per capita for retail and service uses within a market (Berg 2020), the total demand for retail use could be between about 191,115 to 254,820 square feet. If half the market demand from the balance of the city population of 3,070 were captured by retail in the OFL Subarea, this could add 20,000 to 30,000 square feet of floor area for a total of about 211,115 to 284,820 square feet. This is estimated to be split

between retail and service uses according to the classifications in the DuPont zoning code. It is recognized that these estimates would require retail and service uses within the city to capture a much higher proportion of the market potential of the population than is currently the case. It is possible that a greater concentration of uses may make the city more competitive with existing retail and service centers that currently serve the population. This mix of uses may not occur exactly as projected, but this provides a reasonable projection of what may occur if market conditions are favorable.

An additional component of projected market support is envisioned to come from amenity-based demand largely focused around the golf course which brings a large recreation market to the area. Golf and similar games account for about \$740 million dollars in direct expenditures in Washington State in addition, for all recreation activities an additional 45 percent of direct expenditures are spent for supporting costs such as local trips, longer distance travel, food and beverage, lodging, shopping and souvenirs. (BEA 2023). It is also anticipated that the natural physical amenities of the site, coupled with the amenities of the golf course could attract a range of amenity related uses including restaurants, specialty retail, hotels and other uses. One use contemplated is a wellness center which integrates a range of services and products to improve health, fitness, nutrition, appearance, sleep, and other functions. (McKinsey 2021).

A summary of anticipated uses that may be located in the commercial and entertainment zoning districts on the site is included in Table 3.1-1.

Table 3.1-1 Land Use Projections by Alternative

Land Use	Existing Subarea Plan and Zoning	Proposed Subarea Plan and Zoning Amendments	
		Moderate Projection	High Projection
	Units or Sq Ft	Units or Sq Ft	Units or Sq Ft
Residential Uses			
Single-Family Residential Units Total	100	420	560
Middle Housing		1,695	1,860
Multi Family	1,000	1,020	1,360
Total Housing Units	1,100	3,135	3,780
Population	2,330	7,277	8,782
Non- Residential Uses			
Retail Use	70,700	175,000	175,000
Restaurant	20,000	61,500	61,500
Service Use	70,800	40,000	40,000
Office Use & Research & Dev	1,602,700	40,000	40,000
Auto Repair/Service		3,000	3,000
Hotel Rooms	90	300	300
Wellness Village		30,000	30,000
Convention center		30,000	30,000
Private Entertainment/Cinema 200 seats		10,000	10,000
Light Manufacturing		20,000	20,000
School - Students		500	500

3.1.4 Mitigation

Mitigation measures for land use and housing impacts depends on the extent to which the land use and housing patterns described above are considered adverse. If land use and housing patterns meet the needs of the community and fulfill the objectives of the comprehensive plan, they may be considered simply as the effects of adopted or proposed policies and regulations, rather than as adverse.

Both the existing Subarea Plan and zoning and the proposed amendments to the Subarea Plan and zoning further these goals to various extents. The major difference is that the existing Subarea Plan and zoning emphasizes economic development, although the type of economic development envisioned appears to have little regional market support. Since the land use plans and the differences between them involve policy tradeoffs, the options of modifying them may be seen as issues of legislative policy rather than environmental impact, therefore it is not appropriate to characterize other options as measures that mitigate environmental impacts.

Set asides for affordable housing could benefit vulnerable or overburdened communities that experience lack of housing opportunities because of income constraints.

Impacts on specific elements of the environment are discussed under each element and mitigation measures identified.

3.1.5 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, the implementation of either alternative will introduce a variety of land uses that will permanently change the character of the area.

3.2 AESTHETICS/VISUAL QUALITY

3.2.1 Assessment

The assessment of visual quality addresses both the character of the visual experience and the impact upon the viewer. For the purposes of this analysis, visual quality and aesthetics are analogous terms. The assessment of visual quality is subjective, from the perspective that the human subject perceiving the visual environment applies personal and cultural frames of reference to discern and evaluate visual information. There is, however, broad-based agreement in federal, state, and local laws and regulations, as well as supporting research that establishes general public consensus of what constitutes a desirable visual environment. This broad-based agreement is the foundation of the process and definitions put forth in the Federal Highway Administration's Visual Impact Assessment for Highway Projects Manual (FHWA Manual; FHWA-HI-88-054).

Visual Character

Visual character refers to identifiable visual information in a selected view. The existing visual or aesthetic environment is described using objective descriptors of the visible elements, including environmental features and man-made elements. Relationships between elements of the visual environment are described in terms of dominant elements, scale, diversity, and continuity. Dominance refers to the position of an individual element, or its extent or contrast among all the other elements of a view. Scale refers to apparent size relationships between an element and the other components of its surroundings. Diversity is a function of the number, variety, and intermixing of elements in a view. Continuity refers to the maintenance of visual relationships between connected or related landscape

features. The integration of these elements into a complex characterization allows a more complete description of the character of a view as a whole.

Visual Quality

Visual quality is the assessment of the value of the visual experience of a selected view. This analysis uses a variation on FHWA's definition of three descriptors: vividness, intactness, and unity. Vividness describes the memorability of landscape components as they combine striking and distinctive visual patterns. Intactness describes the integrity of natural and human-built visual patterns and the extent to which the landscape is free from encroaching elements or eyesores. Unity describes the compositional harmony of the landscape considered as a framed view, much as one would evaluate a painting or photograph. This does not imply that all elements are the same, but that they are arranged in a way that is pleasing or interesting.

Viewer Response

is analyzed in terms of viewer exposure and viewer sensitivity. These two elements work together. Viewer exposure refers to the physical location of the viewer, the number of people exposed to a view, and the duration of their view. Viewer sensitivity refers to the degree to which a viewer perceives elements of the environment and the extent to which those elements are important to the viewer. Viewer sensitivity is affected by the activities in which a viewer is engaged; the visual context; and the values, expectations, and interests of the person involved in the activity. Sensitive viewers are generally residents of the area and are engaged in elective activities, such as recreation. Moderately sensitive viewers are people engaged in other elective activities such as shopping, patronizing a restaurant, or attending a cultural or sporting event. Travelers and workers tend to be the least sensitive group because of the demands of driving and the short time in which they are exposed to visual elements.

3.2.2 Methodology

The Old Fort Lake site and its environs were visited in order to assess the visual character and quality of the site and to determine viewer groups and viewer sensitivity. The City of DuPont Comprehensive Plan was reviewed for open space, pedestrian/bicycle routes, and recreation plans and policies.

Graphical simulations or rendering for key views were created to illustrate the probable visual impacts of the proposed alternatives. Key views were selected to represent a range of views from locations where significant numbers of viewers are present, where representative features of the existing structure and alternatives are present in important views, and where the visual quality of the views is high. The view selection process included field reconnaissance to locate significant visual features and landmarks and to assess the intrinsic qualities of the landscape. The final viewpoints were developed, reviewed, and approved by city staff before preparation of visual simulations. Viewpoint locations are indicated on Figure 3-1.

Photographs for the existing conditions and building bulk simulations were taken at a lens focal length (35 mm) that approximates the normal static field of view of humans at the scale of a standard sheet size at normal reading distance. This does not reproduce the entire field of view perceived by a human observer, but it does provide an accurate representation of the scale of a structure in relation to other objects seen from the viewpoint. The building bulk simulations are discussed in Section 3.2.4, Impacts.

Building heights and approximate building horizontal dimensions were determined by existing and proposed zoning regulations. Bulk outlines only were provided with window outlines in some cases to

provide an indication of relative building scale. In addition, photographs of existing buildings similar to those allowed by zoning and design regulations are provided.

3.2.3 Affected Environment

The Old Fort Lake Subarea is situated on a generally level terrace above Puget Sound. It is bounded on the west by a very steep slope down to the Burlington Northern Santa Fe Railroad (BNSF) tracks and the water. There is a soft surface public trail at an approximate elevation of 180, about 20 feet below the top of the terrace located outside of the former Powder Works chain link perimeter fence. On the north, the Subarea is bounded by Sequelitchew Creek canyon which varies in depth from about 15 feet at Center Drive to about 200 feet where it passes under the BNSF railroad. The easterly portion of the site is bounded by several parcels owned by the City of DuPont and the Nisqually Tribe. The northernmost parcel contains the DuPont City Hall and the Public Services Building housing the Police and Fire Department, at an elevation of about 230 feet above sea level. The center parcel owned by the city has been largely cleared of vegetation and is vacant. The vacant parcel owned by the Nisqually Tribe is largely forested. There is a narrow corridor along the south boundary of the Subarea designed to provide road access to Center Drive.

Easterly Boundary

The views of the subarea from the Civic Center to the west is generally an area of small evergreen trees and scotch broom that have grown since the site was cleared in 2003 to 2005 for hazardous materials remediation. The margins of the golf course to the west have some large mature trees that were preserved. The nearest fairways (No. 7 and 8) are elevated 10 to 15 feet above the surrounding areas, partially due to natural topography and partially due to the placement and capping of hazardous materials beneath the course. The course, however, is generally not visible because of intervening vegetation. The dominant features in the view are the large retained evergreen trees adjacent to the golf course which are the largest scale elements of the view. There is great diversity in the size and character of vegetation, but little continuity, integration or unity within the view. The character of the view reflects its origin, which is immature vegetation that has grown up haphazardly with an overall ragged and fragmented appearance with a few large specimen trees in the distance. The viewer population in this area is largely employees of the city, persons having business within the city, persons attending official functions such as City Council meetings or citizen advisory committee meetings, and persons parking in the City Hall parking lot to access the Sequelitchew Creek trail that leads to Puget Sound. The parking lots and areas of interest to people other than employees are to the easterly portion of the campus of the subarea to the west and views are partially blocked by the police/fire building to the west. Although persons engaging in civic tasks and visiting recreation trails are likely to be sensitive to surroundings, it is unlikely that views to the west of the subarea are a focus of viewer appreciation.

The views available from vehicles on Center Drive, the major arterial in the city, and sidewalks adjacent to the street immediately south of Civic Drive is of the city-owned parcel cleared of vegetation in the foreground and in the background is similar to the views from the Civic Center of small evergreen trees, scotch broom and a few large mature trees at the margin of the golf course. The near views have no dominant features and little visual interest continuity, integration, or unity. The more distant elements include the mature trees at a distance adjacent to the golf course and some mature second growth trees to the southwest. The occupants of vehicles are likely concentrating on views of the road. In the few seconds it takes to traverse this area, they are not likely to take notice of the view to the side of the vehicle, particularly when there are views of framing landscaping in the greenbelts on both sides of the

road to the north and south. Pedestrians and persons on bicycles are likely to be quite sensitive to the landscape features. Those travelling on the east side of the street are within a continuous greenbelt which provides the major focus of attention. Vegetation within the street median effectively screens views to the east of the subarea. Pedestrians and bicycles on the west side of the street traverse an area with little vegetation in the adjacent greenbelt and a view of mowed rough grass in the adjacent parcel. They are likely to focus attention on the greenbelt they are within, although they also may be aware of the forested area at a moderate distance to the west. Overall, this is likely to be perceived as a less interesting part of the Center Drive greenway corridor they are travelling which is passed through quickly with little impression made. The character of the view reflects its origin, it is of immature vegetation which has grown up haphazardly with an overall ragged and fragmented appearance with a few large specimen trees in the distance.

The view from Center Drive adjacent to the Nisqually Tribe owned parcel is of landscaping in the city owned buffer to the street and of second growth forest. Persons traversing this area are likely to be most focused on the greenbelts they are traversing which are moderately to heavily vegetated. The adjacent forested area to the west is likely to be seen as providing continuity and integration with the greenbelts they are travelling through.

Southerly Boundary

The southerly boundary of the site is bordered on the southeast by an 80-foot-wide corridor owned by the city containing an electric transmission line easement to the north and the Yehle Village/Palisade Village Connector trail which is a 12-foot-wide asphalt non-motorized trail. To the east the trail is bounded by the Steilacoom School District Pioneer Middle School. West of Wren Road, which is adjacent to the school, and extending to the terminus of the trail at Simmons Street, are 22 single-family dwellings. West of the trail and along the subarea boundary extending to the city-owned stormwater detention tract are 13 single-family dwellings. The topography is essentially flat at the same elevation as the subarea extending to McNeil Road.

Persons on the trail are likely to be very sensitive to the visual character of the area. Their views are bounded on the south in the easterly portion by school buildings and playfields. Further west views are of the rear yard fences of houses, or the alley providing access to the rear of houses. The view to the north into the subarea is of a diverse assemblage of undergrowth and a scattering of mature deciduous and evergreen trees and some areas of scotch broom and recently regenerated 6- to 12-foot-high evergreens which is shown in the existing conditions photograph in Figure 3-2. This vegetation is largely to the north of the electrical transmission lines. Although the electric lines are closer, most views are under the lines and toward the subarea to the north. The dominant feature to the north is vegetation with substantial diversity in the size and character of vegetation, but little continuity or integration within the view. This element is in contrast to the groomed playfields, school building and houses to the south. Persons on the trail likely gain some appreciation from the variety of views and the diversity of elements. The most continuous framing feature is the heterogeneous view of a variety of vegetation to the north.

Persons on the playfields to the south of the subarea are likely concentrating on the activities occurring on the playfields, whether they are participants or observers. The portions of the school adjacent to the subarea to the north include the gymnasium, service uses, and school bus parking. Students queuing to take busses and staff participating likely have little concentration on views to the north, which are blocked or obscured by loading busses. The vegetation to the north is likely a pleasant framing element,

even with the presence of the electric lines, but likely has little impact on persons with their focus on the activities in the playfield or on boarding busses.

Residents in their homes are very sensitive to their surroundings, particularly in their backyards which are often the focus of play activities, relaxation, and gatherings. The vegetation to the north which can be seen over fences or across alley access is likely perceived as a pleasant framing element, but is unlikely to be the focus of attention, which is likely to be on the internal landscaping of rear yards and the activities taking place.

The detention facility, which extends for 800 feet along the subarea boundary, has a public trail between the pond and the subarea boundary but is set back with intervening planted vegetation on the facility site. The golf course Fairway 12 is about 50 feet from the property boundary and 90 feet from the trail. Intervening small evergreens largely screen the golf course from views. The existing ragged variety of vegetation within the subarea is likely to be a pleasant addition to the planted vegetation within the detention facility and provides continuity. There are no dominant features on this trail, except perhaps the 22-foot-deep hole and pond, which is the detention facility.

West of the detention facility to Hoffman Hill Boulevard, are 28 single-family dwellings that back up to the subarea boundary. Immediately east of Hoffman Hill Boulevard is the city's one-third acre Parkview Park. West of the park are four single-family dwellings and a trail corridor leading to the westerly perimeter trail below the top of the bluff. The topography of the area is generally flat at the same elevation as the subarea extending for 350 to 500 feet where a 30-to-40-foot bluff is located on the north side of McNeil Drive and is generally contained within a city-owned greenbelt. Residents in their homes are very sensitive to their surroundings, particularly in their back yards which are likely the main location for activities including play, relaxation, and gatherings. The vegetation to the north which can be seen over fences is likely perceived as a pleasant framing element, but is unlikely to be the focus of attention, which is likely to be on the internal landscaping of rear yards and the activities taking place.

The homes that do not back up to the subarea have little or no view of the subarea due to the flat topography. The homes along McNeil Street to the south which are at a higher elevation generally have their views blocked by trees in the greenbelt on the north side of the street. The exception are the dozen homes west of Hoffman Hill Boulevard, where the vegetation in the greenbelt across the street is sparse. These homes have some distant views including peek-a-boo views of the waters of Puget Sound and the Olympic Mountains in the distance through the trees. A few of the homes along Ridge View Drive are 10 to 15 feet higher than the elevation of the land on the adjacent subarea and have territorial views to the north. Residents of these homes are likely to be very sensitive to the quality of views from their residences and value distant views of Puget Sound, although they have no means of preserving such views as vegetation in the public greenbelt matures.

The Pola Andre Park along Ridge View Drive at the foot of McNeil Street, the trailhead at the foot of the slope adjacent to the subarea boundary, and Parkview Park are all bound by substantial vegetation and have essentially no views into the subarea.

Westerly Boundary

The public trail that bounds the west side of the subarea, just outside the old security fence around former manufacturing areas, is the only viewpoint currently available to the public. It is bounded by dense mature evergreen vegetation on the steep bluff to the west below. To the east the trail is bounded by a variety of smaller immature vegetation and generally faces a slope down from the flat

terrace above. There are a few panoramic views of Puget Sound from gaps in the trees that have become informal viewpoints, as they are largely on BNSF right-of-way. Persons using the trail are likely very sensitive to the positive qualities of the trail corridor which is largely of the bounding natural vegetation. It is used by a wide variety of recreational users including walkers, joggers and bicycle riders. The sensitivity to surroundings likely varies slightly between the groups depending on whether they are primarily involved in enjoying surroundings or focused on exercise.

The Wilkes Observatory, which is the site commemorating where the 1841 American expedition under Lieutenant Charles Wilkes set up a site to aid in map making and scientific inquiries and mapped, charted, and documented the Puget Sound region. The site is accessible from the trail along the bluff, but the use of the site is somewhat limited by the 1.2-mile trail being the only current access. The site itself is heavily vegetated. The area to the east outside the fence is largely scrub vegetation. Persons using the site are likely very sensitive to the character of the site. The focus of views is of Puget Sound to the west which is the dominant vivid element of views. The mature vegetation in the interior of the site provides an integrated and unified landscape. Views to the east of the scrub vegetation provide little visual interest.

Northerly Boundary

The Sequatchew Creek Trail on the north side of the canyon is the only publicly accessible viewpoint from this direction. It has no views of the subarea due to steep slopes with mature vegetation to the south.

Golf Course

The Home Course golf course occupies much of the center and westerly portion of the subarea. It is the only existing use within the subarea and currently brings the greatest number of persons into the subarea including several thousand golfers per year and additional spectators during golfing tournaments. Views within the golf course are primarily oriented along the fairways, however the surrounding small-scale evergreens and shrubs provide a consistent although somewhat haphazard assemblage of natural vegetation at the margins of the fairways. In some cases, specimen mature trees were preserved adjacent to fairways as part of the hazardous materials remediation. The most vivid views from generally east-west trending fairways (Nos. 2 through 13, 17 and 18) are of Mount Rainier to the southeast, although the mountain is also visible from many of the cart trails and can be viewed by golfers on the north-south oriented fairways by simply turning. Fairways adjacent to the Old Fort Lake open space (Nos. 9-11) are bounded by the mature vegetation of that feature. Portions of Fairways 4 and 5 are bounded by the mature vegetation of the Sequatchew Creek Canyon. Golfers are extremely sensitive to the visual quality of their surroundings. Golf courses are evaluated not only for the quality of the game provided but also as a satisfying visual experience including landscaping, vegetation, water features, golf features and backdrops, all of which add to the pleasure of the round (Powell 2023). Existing views from the golf course are provided in Viewpoint 6 from Fairway 8, as shown in Figure 3-7, and Viewpoint 7 between Fairways 10 and 11, as shown in Figure 3-8.

Old Fort Lake Open Space

The Old Fort Lake is near the center of the subarea within a steep sided glacial kettle about 50 feet below the surrounding land. The steep slopes are vegetated with mature evergreens and a few deciduous trees, including Oregon White Oaks. The open space area is owned by the City, however, there is almost no flat land in city ownership outside of the steep slopes. The slopes are somewhat more

gentle to the northwest and southeast. The large trees are the signature element of views of this area from surrounding land. There are no views to the water area of the lake from the perimeter. There is no formal public access to the water area of the lake.

Figure 3-1

Visual Analysis Viewpoint Map

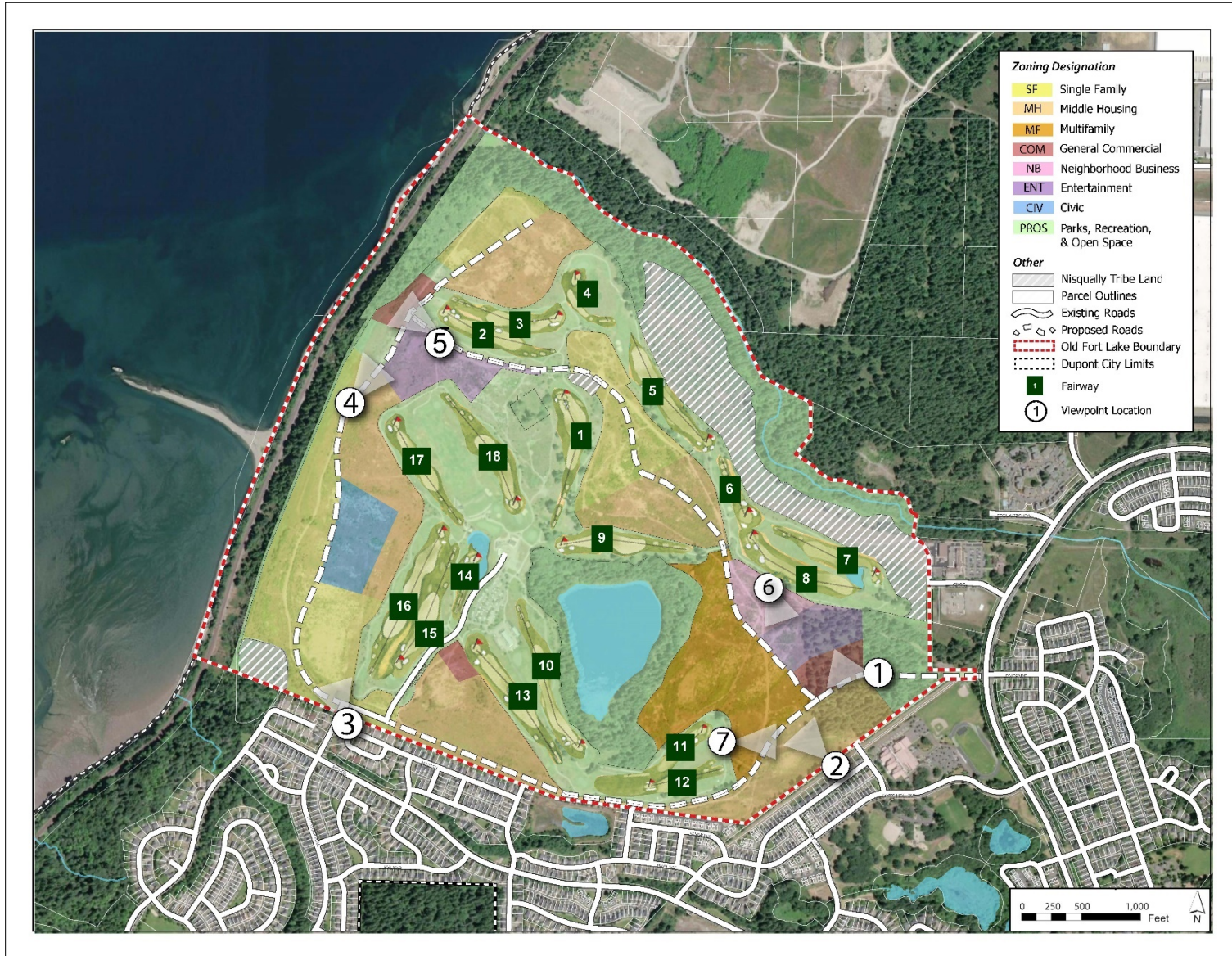


Figure 3-2 *View 1 - Existing Conditions Alignment of Proposed Main Entry Roadway to the West*



Figure 3-3 *View 2 - Existing Conditions South Boundary Pedestrian Trail to the Northwest*



Figure 3-4 *View 3 - Existing Condition View from Hoffman Hills Boulevard to the Northwest*



Figure 3-5 *View 4 - Existing Condition View from Westerly Loop Roadway to the North*



Figure 3-6 View 5 - Existing Condition adjacent to Home Course Fairway 2 to the West



Figure 3-7 View 6 - Existing Condition View from Home Course Fairway 8 to the Southeast



Figure 3-8 *View 7 - Existing Condition View from Home Course Fairway 11 to the East*



3.2.4 Impacts

The discussion of aesthetic/visual quality impacts are organized by the different points from which the site can be observed with comparisons between the existing Subarea Plan and existing and the proposed amendments to the Subarea Plan and zoning discussed together for each area for ease of comparison.

3.2.4.1 *Impacts - No Action/Existing Subarea Plan and Zoning - East*

Under the existing Subarea Plan and zoning, the area to the immediate east of the Civic Center is in the Work/Live Focus Area, specifically Block G-1. This Focus Area is planned to support future employment uses, cultural facilities, and complementary workforce housing for the subarea. Some commercial uses may complement and act as an extension to these adjacent areas. Office, light manufacturing, and research and development are designated as appropriate business uses. The zoning is Mixed Use Village – 7 which allows generally the same uses as the nearby business and industry Focus Area, and other zoning districts in the Old Fort Lake Subarea including commercial recreation facilities, service businesses, retail trade, restaurants, cultural/community centers, office, manufacturing, and research and development. Residential uses are not allowed in the easterly portion of this area. The maximum building height is 65 feet except within 50 feet of the golf course where it is limited to 35 feet in height. There is no maximum building lot coverage and no limit to the length or breadth of buildings. Nonresidential development would be subject to a maximum Floor Area Ratio (FAR) of 0.30, which means that two thirds of a parcel would be consist of features other than buildings, likely parking and landscaping.

This building at 50 feet high is slightly lower than the maximum height allowed. Light manufacturing, research and development, and similar uses are subject to subarea design standards that state that blank walls greater than 50 feet in length along the front and side of a building require softening either by planting 12-foot high trees adjacent to the building, by wood trellises on the building, or by similar means; entrances must be emphasized with architecturally distinctive elements; such as a covered walk, gabled roof, landscaping, or similar means; earth-berming at the base of the facade is encouraged; building designs for multi-phase campuses are encouraged to be of similar character; parking areas and loading areas must be located at the rear of buildings or separated from public rights-of-way by a moderate buffer. The effect of these measures on the visual dominance of a 65-foot-high building with a width of 830 feet and a depth of 235 feet, as was proposed in the Founders Ridge development, would be relatively minor.

Manufacturing or office/research and development buildings near the maximum height of 65 feet would likely be similar to the example shown in Figure 3-9, which is from the proposed Founders Ridge development on the site. Buildings would not necessarily be built at the maximum allowed height; such as the former State Farm Insurance Building in DuPont shown in Figure 3-10 which is approximately 50 feet high. These buildings would be governed by city-wide design standards that require a variety of features including horizontal and vertical building modulation that may break up the apparent mass of a building.

Figure 3-9 *Typical Manufacturing Building*



Development in the subarea adjacent to the Civic Center would result in buildings up to 65 feet in height within 25 feet of the property line. Such buildings would be up to five stories high, about two to three times the height of the existing City Hall and police/fire building (not including the tower on the City Hall building). These buildings would dominate views to the west and completely obscure any views of the golf course or the large trees preserved at the margins of the course. Landscaping at the margins of the parcel would soften views of the base of buildings but would take decades to obscure or soften views of upper floors. The new development in the subarea would likely be of a consistent scale and internally would provide a landscape with the continuity and unity of dominant urban forms, but it would contrast with the scale of existing buildings on the Civic Center.

Figure 3-10 *State Farm Insurance Building*



The viewer population including employees of the city, persons having business within the city, persons attending official functions, and persons parking in the City Hall parking lot to access the Sequelitchew Creek trail that leads to Puget Sound would not be necessarily oriented to views to the west, but the size of the buildings would dominate all other views in the vicinity.

Under the existing Subarea Plan and zoning the area within the Old Fort Lake (OFL) Subarea to the immediate west of the Civic Center is in the Business/Industry Focus Area, specifically Block F-5. The OFL Subarea, however, is separated from Center Drive by parcels zoned MXD – Mixed Use. This district allows a variety of office and retail uses and a range of service uses including cultural services, churches and club houses and as a conditional use hospitals, nursing homes and similar uses. Maximum building height is 50 feet with 20-foot setbacks from property lines. Design Review is required for multifamily, commercial and mixed use development.

The zoning within the adjacent OFL Subarea is Mixed use Village – 5 (MUV-5) which allows a range of office, manufacturing, and research and development uses. Retail and restaurant uses are allowed only as accessory uses, which are subordinate to and incidental to allowed uses. Cultural/community centers are not permitted. Bulk regulations include maximum building height of 65 feet except within 50 feet of the golf course, where it is limited to 35 feet in height. There is no maximum building lot coverage and no limit to the length or breadth of buildings. Landscaping at the margins of the parcel would soften views of the base of buildings but would take decades to obscure or soften views of upper floors. The buildings likely would dominate views and provide a consistent scale among new development but would contrast with the scale of existing buildings in the Civic Center. It would provide a continuous and unified landscape within the Subarea. The slightly higher buildings allowed in the OFL Subarea would blend into the scale of development allowed in the Mixed Use area. Persons travelling on Center Drive would be primarily oriented to linear views along the street, but the urban development to the west would dominate views to the west. This zoning district would allow large manufacturing buildings such as were proposed as part of the Founder’s Ridge proposal on adjacent parcels, the bulk of which is illustrated in the rendering in Figure 3-11.

3.2.4.2 Impacts - Proposed Subarea Plan and Zoning Amendments - East

The parcel immediately to the west of the civic center is excluded from the proposed Subarea Plan and zoning amendments. The proposed plan recognizes its ownership by the Nisqually Indian Tribe, although it is not currently trust land. Absent of any specific proposal in the Subarea Plan and zoning amendments and any formal statement of intent by the tribe, the existing land use regulations are presumed with the same potential impacts.

The area immediately west of the mixed use zoning that abuts Center Drive is designated PROS - Parks, Recreation, and Open Space. Although it is privately owned, it has been established by analysis as part of the Founders Ridge Development that preservation of this area is required to meet the City’s tree preservation requirements.

The character of the area as viewed from Center Drive would be of urban development as described above for the existing Subarea Plan and zoning.

The preserved open space land would provide a continuous buffer of mature native vegetation of varying density on both sides of the proposed arterial access to the subarea which would provide a sense of entry initially emphasizing elements of the natural environment.

After traversing a short distance, the dominant elements of views would transition to commercial development in the General Commercial area which would be in the center of the field of vision due to a curve in the roadway. The general bulk of such buildings is shown in Figure 3- 12 with typical retail buildings illustrated in Figures 3-13 and 3-14. The maximum building height within the commercial district is 45 feet with specific design review requirements. Office development (but not residential) is allowed and could occupy upper floors with retail or service uses on ground floors. Design standards would require the ground floor of buildings to abut sidewalks. Parking would be located behind or under buildings. This would provide a landscape with urban commercial buildings as the dominant form with the continuity and unity of similar building form and design.

Figure 3-11 View 1 - From Proposed Main Entry Roadway to the Northwest - Building Bulk -
No Action/Existing Subarea Plan and Zoning

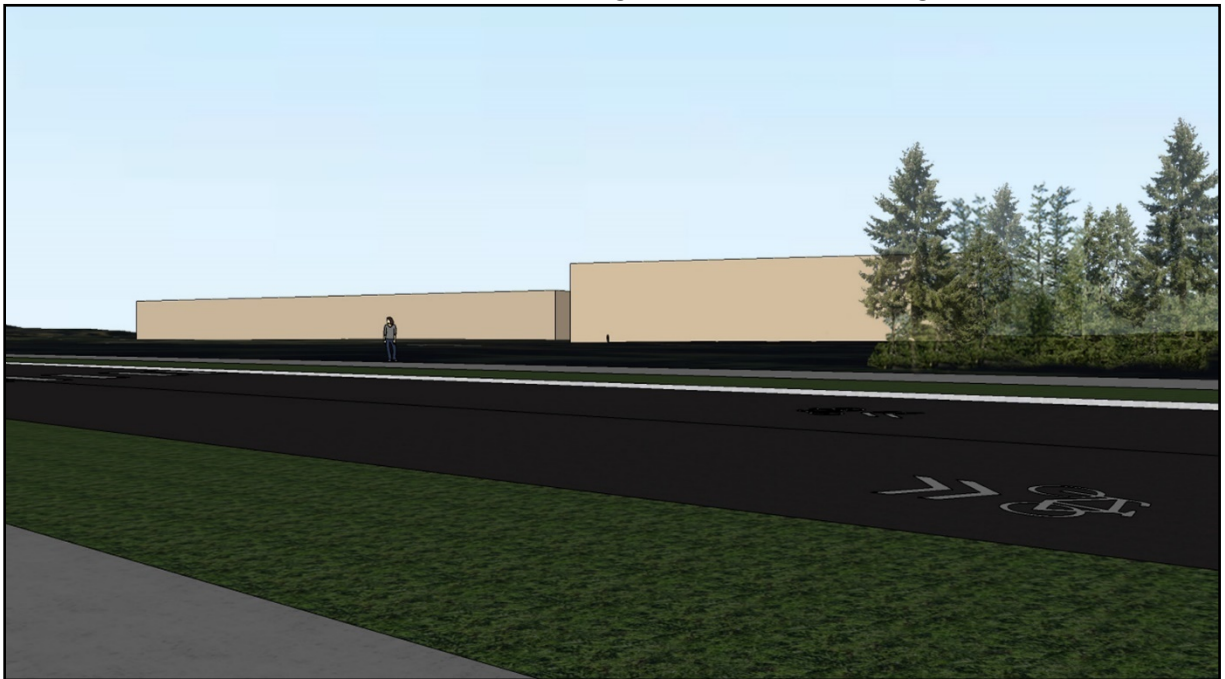


Figure 3-12 View 1 - From Proposed Main Entry Roadway to the Northwest - Building Bulk -
Proposed Subarea Plan and Zoning Amendments



Figure 3-13 Typical Retail Building



Source: Makers

Figure 3-14 Typical Retail Building with Upper Floor Use



Source: Makers

3.2.4.3 Impacts – No Action/Existing Subarea Plan and Zoning - Southeast

The southerly boundary of the site would continue to be bordered on the southeast by an 80-foot-wide corridor including an electric transmission line easement and the 12-foot-wide asphalt non-motorized trail, the Yehle Village/Palisade Village Connector.

Views from the trail to the south of school playfields, the school, and single-family residents would remain the same as the existing. The views to the north would be of the designated PROS - Parks, Recreation, & Open Space area which would retain the current diverse assemblage of trees and undergrowth for about 800 feet, approximately to the alignment of the edge of the school. The heterogeneous view of a variety of vegetation to the north and the playfields to the south would continue to be the dominant features of the views in this area.

Persons on the playfields to the south of the subarea would likely concentrate on the activities on the playfields. The mature vegetation north of the trail corridor would remain a pleasant framing element.

Approximately 800 feet west of Center Drive, approximately aligned with the east edge of the school building, the existing vegetation to the north of the trail corridor would be replaced by new urban development. The adjacent OFL Subarea is designated as Business/Industry Focus Area, specifically Block F-4. The existing zoning is Mixed Use Village – 4 (MUV-4) which allows a range of office, manufacturing, and research and development, retail and service uses. Bulk regulations include maximum building height of 65 feet except within 150 feet of a residential zoned district where it is limited to 35 feet. There is no maximum building lot coverage and no limit to the length or breadth of buildings. Nonresidential development would be subject to a maximum Floor Area Ratio (FAR) of 0.30, which means that two thirds of a parcel would consist of features other than buildings, likely parking and landscaping. Refer back to Figure 3-9 for a rendering of large manufacturing buildings such as were proposed as part of the Founder's Ridge proposal on adjacent parcels. This building is slightly lower than the maximum height. Figure 3-15 provides a visual simulation, or rendering, of a 35-foot-high building located 25 feet from the south property line. This is the maximum height at this minimum building setback. A 65-foot-high building at a distance of 150 feet, probably with intervening parking, would likely appear somewhat smaller in scale. In addition to height, the width of the building (which is not regulated) would be a substantial contributor to perception of scale.

Persons on the trail are engaged in recreation activities and would be sensitive to the context and would have views of dense urban development to the north. The urban office, research park or manufacturing buildings to the north of the trail corridor would become the dominant element in views, as the bulk of buildings would be greater than other elements. The views of building facades might be softened by landscaping and the relative bulk of the buildings would be reduced if parking were placed between the property line and the buildings. The building scale to the north would be similar in bulk to the school to the south, although the school is setback approximately 100 feet. The school is setback more than the minimum distance of setbacks to the north. which would be approximately 80 feet from the trail with a 25 foot setback from the property line. Additionally, the school has a variety of forms including variations in wall length, wall height and roof forms.

To the east of Wren Road, persons on the trail would likely perceive the large buildings to the north as the dominant feature, since the rear yard fences and the single-family residences behind them generally would be smaller in scale and separated into discrete houses separated by side yards.

Residents in their homes west of Wren Road would be sensitive to their surroundings, particularly in their back yards in which play, relaxation and gatherings take place. The replacement of vegetation to the north of the trail corridor with large-scale buildings would change the character of the views from their residences and likely would be perceived as encroachment of large-scale urban forms on views currently characterized by neutral to positive natural vegetation. At a minimum distance allowed by setbacks of about 105 feet with the 80-foot trail corridor and 25-foot building setback, the urban form of large buildings at a height of 35 feet would not likely be prominent from rear yards or ground floor vantage points. The width of buildings would likely be the feature most at variance with the character of the single-family neighborhood, where buildings are of similar height but with a maximum width of 40 to 50 feet. A new urban development would internally provide the continuity and unity of similar building form and design, they likely would be perceived from outside as an incompatible intrusive element at odds with the character of the residential neighborhood.

3.2.4.4 Impacts - Proposed Subarea Plan and Zoning Amendments - Southeast

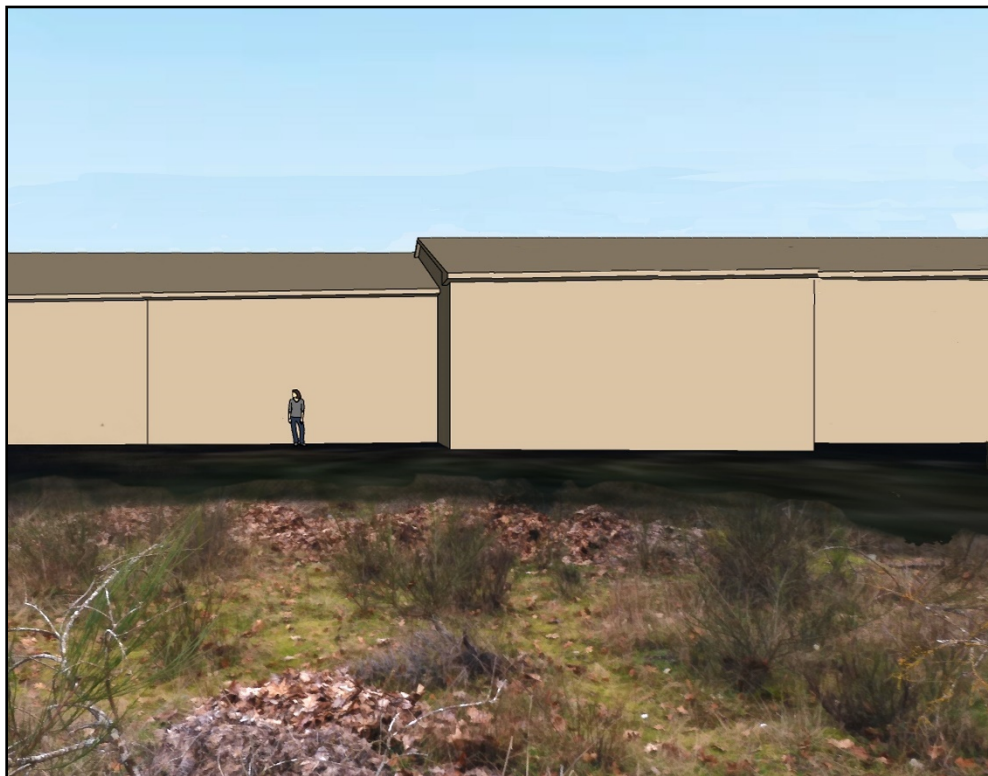
The area to the north is designated middle housing in the proposed amendments to the Subarea Plan and zoning. Middle housing has a maximum building height of 35 feet and allows duplexes through sixplexes, townhomes, stacked flats, and cottage housing. No particular limit on density is provided, except for a maximum lot coverage of 40 percent. Townhomes generally range in width from 14 to 24 feet and in depth from 30 to 50 feet, which would result in about 10 to 30 units per acre at this lot coverage. Figure 3-16 provides a visual simulation, or rendering, of 35-foot-high townhomes located 25 feet from the south property line. A typical townhome development is illustrated in Figure 3-17.

It is likely that middle housing/townhome development will be perceived by persons using the non-motorized trail and adjacent single-family development to the south as generally compatible with the existing single-family development in the area. The lower range of townhome density at 10 units per acre is similar to the zero-lot-line homes along the westerly portion of Charles Street. The upper limit of townhome density is two to five times the density of single-family homes on individual lots in the area. The physical features of townhomes, however, are likely to have features that harmonize with the appearance of single-family homes, particularly with the proposed design standards for single-family and middle-housing development types, although the pitched roofs and other features of the residences to the south that are generally evocative of the styles from the 1900- 1940's are not required. The development of allowed "stacked flats" is likely to be less evocative of single-family dwelling types as units off central hallways generally lead to larger bulkier buildings. The maximum height would be 35 feet, but the rear façade of such a building facing existing development could be relatively featureless. The proposed design standards for single-family and middle housing do not provide specific measures that would require breaking up the rear façade of such a building with modulation or other features to reduce apparent bulk as are included in the city's multifamily design standards that require articulation of facades including breaking up horizontal facades and including distinctive roof forms, changes in materials, window patterns, and color differentiation (Ord. 02-707).

Figure 3-15 View 2 – From Southeast Boundary Pedestrian Trail to the Northwest - Building Bulk - No Action/Existing Subarea and Zoning



Figure 3-16 View 2 – From Southeast Boundary Trail to the Northwest - Building Bulk - Proposed Subarea Plan and Zoning Amendments



The area to the north is designated middle housing in the proposed amendments to the Subarea Plan and zoning. Middle housing has a maximum building height of 35 feet and allows duplexes through sixplexes, townhouses, stacked flats, and cottage housing which likely would range from 10 to 30 units per acre at the proposed maximum lot coverage. As discussed above, Figure 3-16 provides a visual simulation, or rendering, of 35-foot-high townhomes located 25 feet from the south property line with an illustration of a typical building in Figure 3-17. The visual prominence of these buildings as seen from adjacent residences in this area would be somewhat greater than shown in Figure 3-16 because they would be closer to the property line. The adjacent buildings east of the detention facility are triplexes and are somewhat larger than nearby single-family houses, although they have similar design features.

It is likely that middle housing/townhome development will be perceived by persons in the residences to the south as generally compatible with the existing single-family development in the area. The lower range of townhome density is similar to the density of the triplexes although the upper range is about three times higher. The physical features of townhomes, however, are likely to have features that harmonize with the appearance of the triplexes to the south as provided by the proposed design standards although some features for the triplexes are generally evocative of the styles from the 1900-1940's, including pitched roofs are not required.

As indicated above in the discussion of the existing Subarea Plan, the area in the vicinity of Hoffman Hill Boulevard is unlikely to provide sufficient clearance for a row of townhomes or other development. Proposed Subarea Plan design standards are similar to the existing plan and would require a landscape buffer similar to what is currently present, but likely more formal and at a greater density. The visual character of development of the arterial likely would be similar to the vegetation currently visible, but the noise from the arterial would signal a greater intensity of urban activity.

Figure 3-17 *Typical Townhome*



Source: Makers

3.2.4.5 Impacts - No Action/Existing Subarea Plan and Zoning - South

On the southerly boundary, west of Hoffman Hill Boulevard, persons using Parkview Park and residents abutting the subarea could experience a variety of urban development. This area which is designated as the Mixed Use Focus Area in the existing Subarea Plan as area C-1 and C-2 is zoned Multi-Use Village-2 (MUV-2). This zoning district allows a greater variety of uses than the Business/Industry Focus Area, to the east and allows, in addition to office, research park, manufacturing uses retail and service, the additional uses of hotels, single-family and multifamily residences. There is no specific location provided for the different uses which presumably would be based on the developer's perception of market conditions and the City's oversight through site plan review.

Single-family and multifamily development may also be developed in this area, as throughout the Mixed Use Focus Area, although higher amenity areas with views of Puget Sound or adjacent to the golf course may be more likely locations. The existing zoning limits single-family use to 100 units at 3 units per acre. The small number of units at a low intensity provides an incentive to locate such units where they will have the highest value which would be at high amenity locations with views or proximity to the golf course. If single-family development were to be developed adjacent to the existing single-family development to the south, it would likely be similar in character and provide continuity and unity with existing development.

Figure 3-18 Typical Four-Story Apartment Building



Source: Makers

Multifamily development is limited to 1,000 units at a density of 32 units per acre and a maximum height of 55 feet. It is likely that the unit count limit and market perceptions would determine the type of unit developers choose to implement. It is possible that less intensive development of larger units would produce higher returns and might feature townhome units oriented to views or the golf course at a density of 12 to 20 units per acre and contain three to four stories. Figure 3-17, above, illustrates typical townhouse development. At maximum density, 1,000 units would utilize 31 acres and at maximum height likely be four stories (although low ceiling heights might allow up to five stories). Although the zoning code does not limit building horizontal dimensions, the building code provisions for frame buildings, which is most economical, generally limits floor plates to 24,000 to 90,000 square feet, with cost per square foot higher for larger floor plates (Podesto 2017). Figure 3-18 illustrates typical multifamily development at this approximate height. It is likely that the greater bulk of multifamily buildings developed immediately adjacent to existing development to the south would be regarded as a visual intrusion.

The area immediately adjacent to the south boundary of the subarea may be constrained in building scale by the short distance to the loop arterial. Across the arterial may be a desirable location for a hotel as it is the closest site to the golf course, as hotels are not allowed in the zoning districts further east. This use would be allowed at a maximum height of 65-feet with design standards requiring vertical and horizontal modulation. To achieve this height it would have to be located 150 feet from the adjacent single-family zoning, which would reduce the apparent scale somewhat. It would be subject to a maximum Floor Area Ratio (FAR) of 0.30. This would mean that a building with five floors and 100 rooms with an approximate size of 70,000 square feet must be on a lot of 233,000 square feet, which would certainly involve extensive surface parking and landscaping. A hotel building would be relatively narrow as the width is generally determined by the rooms opening off of a central corridor. Such a building would likely be perceived by residents to the south as encroachment of large-scale urban forms on views currently characterized by neutral to positive natural landscaping. A visual simulation/rendering of the bulk of a maximum height building as seen from the existing terminus of Hoffman Hill Boulevard is shown in Figure 3-19.

The homes along McNeil Street to the south, which do not have their views to the north blocked by greenbelt trees on the north side of the street, would experience a visual intrusion from 65-foot-high buildings. The tops of these buildings would be at an elevation of about 275 feet, which is about 25 to 30 feet higher than the ground floor of these buildings at 245 to 250 feet. Buildings close to the Subarea southern boundary could block views, depending on how closely they were spaced. The extent of view blockage also depends on the blockage of existing trees. There are several large trees on the northernmost existing lots north of McNeil Street that currently serve to frame views. These trees in combination with buildings to the north could contribute to view blockage. The extent to which new development is required to be set back from steep slopes will also affect view blockage. The extent to which maximum height buildings located at the northerly extent of the subarea block views is also affected by the dense mature trees along the bluff above Puget Sound with currently allows only limited view corridors. Multifamily development at a maximum height of 55 feet would be 10 to 20 feet higher than existing residences ground floors. Similarly, intrusion and view blockage would occur. Development of townhouses likely would be below the line-of-sight and would not be a visual intrusion or block views.

Figure 3-19 View 3 - From Hoffman Hills Boulevard to the Northwest - Building Bulk - No Action/Existing Subarea Plan and Zoning



Figure 3-20 View 3 - From Hoffman Hills Boulevard to the Northwest - Building Bulk - Proposed Subarea Plan and Zoning Amendments



3.2.4.6 Impacts - Proposed Subarea Plan and Zoning Amendments - South

The southerly boundary area near Hoffman Hills Boulevard is designated single-family under the proposed amendments to the Subarea Plan and zoning. Single-family zoning has a maximum building height of 35 feet. Lot size is determined by setbacks and lot coverage. The maximum lot coverage is 40 percent. A single-family house with a footprint of 1,000 feet could be located on a lot of 2,500 square feet. Up to two dwellings can be placed on any lot, but lots with greater lot coverage would require a larger site than the minimum 2,500 square foot lot size minimum. It is possible that developers would implement larger lots if they perceived them to be more marketable and to provide a higher return.

It is likely that proposed single-family development will be perceived by adjacent single-family development to the south as generally compatible with the existing development, although they could have lot sizes a third to a quarter of the size of existing lots. They would have a similar character in terms of building form and likely be perceived as providing continuity and unity within existing residential neighborhoods to the south. A visual simulation/rendering of the bulk of a maximum height building allowed in the proposed Subarea Plan and zoning amendments as seen from the existing terminus of Hoffman Hill Boulevard is shown in Figure 3-20.

The homes along McNeil Street to the south which do not have their views to the north blocked by greenbelt trees on the north side of the street would not experience visual intrusion from 35-foot-high buildings near the southern boundary of the subarea. The tops of these buildings would be at an elevation of about 245 feet, which is at or below the ground floor of these buildings. New single-family residences would be at a somewhat higher elevation, where there is a slight rise that crests about 2,000 feet north of the subarea southern boundary. However, this rise is generally out of the line-of-sight of views of Puget Sound and views in this area are also blocked or framed to some extent by mature trees along the bluff.

3.2.4.7 Impacts - No Action/Existing Subarea Plan and Zoning - West

This area west of The Home Course golf course is designated as the Mixed-Use Focus Area in the existing Subarea Plan and is envisioned to provide uses complementary to the golf course, the bluff, and adjacent neighborhoods; to support a variety of commercial, business, residential, and community uses with a walkable neighborhood center, employment campuses, and modestly sized residential neighborhoods.

The area is zoned Multi-Use Village-1 and 2 (MUV-1 and MUV-2). These zoning districts allow a greater variety of uses than the Business/Industry Focus Area, to the east. They allow, in addition to office, research park, manufacturing retail and service uses, the additional uses of hotels, single-family and multifamily residences. Allowed uses are virtually the same in the two zoning districts, except that the MUV-1 district allows the additional uses of convention center, cultural/community center, and public uses (other than parks and K-12 schools) in the northerly 2,500 feet of the Focus Area. There is no specific location provided for the different uses which presumably would be based on the developer's perception of market conditions and the City's site plan review oversight and approval.

Single-family and multifamily development may be developed throughout the Mixed Use Focus. It is likely, as provided for in the goal statement for the area, that they would be located complementary to the golf course and the bluff. The existing zoning limits single-family use to 100 units at 3 units per acre. The limited number of units at a low intensity provides an incentive to locate such units where they will

have the highest value which would be at high amenity locations with views of the Puget Sound or proximity to the open space of the golf course.

Multifamily development is limited to 1,000 units at a maximum density of 32 units per acre and a maximum height of 55 feet. It is likely that the unit count limit and market perceptions would determine the type of unit developers choose to implement. It is possible that less intensive development of larger units would produce higher returns and might feature townhome units oriented to views of the golf course at a density of 12 to 20 units per acre and three to four stories. The 4,000 linear feet abutting the golf course would accommodate 130 to 185 townhome units at widths of 24 to 30 feet. On the other hand, higher intensity flats (four or five story) might be located adjacent to the golf course and provide direct views to 500 to 1,000 units. Figure 3-17, above, illustrates typical townhouse development. Typical apartment flats are shown in Figure 3-18, above.

Manufacturing, office and other non-residential uses have a maximum building height of 65 feet except within 50 feet of a golf course where it is limited to 35 feet in height. In this area, it is unlikely that non-residential uses would be located adjacent to the golf course because such a location would be a valued amenity for residential use. There is no maximum building lot coverage and no limit to the length or breadth of buildings. Nonresidential development would be subject to a maximum Floor Area Ratio (FAR) of 0.30, which means that two thirds of a parcel would be parking and landscaping. Light manufacturing, research and development, and like buildings are subject to subarea design standards that state that blank walls greater than 50 feet in length along the front and side of a building require softening either by planting 12-foot high trees adjacent to the building, by wood trellises on the building, or by similar means; entrances must be emphasized with architecturally distinctive elements; such as a covered walk, gabled roof, landscaping, or similar means; earth-berming at the base of the facade is encouraged; building designs for multi-phase campuses are encouraged to be of similar character; parking areas and loading areas must be located at the rear of buildings or separated from public rights-of-way by a moderate buffer. The effect of these measures on the visual dominance of a 65-foot-high building with a width of 830 feet and a depth of 235 feet, as was proposed in the Founders Ridge development, would be relatively minor. Such a building is illustrated above in Figure 3-10. The former State Farm Insurance Building in DuPont in Figure 3-11, above, is an example of a style of office building that could be built in the subarea at less than maximum intensity, as it is approximately 50 feet in height.

A typical rendering of streetscapes of the bulk of non-residential buildings along the westerly north-south loop road is provided in Figure 3-21. A similar view along the east-west loop road adjacent to Fairway 2 is shown in Figure 3-23. Such new urban development within the subarea would provide the continuity and unity of similar building form and design when viewed from inside the subarea, as viewed from outside the subarea. Potential visual quality impacts when viewed from outside the subarea in the vicinity are addressed below.

The public trail that bounds the west side of the subarea just outside the old security fence will likely experience little change from its existing character. This is designated Trail T-2 in the existing plan with future improvements and local connections envisioned. It is unlikely that the character of the trail will change with new development as the trail is located about a third of the way down a steep slope for the southerly two thirds of its extent. New development is unlikely to be developed on the steep slopes above the trail, unless an applicant were to demonstrate the absence of critical areas including landslide

and erosion hazard areas. Even if such hazards could be overcome, construction on the steep slopes may be economically infeasible.

The portion of the trail in the northerly third of the subarea adjacent to the Wilkes Observatory site is more gently sloping and new development could be constructed within the minimum 25-foot setback. A series of 65-foot-tall office, research or manufacturing buildings, or 55-foot-tall multifamily buildings in this area would likely be regarded as a substantial visual intrusion into the character of the trail and the historic site. The public enjoying this resource are likely to be very sensitive to visual quality and the character of the site. Although the focus of views is likely to be the Puget Sound to the west which is the dominant vivid element of views. The presence of high intensity urban development to the east is likely to be perceived as an intrusion that impairs the integrity of what is now an integrated and unified landscape.

3.2.4.8 Impacts - Proposed Subarea Plan and Zoning Amendments - West

The area to the west of the golf course is designated in the proposed Subarea Plan amendments and proposed zoning amendments as discrete areas for single-family, middle housing/townhomes, commercial and entertainment uses as well as an area designated for civic, which is anticipated to be used for a future school. As indicated in the subarea map in Figure 2-3, in general, single-family use is designated in the southerly quarter of the subarea and along the westerly portion between the bluff and the north-south loop road. Middle housing is generally designated between the loop road and the golf course. A 3-acre commercial area is designated along the bluff at the terminus of the east-west road and an 11-acre entertainment area is designated along the east-west road south of Fairway 2. The potential school site is designated near the center of the southerly portion of the area.

Single-family zoning has a maximum building height of 35 feet. Lot size is determined by setbacks and lot coverage. The maximum lot coverage is 40 percent. A single-family house with a footprint of 1,000 feet could be located on a lot of 2,500 square feet. Up to two dwellings can be placed on any lot, but lots with greater coverage would have to be larger. It is possible that developers would implement larger lots if they perceived them to be more marketable and provide a higher return.

Middle housing zoning has the same dimensional requirements as detached single-family with the same maximum building height of 35 feet. Lot size is determined by setbacks and lot coverage. Up to six units are allowed on a lot, or units can be placed on individual lots. With townhome development, lot lines would pass through walls between units. Size and dimension of townhome units varies considerably between about a 14-foot width by a 24-foot depth, to a 32-foot width by a 40-foot depth. At the smaller end of the unit size range, the footprint of a unit would be about 340 feet, lot size per unit at 40 percent coverage would be about 840 square feet and the density could achieve between about 45 to 50 units per acre. At the upper end, the footprint would be about 770 square feet per unit and the lot size would be about 1,920 square feet per unit, or about 22 units per acre. The area of streets with units on both sides of the street would reduce the density slightly. Fourplexes, similar to those on Simmons Street in Northwest Landing are at a density of about 16 units per acre or with street frontage about 14 units per acre. With street dedications and park dedications the actual density would be considerably lower. It is possible that developers would implement larger units on larger lots if they perceived them to be more marketable and provide a higher return. The densities in Table 3.1-1 are based on probable densities based on required dedications and probable market conditions.

A typical rendering of streetscape of the bulk of single-family residences on the west side and middle housing on the east side along the westerly north-south loop road is provided in Figure 3-22.

Multifamily units have no specific density limit except the proposed high estimate of 1,360 units which would be 40 units per acre on the 34 acres proposed for the use. The nationwide average size for an apartment is 514 square feet for a studio, 757 square feet for a one-bedroom and 1,138 for a two bedroom. (DeVault 2022). Since there is a limit on total units, the size of unit likely to provide the best return is most likely to be developed on the site. The only other density limit is the landscape standard which is 30 percent of the site by general landscape standards, but which may be reduced by design standards. The 30 percent landscape standard would consume 10.2 acres. Surface parking at one space per unit would consume about 9 acres. The park dedication standard, which is 4.6 acres per 1,000 population would vary slightly by the size of unit and the resulting number of persons per unit and would range from about 7.5 acres for studio apartments, to about 13.7 acres for 2-bedroom apartments. The net area available for apartment buildings would also vary with the size of units and will ultimately determine the size and number of buildings. To achieve the maximum allowed number of units, with larger units, the entire 34-acre site would be utilized and some underground parking below the building may be required.

The three-acre commercial parcel along the bluff at the extreme westerly portion of the subarea is intended to provide for higher intensity commercial uses such as retail spaces, restaurants, and commercial recreation that may draw from a larger region. It is located on a narrow site due to the limited distance between the bluff and the existing golf course Fairways 2 and 3. The available area of about 175 feet between the property line and the fairways would be reduced by the approximately 60 feet required for the road on the east side, leaving an approximately 115 feet wide of available area. The site also slopes about 14 to 18 feet to the west which likely will require a retaining wall to the west, or if buildings were located to the west, they would require stepped foundations. Opportunities to locate buildings both on the street and at the westerly margins of the site overlooking the bluff would be limited due to the limited width and the requirement that commercial buildings abut the adjacent street frontage with parking in the rear, unless at least some of the parking were placed under buildings. This would be needed along the westerly side, which fronts towards the trail and would be fully visible to users of the trail. The 45-foot building height would be 10 feet higher than single-family and middle housing in the vicinity. This 20 percent greater height likely would not be a significant distinguishing element given the difference in building character. It is likely that building occupancy will have a larger impact on determining the necessary building height for the building, rather than the regulations. Building devoted solely to retail use are likely to be single-story, unless upper floors are devoted to other allowed uses such as services and offices (which are a conditional use). Restaurants may employ two story buildings, particularly if views to the west are desired, in which case ground floors may be devoted to kitchens and other uses with dining located on the second story where there is a greater potential for amenity views.

The 11-acre entertainment zoning district is located east of the commercial site along the south side of the east-west loop road and south of Fairway 2 extending to the east to abut undeveloped land owned by the golf course. This zoning is intended to provide for entertainment and recreation type uses such as hotels, commercial recreation, retail, restaurants, community, and cultural centers. These uses may draw visitors from the region and serve to support the adjacent golf course use. It has similar dimensional standards to commercial with 45-foot height limits, with the exception of hotels, which allow a maximum height of 50 feet. It abuts middle housing to the south and requires no setbacks for

buildings without windows and a 5-foot setback in other cases. The 45-foot adjacent buildings with little or no setback would likely be perceived by immediately adjacent middle housing as a visual intrusion, although for buildings further away, the 20 percent greater height would be less of a contrast. If parking lots with required buffer landscaping were located adjacent to middle housing, there likely would be little perceived scale difference, although noise and headlights may be perceived as an intrusion.

A view of the entertainment district along the east-west loop road adjacent to Fairway 2 and of the commercial area at the terminus of the road is shown in Figure 3-24. At this location, the new urban scale development within the subarea would provide the continuity and unity of similar building form and design when viewed from inside the subarea.

The northeast corner of the subarea adjacent to the Wilkes Observatory is designated for single-family use to the west and middle housing to the east. The maximum building height of 35 feet and rear yard setbacks of 20 feet will contrast with the vegetated open space character, but is not likely to be regarded by visitors to the site as a substantial visual intrusion into the character of the area. Even though the focus of views is likely to be the Puget Sound to the west as the dominant vivid element, the presence of moderate intensity urban development to the east particularly as visitors must pass through this area for access to the site, is likely to be perceived as somewhat of a contrast. However, during the course of the trip to the site one will pass through at least one mile of such land use and that will therefore appear to be the dominate land use, creating a sense of unity. The Wilkes Observatory site will serve as a visual relief of intact mature vegetation.

Figure 3-21 View 4 - From Proposed Road Along Western Portion to the North - Building Bulk – Existing Subarea Plan and Zoning



Figure 3-22 View 4 - From Proposed Road Along Western Portion to the North - Building Bulk - Proposed Subarea Plan and Zoning Amendments



Figure 3-23 View 5 - From Proposed Road Through The Home Course to the West - Building Bulk – Existing Subarea Plan and Zoning



Figure 3-24 View 5 - From Proposed Road Through The Home Course to the West - Building Bulk – Proposed Subarea Plan and Zoning Amendments



3.2.4.9 Impacts - No Action/Existing Subarea Plan and Zoning - North

This area adjacent to the Sequelitchew Creek canyon which forms the northerly boundary of the subarea is designated to the northwest as the Mixed-Use Focus Area and is zoned Multi-Use Village-1 (MUV-1). The majority of this area extending to the east is in the Subarea Plan Work/Live Focus Area and is zoned Mixed Use Village – 7 (MUV-7). Both these designations are discussed above. Bulk standards are similar with 65-foot maximum height for non-residential use. The Sequelitchew Creek Trail on the north side of the canyon is the only publicly accessible viewpoint from this direction. There are no views of the subarea available to the public outside of the subarea due to steep slopes with mature vegetation on the south side of the canyon. Proximity impacts on other elements of the environment relevant to the open space, such as impacts on plants and animals are discussed in those sections. The cohesiveness of future development of the area to internal observers will depend on the specifics of layout and design.

3.2.4.10 Impacts - Proposed Subarea Plan and Zoning Amendments - North

The northwest corner of the subarea is proposed to be for single-family and middle housing uses. These uses will not be visible to most of the public using the Sequelitchew Creek trail on the opposite side of the canyon. The parcel which abuts the canyon to the east is owned by the Nisqually Tribe and has been excluded from the Subarea, pending future planning coordination with the Tribe. Until that planning effort is completed, it is presumed that existing regulations will control. However, as discussed above, no impact on visual quality to those outside of the subarea is expected as there is no viewing population.

3.2.4.11 Impacts - No Action/Existing Subarea Plan and Zoning - Golf Course

The Home Course golf course occupies much of the center and westerly portion of the Subarea. About half of the perimeter of the golf course is abutted by areas designated for future development. About a third of the perimeter of fairways is bounded by other fairways and about a fifth is bounded by the Old Fort Lake open space. Three of the fairways are bounded on both sides by parcels designated for future development. Twelve fairways are bounded on one side by other fairways and by developable parcels on the other side. Two fairways are bounded by permanent open space on one side and developable area on the other. One fairway, No. 14, the shortest, is surrounded by golf course facilities on all sides.

The Home Course golf course currently brings the greatest number of persons into the Subarea including several thousand golfers per year and additional spectators during golfing tournaments. Views within the golf course are primarily oriented along the fairways, however the surrounding small-scale evergreens and shrubs provide a consistent although somewhat haphazard assemblage of natural vegetation at the margins of the fairways.

Under the existing zoning the areas designated by parcels subject to development all allow non-residential development at a height of 65 feet with a limit of 35 feet in height when the building is within 50 feet of the course. The westerly portion of the subarea, zoned MUV-1 and MUV-2, also allows single-family use at a maximum height of 35 feet with a minimum building setback adjacent to the course of 20 feet. Multifamily use is allowed in the same westerly area with a building height of 55 feet and a minimum building setback of 20 feet. Single-family use is limited to 100 units. If all were located at the west side of the golf course, they might reasonably be projected to occupy about 1,000 feet of the 11,000 feet of golf course perimeter allowing such use. Multifamily use is limited to 1,000 units that could be developed as attached townhomes for maximum value per unit. Townhomes could reasonably

be projected to occupy the entire perimeter where allowed. If higher density apartments were located adjacent to the course, they could be projected to occupy 30 to 60 percent of the perimeter where allowed.

Golfers are extremely sensitive to the visual quality of their surroundings including landscaping, vegetation, water features, golf features and backdrops (Powell 2023). The most vivid views from the golf course are of Mount Rainier to the southeast, which is most prominent from east-west trending fairways (Nos. 2 through 13, 17 and 18). The mountain is also visible from any place on the course by simply turning to face it. The Home Course has generally small areas under course ownership outside of fairways. The dimensions from the center of fairways to the property line are often less than 250 feet and in some cases as little as 100 feet. This provides for very limited area for buffering vegetation and for errant golf balls to leave the course without potentially damaging adjacent uses. The presence of single-family houses at the perimeter of golf courses is familiar to the golfing community and likely would not be regarded as a substantial intrusion or as an incompatible element, although it would be a substantial change from the existing background of native vegetation, even though that vegetation is of mixed age, character and somewhat haphazard.

The location of 55-foot-high apartment buildings adjacent to the westerly portion of the golf course 20 feet from the property line and between 120 and 300 feet from the center of the fairways and closer to perimeter facilities, such as golf cart trails, likely would be considered a substantial intrusion and an incompatible element as it would tend to dominate the natural and landscape elements of the course.

The entire perimeter of the golf course could be lined by non-residential buildings such as office, research and development, and manufacturing uses if residential uses were located elsewhere, such as adjacent to the bluff. It is unlikely that such uses would be developed at a height of 35-feet within 50 feet of the course since that area could be used for parking and maximum building height of 65 feet could be achieved by buildings located at the 50-foot limit. The bulk character of such a building located south of Fairway 8 is shown in Figure 3-25 and a similar size building is shown in Figure 3-27 to the west of the Fairway 12 golf cart trail. In both cases, the bulk of the building would dominate the views and would very likely be viewed as an intrusion upon the course and as incompatible with the open space landscape and natural character of the course.

3.2.4.12 Impacts - Proposed Subarea Plan and Zoning Amendments – Golf Course

The proposed Subarea Plan and zoning amendments provide specific land uses at specific locations rather than the allowed mix of uses in the existing plan and zoning that provides developers with the option of what uses to locate where, with oversight by the City's design review process.

The north and northwest portions of the subarea owned by the Nisqually Tribe are excluded from the Subarea Plan amendments and presumably would be addressed in the future.

The easterly most fairways include Fairway 7, which is bordered on the north and east by the excluded parcel owned by the tribe. Until alternative regulations are adopted, it can be considered to be governed by existing codes with the same impacts as under the existing Subarea Plan and zoning. Fairway 8 is bordered by the Parks, Recreation and Open Space designation which is preserved to meet the City's tree preservation standards. This area can be expected to be maintained in the mix of second growth vegetation that is currently present.

Fairway 8 is bordered by the Entertainment (ENT) district on the south further west along a boundary of about 500 feet. The ENT district is intended to provide for entertainment and recreation type uses such

as hotels, commercial recreation, retail, restaurants, community and cultural centers that draw visitors from the region and serve to support the adjacent golf course use. This 9-acre entertainment zoning district has a building height maximum of 45 feet, with the exception of hotels, which have a building height maximum of 50 feet.

Further to the west the golf course is bounded by a 7-acre triangular shaped Neighborhood Business (NB) district. This zoning designation is intended to provide for smaller scale commercial type uses that serve the subarea and city residents, such as retail and restaurants, personal service uses, light manufacturing buildings, professional and medical offices and banks and credit unions. This district allows for a maximum building height of 45 feet.

The proposed zoning would require some uses to be oriented to the public street, but given the configuration of the two sites which extends about 900 to 1,000 feet from the street in the case of the ENT site and up to 800 feet in the case of the NB site, uses in the interior can be expected to be oriented to internal driveways and parking areas. At the rear of the site adjacent to the golf course, it is reasonable to expect buildings to be separated from the property line by double-loading parking lots and by a landscape buffer.

Figure 3-26 shows a visual simulation/rendering of the bulk character of such a building about 60 feet from the property line with potential building height at both one to two stories and the 45-foot maximum height (for uses other than hotels). The bulk of the building would dominate the views, despite landscaping which likely would not be an effective screen for 15 to 20 years and would very likely be viewed as an intrusion upon the course and as incompatible with the open space landscape and natural character of the course. Although the 45-to-50-foot height limits are 10 percent to 30 percent lower than the maximum allowed height in the current zoning, buildings developed at or near maximum height would be the tallest features visible and would have impacts similar to those described above for the existing subarea and zoning. Most viewers from the golf course would likely consider maximum height buildings in adjacent ENT and NB districts to be a substantial intrusion and an incompatible element as it would tend to dominate the natural and landscape elements of the course.

Figure 3-25 View 6 - View from Home Course Fairway 8 to the Southeast - Building Bulk - No Action/Existing Subarea and Zoning



Figure 3-26 View 6 - View from Home Course Fairway 8 to the Southeast - Building Bulk - Proposed Subarea Plan and Zoning Amendments



If buildings were located at or near the common property line with the golf course at the minimum setback of 5 to 20 feet, rather than separated by a parking lot as shown in Figure 3-26, a 45- to 50-foot-high building at that location would dominate views from the golf course and most likely be perceived as intrusive and out of place.

Landscaping is required over a minimum of 20 percent of a site by general land use code provisions. Parking lot landscaping is required adjacent to streets. The type of landscaping between required adjacent to a use such as the golf course depends on whether the ENT and NB uses are considered incompatible, which is then addressed on a case-by-case basis (DMC 25.90.30(3)). The proposed zoning has specific landscape standards that may modify such standards but largely apply to frontage or internal landscaping. There are no specific setbacks or buffers designated for the golf course.

Landscape buffers may be required on a case-by-case basis if adjacent use is considered incompatible, but the width is undetermined (DMC 25.90.30(3)). Parking lot landscaping is required adjacent to streets. The type of landscaping required adjacent to a use such as the golf course depends on whether the ENT and NB uses are considered incompatible, which is then addressed on a case-by-case basis. The proposed zoning has specific landscape standards that may be in addition to DMC 25.90.30(3)(b), below:

"In the process of reviewing development proposals, the city will require full, moderate, or light buffers as necessary to mitigate incompatibility, for example between residential and nonresidential development, or between an outdoor storage or trash receptacle area and surrounding high-use areas"

Both zoning districts would require facade articulation under proposed regulations to create a human-scaled pattern for street-facing building façades and other building elevations facing parks. If applicable, the proposed regulations require a façade articulation feature every 40 feet of façade. Code requirements could be met with three out of seven listed design features that could lead to employment of features that can be adhered to the building façade such as window patterns, vertical piers/columns, and change in building material or siding style. All of these features may simply be attached or added to a relatively flat building face and may provide some scale benefits when viewed from close-up within the urban area. When viewed at a greater distance, however, they likely would not be effective in breaking up building scale. The proposed standard for building modulation of 12 to 18 inches would likely be relatively ineffective in reducing perceived bulk and intrusiveness from the distance of the golf course.

The lack of imposition of any specific provisions for transitions from the golf course in the proposed subarea and zoning amendments would likely create two adjacent landscapes with a definitive and abrupt boundary between the two with entirely separate dominant features. There are few, if any, provisions proposed that would make the transition more gradual or soften or obscure the visual prominence of the urban landscape from the relatively natural landscape of the golf course. Overall, the sensitivity of site and building design would depend on design decisions made at the implementation stage depending on the design sense of design professionals and city review staff, but not necessarily guided by specific proposed standards.

Slightly further to the west near the southerly boundary of the subarea, Fairways 11 and 12 are bounded to the east by the proposed Multifamily (MF) district on a 34-acre site. This zoning is intended to provide for higher density housing in buildings greater than 6 units. A high density estimate of 1,360 multifamily units in the Old Fort Lake Subarea would result in a maximum density of 40 units per acre. In addition to multifamily units, the district allows adult retirement communities, adult family homes, and by

conditional use permit allows nursing homes with up to 180 beds, assisted living facilities, commercial indoor and outdoor recreation, schools and churches.

This MF district has bulk standards similar to the Entertainment and Neighborhood Business district with a 45-foot height limit, which would allow four story buildings, or in some cases, a partially buried first floor might achieve five stories. Design standards for the MF district are similar to ENT and NB with a minimum setback of 5 feet.

Figure 3-28 shows a visual simulation/rendering of the bulk character of such a building about 15 feet from the property line as viewed from east of Fairways 11 and 12. Figure 3-18, above shows a typical development of 4-story buildings with surface parking. Achieving the maximum allowed density may require underbuilding parking for at least some buildings.

Figure 3-27 View 7 - View from Home Course Fairway 11/12 to the East - Building Bulk - No Action/Existing Subarea and Zoning



Figure 3-28 View 7 - From Home Course Fairway 11/12 to the East - Building Bulk - Proposed Subarea Plan and Zoning Amendments



Facade articulation similar to that described above for the ENT and NB districts under the proposed regulations applies to the MF district. The same limitations of proposed regulations to reduce scale impacts as viewed from a greater distance applies to multifamily development.

It is likely that the apartment buildings would be placed as close as possible to the golf course to obtain the maximum amenity value from proximity to its open space. A building with a height of 45 feet that is 5 to 15 feet from the golf course boundary and 115 to 175 feet from tees, greens, and fairways would likely be perceived as a dominating and intrusive feature in the landscape to many viewers. The extent to which it would be viewed as intrusive and out of place is largely dependent on viewer expectations. To some persons it might seem out of place and incongruous, to others it might fit into expectations of playing adjacent to a high intensity urban community. Single-family dwellings are relatively common adjacent to golf courses and are often planned as an integral part of a county club environment. Single story or two-story residences can be effectively screened by even small trees. Multifamily buildings 45 feet tall would require mature trees to provide effective screening. Although there are a few specimens of mature native trees preserved on the margins of the course, there are far too few to screen four-story buildings, particularly if those buildings were of substantial horizontal extent. The appearance from the golf course could be of a landscape bounded by a wall of buildings.

Landscaped areas may provide a buffer to the golf course. DMC 25.90.020 requires 30 percent of the land area to be landscaped area, which would total 10 acres.

Areas of parkland that might be required to be dedicated also could be located to provide buffers to the golf course and could augment buffer area and buffer effectiveness. The Comprehensive Plan Level of Service (LOS) standards provide for 4.5 acres of Community Parks per 1,000 population, which would require 13.5 acres of parkland for the maximum number of units allowed. Proposed subarea zoning regulations also require amenity space of 150 square feet per dwelling unit for studio and one-bedroom units and 200 square feet for two or more bedroom units. For 1,360 units, this would total between 4.5 and 6.2 acres of amenity space. It is not clear whether this is in addition to, instead of, or combined with the Comprehensive Plan Level of Service (LOS) standards.

The easterly portion of the subarea containing commercial, entertainment, neighborhood business and multifamily uses would have the greatest impact on the visual quality of views from the golf course.

The majority of the golf course on the westerly boundary and the center area bounded by Fairways 1, 5, and 9, are all bounded by middle housing (8,800 feet or 1.7 miles) and single-family housing designations (8,000 feet or 1.5 miles). Bulk standards are virtually the same for the two districts: with a maximum building height of 35 feet; a maximum lot coverage of 40 percent, a minimum rear yard setback of 20-feet, and minimum side yard setback of 5-feet. The single-family district allows single-family detached houses and allows a separate accessory dwelling unit on a lot or duplexes. Middle housing allows up to six units which can be placed on one lot or on individual lots.

There is no minimum lot size which is effectively determined by lot coverage: a single-family house with a footprint of 1,000 feet could be located on a lot of 2,500 square feet. With two dwellings, lot coverage presumably would be greater and lots would have to be larger. The greatest difference between the two housing types is the separation between buildings which would render single-family homes separate units of varying widths. For middle housing, at the smaller end of the width range the footprint of a unit would range from about 80 feet long to almost 200 feet at the upper end.

It is possible that a developer might implement larger lots or larger middle housing units adjacent to the golf course if they perceived them to be more marketable and provide a higher return.

The 35-foot height limit and minimum 20-foot rear yard setback likely would result in the view from the golf course being of both single-family and middle housing dwellings as a two-story building set back the minimum setback. In many cases, property owners might prefer not to have a fence for view purposes and let their rear yards blend into the golf course margins or employ rail fences or other measures to delineate property lines without blocking views.

The presence of single-family houses at the perimeter of golf courses is familiar to the golfing community and likely would not be regarded as a substantial intrusion or as an incompatible element, although it would be a substantial change from the existing background of native vegetation.

3.2.4.13 Impacts - No Action/Existing Subarea Plan and Zoning - Old Fort Lake

The Old Fort Lake open space tract is a 47-acre parcel near the center of the subarea owned by the city. It is a steep sided glacial kettle with the lake surface about 50 feet below the surrounding land. The steep slopes are vegetated with mature evergreens and a few deciduous trees, including Oregon White Oaks. The city property line lies adjacent to the steep slopes. There is almost no flat land in city ownership outside of the steep slopes. The property currently has a covenant imposed by Weyerhaeuser and the state Department of Ecology that limits disturbance and limits use to those that would not lead to children having sustained access to soils due to the presence of hazardous materials. There currently is no public access to the open space area.

The existing Subarea Plan has a policy (OSR 1.2) that provides for a looped trail around the lake that connects with surrounding trails and provides views of the lake. If implemented, this would provide a viewing population in that open space.

The entire east perimeter of this open space would be lined by non-residential buildings such as office, research and development, and manufacturing uses if residential uses were located elsewhere, such as adjacent to the bluff. There is not a limit on building height within proximity of the open space. Sites abutting open space districts require screening by a light landscape buffer, which would likely provide little effect on the visual prominence of buildings up to 65 feet in height. It is likely that the bulk of the building would dominate the views from the open space and would very likely be viewed as an intrusion and as incompatible with the natural character of the open space.

3.2.4.14 Impacts - Proposed Subarea Plan and Zoning Amendments - Old Fort Lake

The east side of the Old Fort Lake open space is abutted by multifamily zoning. The proposed amendments to the Subarea Plan provides for a pedestrian-oriented trail along the bluff. If implemented, this would provide a viewing population in that open space. Given the lack of specific provisions for buffers in the proposed Subarea Plan and zoning and the limited setbacks coupled with the maximum allowed building height, the impacts would likely be similar to that described for multifamily development adjacent to the golf course. It is likely that the bulk of the building would dominate the views from the open space and would very likely be viewed as an intrusion and as incompatible with the natural character of the open space.

3.2.5 Mitigation

There are a wide range of strategies available to reduce visual quality and negative aesthetic impacts ranging from changing building height and bulk to specific building design features that provide visual unity and interest to screening and softening.

The initial commitment in mitigation strategy must be recognizing that there is a public benefit to some degree of continuity, integration and unity between elements of a landscape. The existing Subarea Plan speaks to:

- “neighborhood compatibility”
- Creating “a strong community character that balances function, aesthetics, and compatibility”
- “ensure compatibility of development”
- Notes that “The existing Comprehensive Plan and Municipal Code establish natural resource and land use controls but lack detail about future infrastructure, aesthetics, amenities, and compatibility”
- “apply land use designations, buffer standards, and other development controls to ensure neighborhood compatibility”
- “new development needs to be sensitive to the surrounding context and character”
- “It is a commonly held community goal to protect the Home Course as a beautiful and highly desirable public amenity. New development will need to protect the edges, views, and overall character of the golf course”
- “architectural design guidelines shall be applied to address massing, appearance, and compatibility concerns”
- “The subarea should create plans to address building orientation, exterior colors/materials, architectural details, and size/height restrictions to ensure an attractive community character, to enhance neighborhood compatibility, and to protect views and natural areas.”

The proposed plan amendments include similar policies but with less emphasis on the open space and no specific policies to “protect edges, views and overall character of the golf course.”

Continuity, unity and lack of encroachment can be addressed by a variety of strategies.

Compatible building bulk can be addressed by placement of buildings in relation to areas with less density, or areas of open space such as natural areas or the golf course such that building scale does not overwhelm the character of adjacent areas. This can be done by a variety of approaches:

- Providing lower building height adjacent to less intense areas which are less prominent due to their scale and therefore don’t present as great a contrast. This could be done by designating a buffer area of lower intensity uses adjacent to landscapes with a primarily natural character, or areas with substantially lower intensity uses, or providing for a step-down in intensity within higher intensity zoning districts.
- Establish greater setbacks such that the relative height of more intensive use is attenuated by distance such as the perception of relative height and the degree of encroachment or incompatibility is reduced.

- Provide effective landscape screening such that intrusive features are blocked or shielded. This is often problematic because planting landscaping necessarily involves smaller trees that are more likely to survive. Even the largest available nursery stock often takes several years, or decades to provide an effective screen, especially of taller or bulkier buildings.
- Retain, if available, large specimen vegetation that not only may screen new development but may provide features that are taller and therefore become the dominant element of a view, rather than buildings.
- Establish building façade articulation that effectively breaks up the perceived scale of a building when viewed from moderate to greater distance rather than just providing visual interest for close-up viewers. The more effective measures include substantial upper floor setbacks that reduce the apparent building height, often combined with features such as balconies that add complexity and therefore reduce monumental scale. Substantial vertical articulation that are read as breaking buildings into recognizable smaller units is more effective, rather than simply providing variety. The effectiveness of such measures is enhanced by the other measures listed above.

Strategies for increasing compatibility can be combined with other development requirements to enhance one another and work in concert.

- Location of required landscaping to increase setbacks or buffers and enhance the density and viability of large specimen landscape elements.
- Location of required park and recreation dedications to also increase buffers or setbacks, possibly in conjunction with trails and other facilities to provide a managed landscape designed to incorporate many of the strategies above and provide land usable for multiple functions.

Such increased buffer areas would also support the proposed Subarea Plan for additional trails in areas where available space on existing public land is limited as well as enhancing the policy of buffering development from the adjacent Home Course Golf Course to protect people and structures from errant golf balls.

Such strategies can be incorporated throughout the proposed zoning code to introduce specific buffers within the regulations for a specific district, for example with specific standards for the boundary between higher buildings in commercial and entertainment districts from lower intensity residential development, open space and the golf course. Alternatively, separate overlay districts with specific regulations appropriate for a neighboring use could be established.

Achieving the goals of providing compatibility between different areas designated for different uses with different landscape characteristics is ultimately a site and building design challenge requiring collaboration between design professionals, the public, interested parties, and City review staff. This effort would be enhanced by specific zoning and design standards that clearly establish the preferred approaches and clear standard for judging whether a particular design solution is successful.

3.2.6 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, the implementation of either alternative will introduce a variety of land uses that will permanently change the visual character of the area.

3.3 LIGHT AND GLARE

3.3.1 Affected Environment

Lighting within the Old Fort Lake Subarea at the present time consists only of street lighting and parking lot and building lighting within the Home Course golf course.

3.3.2 Impacts

Under the proposed alternatives, lighting impacts would be similar. Light sources from both alternatives would include street and/or sidewalk lights, building-mounted lights, and interior lights. There would likely be a greater number of sources in the proposed development than currently exist in the subarea, which could result in an overall increase in ambient or diffuse brightness. Streetlights would most likely conform to the City of DuPont's policy of directing exterior lighting away from nearby properties and wildlife habitat to prevent spillover or glare. Downcast, shielded lamps with low-intensity filaments would reduce the overall brightness at night and would reduce glare. Under the existing plan and zoning, the dominant light sources would be building-mounted and pole-mounted security lights. The density of such lights could increase, but the overall impact would be moderate if modern lamps with shielding and low-intensity filaments were designed into the project.

The most significant light and glare impacts would be to viewers from the south particularly the pedestrian trail and the first row of houses. In the area west of Hoffman Hill Boulevard some additional existing residents to the south would view light sources because of the hill they are located on. Elsewhere, residences at higher elevations would not have views because of the greenbelts along McNeil Drive. Light from street lamps and interior lights could create a high level of ambient light generally visible from the area as a whole.

Headlights from cars leaving the site on the proposed roadway aligned with Palisade Boulevard will sweep across the sides of the existing final residences at the west end of the existing street as cars turn right or left.

3.3.3 Mitigation

For both alternatives, source shielding for exterior lights may be used to reduce the visibility of light from distance residential areas and limit spillover light. The City of DuPont recommends using downcast, shielded lights for urban areas. In addition, architectural design of buildings should consider avoiding glare from glass surfaces that might temporarily blind motorists or cyclists.

This project is not expected to generate indirect or cumulative impacts that would be significant after mitigation.

3.3.4 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, the implementation of either alternative will introduce a variety of land uses that will add artificial lighting and permanently change the nighttime character of the area.

3.4 HAZARDOUS MATERIALS

Technical studies that form the basis of the analysis presented in this section may be found at:

<https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>

3.4.1 Affected Environment

A substantial portion of the Old Fort Lake (OFL) Subarea was contaminated by a variety of substances as the result of munitions manufacture by the I.E. DuPont de Nemours Company and by airborne arsenic and other materials from the ASARCO smelter in Ruston, located about 15 miles to the north.

3.4.2 Regulations Governing Hazardous Materials

Hazardous materials are regulated at the federal, state, and local level and are classified based on the laws and regulations that define their characteristics and use (i.e., hazardous or dangerous wastes, hazardous or toxic substances). Facilities or properties that store or manage hazardous materials or waste in significant quantities or have released hazardous materials or waste to the environment, are required to report these activities to both the federal and state agencies that regulate them. In addition, several local agencies protect human health and the environment.

3.4.2.1 Federal

The Environmental Protection Agency (EPA) administers several programs under a variety of regulatory authorizations, including the Resource Conservation and Recovery Act (RCRA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Toxic Substance Control Act (TSCA). The EPA maintains databases that track sites with potential or confirmed releases to the environment. RCRA regulates hazardous waste treatment, storage, and disposal facilities that are in active operation. CERCLA provides a means of discovering and listing hazardous waste disposal sites on the National Priorities list, followed by EPA oversight or direct involvement of site cleanup. The EPA maintains files of hazardous waste management for facilities based on notification requirements; defines the type of handling to be performed; and in the case of spills or accidents, determines whether a release to the environment has occurred.

3.4.2.2 State

Ecology implements state programs that regulate hazardous materials and waste, in cooperation with the corresponding EPA programs and regulations; MTCA regulations (Chapter 173-340 WAC) and Dangerous Waste regulations (Chapter 173-303 WAC) are the principal regulations in this regard. Ecology maintains records and lists of hazardous waste sites, spills, and enforcement actions. Ecology has been directly involved in oversight of cleanup and remediation efforts on this site since the mid-1980s as is further detailed below.

3.4.2.3 Local

The Puget Sound Clean Air Agency regulates discharges to the air from hazardous materials and waste sites. Public Health Seattle and King County enforce landfill and waste disposal site regulations. The City of DuPont municipal code includes regulations pertaining to hazardous and toxic materials, underground storage tanks (USTs), and activities within wellhead protection areas around municipal water supply wells.

Local government such as the City of DuPont has no specific role in MTCA cleanup and remediation, except for notification and the opportunity to comment at specific points of the process.

3.4.3 Site Industrial History

In 1906, the E.I. du Pont de Nemours Company purchased approximately the site covered by the DuPont Old Fort Lake Subarea which is part of five square miles of land on both sides of Sequelitchew Creek. Plant capacity in 1909 was rated a total of 18,000,000 pounds per year of nitroglycerine dynamite. A black powder mill was completed in October 1913 which produced standard commercial black powder for blasting purposes as well as fuse, sporting and fireworks. Production of black powder continued until 1945. In 1915 and 1916 the capacity of the plant was expanded to 40,000,000 pounds of dynamite per year. During the First World War, the plant produced large quantities of nitrate of ammonia for military purposes. It is estimated that total production at the plant over its operation exceeded over 1 billion pounds of dynamite (DuPont 2021). The facilities were dispersed throughout the site to prevent fire and explosions from spreading. Figure 3-29 shows the location of facilities previously located on site. In general, manufacturing facilities were concentrated in the northerly and westerly portions of the site. Manufacturing areas were connected by an internal narrow-gauge railroad.

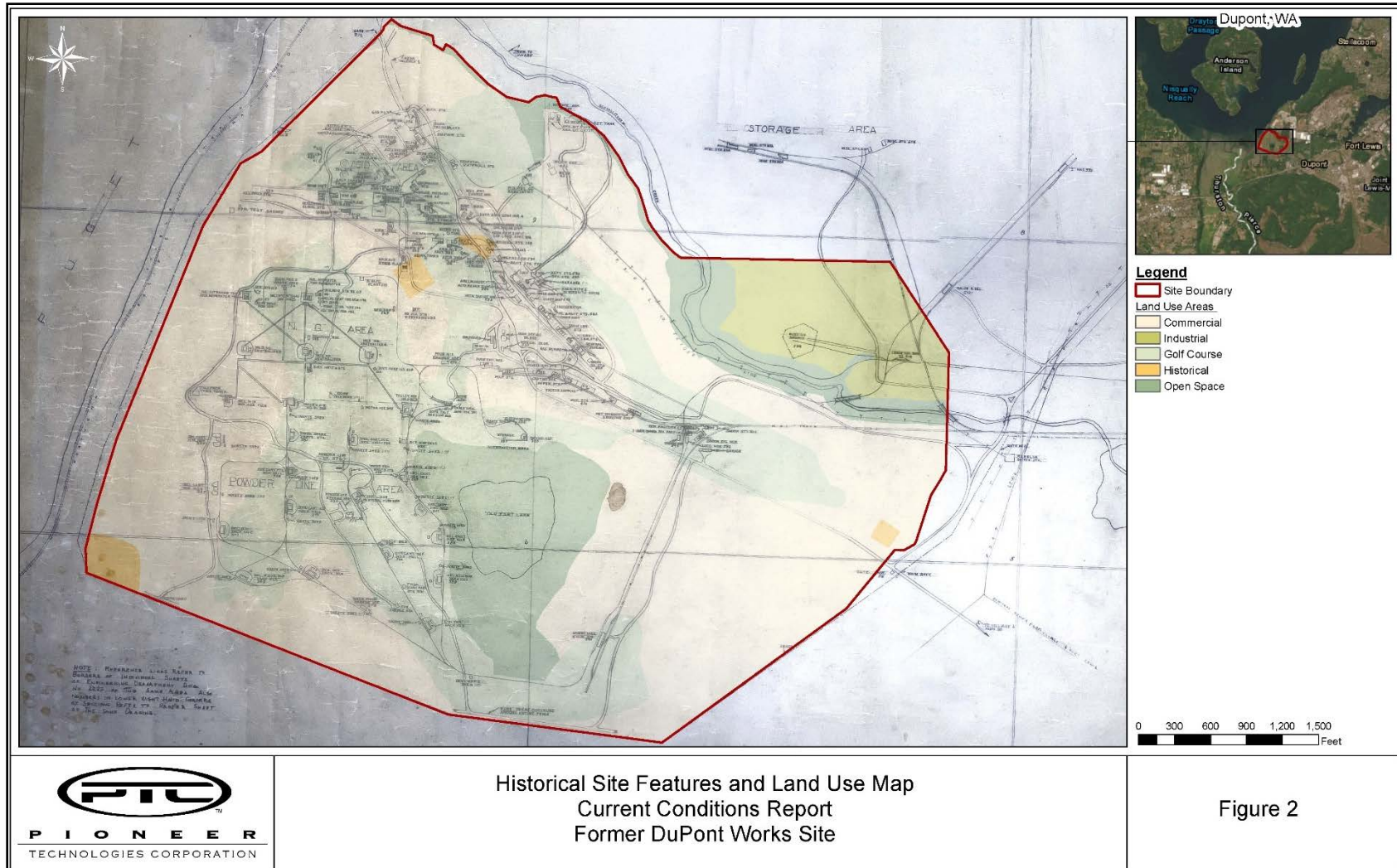
Weyerhaeuser purchased the 3,200-acre former explosives plant site in 1976 from the DuPont Company. Weyerhaeuser originally planned to use the property as the site for a wood products export facility and initiated the land use and shoreline permit process. In the 1980s, Weyerhaeuser changed its focus to land development through its subsidiaries Weyerhaeuser Real Estate Company (WRECO) and Quadrant Homes and developed the Northwest Landing planned community on land that had been maintained as a buffer area and had not been subject to manufacturing activities.

Weyerhaeuser began the process of cleanup and remediation of hazardous materials on the site in the 1980s. Soil and groundwater contamination within the Old Fort Lake Subarea was addressed by a variety of investigations and governmental reviews and approvals as outlined below.

1980s Investigations

A series of investigations into potential environmental contamination were first completed on the Site in the 1980s. In 1985, Weyerhaeuser initiated studies to determine whether hazardous substances were present. In 1986, a Phase I Environmental Site Assessment (ESA) was conducted to identify areas on Site that may be of environmental concern and soil contamination was first documented and reported to Ecology (Hart Crowser Inc. 1986). In 1987, a Phase II ESA was performed, which characterized the type, concentration, and distribution of contamination in 38 areas on the Site (Hart Crowser Inc. 1987). In 1989, a Baseline Human Health Risk Assessment was performed using results of the Phase II ESA (Pioneer 2003).

Figure 3-29 Historic Location of Explosives Manufacturing Facilities



1991 Consent Decree

In 1991, Weyerhaeuser and DuPont signed a Consent Decree (No. 91-2-01703-1) with Ecology to study the Site and complete a Remedial Investigation (RI), Risk Assessment (RA), and Feasibility Study (FS). The Site was divided into two main areas: Parcel 1 (the area that includes the DuPont Old Fort Lake Subarea) and Parcel 2 (to the north of the subarea, which is currently an aggregate mine)

1990 to 2001 Interim Remedial Actions

Between 1990 and 2001, Interim Remedial Actions (IRAs) were conducted to remove soil and/or debris from 21 areas of the Site. These activities occurred while studies and negotiation with Ecology were ongoing. For each IRA, complete work plans were developed, reviewed and approved by Ecology. IRAs were localized soil and/or debris removal actions conducted to minimize the potential for transport of residual constituents in soil, to protect groundwater (thereby minimizing potential future environmental impacts), to improve the safety and environmental conditions at the site, to remove debris and facilitate a more complete and accurate RI, and to prepare for the final remediation of the Site. Materials were recycled off-site, incinerated off-site, or sent to an approved landfill. IRAs were completed around former Bunker-C pipelines and above-ground storage tanks, around building foundations, the former narrow-gauge railroad, the soil and sand laydown areas, along a 250-foot swath of land on the southern perimeter of the Site, and in areas where there were elevated mercury concentrations. The total volume of material removed from the Site during IRAs included approximately 60,900 tons of soil; 9,700 tons of debris; 1,540 tons of soil and debris mixtures; 4,836 drums; 69,204 gallons of liquids; and 170 cubic yards of asbestos-containing material. Materials were recycled off-site, incinerated off-site, or sent to an approved landfill (West Shore Corporation NW and PIONEER 2000a through 2002b). A more detailed summary of the specific IRAs can be found in the January 2024 Remedial Investigation Report (Pioneer 2024) and the 2007 Closure Report (Pioneer 2003, 2007).

2003 Remedial Investigation

The Final Remedial Investigation (RI) was completed in 2003 and characterized the nature and extent of contamination in the context of past activities at the site. The RI investigated soil, surface water, groundwater, and sediment and determined that soil was the only medium of concern. The highest levels of contamination occurred in areas associated with former building foundations, in areas where manufacturing materials were disposed and along the narrow-gauge railroad (NGRR) tracks (Pioneer 2003).

2003 Risk Assessment

The Final Remedial Investigation was completed in 2003 and evaluated constituent concentrations in soil. The Risk Assessment (RA) evaluated site conditions based on planned future land industrial and commercial uses (as of 2003). The RA identified soil cleanup levels and presented the methods used to derive site-specific soil cleanup levels that were protective of human health and ecological receptors. These cleanup levels were compared to constituent concentrations in order to identify the areas on the site that required additional evaluation in the FS. Of the 213 constituents evaluated in soil, 11 (aldrin, arsenic, benzo(a)pyrene, dinitrotoluene [DNT], copper, lead, mercury, nitrobenzene, trinitrotoluene [TNT], tetrachlorethylene [PCE], and various types of petroleum) required a remedy due to significant exceedances of cleanup levels (Pioneer 2003).

2003 Feasibility Study

The Final Feasibility Study (FS) was completed in 2003 and evaluated over 50 different potential cleanup alternatives designed to meet the remedial action objectives. The FS report provided information for Weyerhaeuser and DuPont to recommend alternatives for remediation of selected areas, including both no action and action alternatives. The preferred alternatives included a variety of small- and large-scale actions (Pioneer 2007).

2003 Cleanup Action Plan

In 2003, Ecology then evaluated the Feasibility Study (FS) and selected the remedial measures it believed were the most appropriate. The Final Cleanup Action Plan (CAP) was then approved by Ecology. Depending on location, different alternatives were selected for implementation. The preferred alternatives selected were on-site soil excavation and deposition with cap and cover (for large scale applications), and a combination of the remaining alternatives (for small scale applications) and included:

- **On-Site Deposition with a Cap/Cover (Golf Course):** The majority of contaminated soil excavated from the Site was deposited in placement areas (PAs) that were located within the golf course footprint. The contaminated soil was then covered with a cap that consisted of at least 12 inches of compacted gravel that was then topped with a minimum of six inches of clean soil. Of the 197 acres of the golf course, placement areas (PAs) totaled 75 acres and Non-Placement Areas (non-PA) totaled about 121 acres (Pioneer 2007).
- **Tree Root Zone Remediation:** The purpose of this remedial action was to preserve selected trees within the future GC footprint. This remedial action involved sampling soil within tree drip lines (e.g., the approximate horizontal distance of the outstretched limbs and roots) for arsenic and lead. In instances where the arsenic CL or lead SL were exceeded, one foot of soil was carefully removed within the drip line of the tree, soil samples were collected, and the excavation was immediately filled with clean topsoil. If confirmation sample results exceeded the applicable cleanup goals, additional rounds of excavation and confirmation sampling were conducted until the remediation goals were achieved (Pioneer 2007).
- **Large-Scale Excavation:** Large-Scale Excavation involved excavation of one foot of soil over large areas of the Site where elevated levels of arsenic and lead were present. Following excavation, confirmation samples were collected to confirm that the applicable cleanup goals were met. Where goals were not achieved, additional excavation was conducted until goals were met. Excavated soil was disposed of on Site in PAs within the GC Area (Pioneer 2024).
- **Localized Removal at Miscellaneous Small Units:** MSUs were identified as areas where isolated, small occurrences of TPH, mercury, DNT and TNT, nitrobenzene, benzo(a)pyrene, aldrin, tetrachloroethylene, copper and/or arsenic/lead were found in subsurface soil (e.g., soil at a depth greater than one foot). MSUs represented less than one percent of the total volume of contaminated soil on-site. Some of the soil from the MSUs was excavated and disposed of on-site in placement areas (PAs) within the GC, and some was transported off-site for disposal at an United States/Ecology Environmental Protection Agency (EPA) approved landfill. Contaminated debris occurred on-site as piping, brick and other construction materials painted with lead-based paint. Stockpiles of formerly excavated material primarily consisted of soil, although in some cases there was also demolition debris. Debris and stockpile materials were sampled to characterize the constituent (arsenic, lead, etc.) concentration. Depending on the concentration,

they were either excavated and disposed of on Site in PAs within the golf course, or transported off-site for disposal at an Ecology/EPA approved landfill (Syntec 2017).

- Cap/Cover of Historical Areas: Contaminated soil in the HI Areas was covered with a cap that consisted of at least 12 inches of compacted gravel that was then topped with a minimum of six inches of clean soil. After the minimal cap thickness was met, where planting was specified, additional soil was added to the depth necessary to cover the root ball of the designated plant(s) (Pioneer 2007).
- A 15-acre wooded area in the easterly portion of the site designated CM-08 in remediation plans was not subject to substantial excavation and remediation activities because burial sites were believed to be present. Cleanup was based on meeting statistical compliance with cleanup levels (Pioneer 2024).
- Open space areas consisting of the Sequelitchew Creek Canyon (three areas) and the open space surrounding Old Fort Lake received minimal sampling and remediation. Removal of materials in several Miscellaneous Small Units (MSUs) was implemented. The open space areas comprise approximately 72 acres, of which 47 acres are within the Old Fort Lake open space (Pioneer 2007).

Natural restoration was selected as the preferred alternative for groundwater remediation because the cost for active groundwater treatment would be substantial and disproportionate to the degree of risk reduction achieved. DNT concentrations (the only detected constituents) were consistently low, were not affecting the regional aquifer, were not affecting surface water, and the aquifer was not used as a drinking water source. Therefore, Ecology determined that no active remedial action was necessary, and long-term monitoring at selected wells would be sufficient (Pioneer 2007).

2003 Consent Decree

In 2003, Weyerhaeuser and DuPont signed an updated consent decree (No. 03-2-10484-7) with Ecology committing to complete the remedial action identified in the 2003 CAP (Ecology 2003).

2007 Closure Report

In 2007, the Closure Report was prepared to document the completed remediation on the Site (PERC and PIONEER 2007). The remediation fulfilled the requirements of both consent decrees on file for the Site (No. 91-2-01703-1 [1991] and No. 03-2-10484-7 [2003]). As discussed in Section 1, the Site was subdivided into five Areas, which were further subdivided into remediation units (RUs) with specific remediation actions for each (Pioneer 2007).

3.4.4 Remediation Areas

Golf Course

The area that has become the Home Course golf course was divided into Placement Areas (PAs) totaling 75 acres that were used to place contaminated soil from other areas of the site and Non-Placement Areas (non-PAs) that totaled 121 acres. After placement, the contaminated soil was capped with at least 12 inches of compacted gravel and at least six inches of clean soil.

Within the golf course, some materials were removed including elevated levels of metals (i.e., arsenic, copper, and lead), explosives (i.e., 2,4-DNT, 2,6-DNT, nitrobenzene, and TNT), TPH (specifically Bunker-C fuel oil and motor oil), and PCE. The arsenic- and lead-impacted soil with constituent concentrations greater than cleanup levels were placed on an asphalt pad adjacent to Fairway 2 for processing and

were either included in the arsenic and lead soil-screening program where material could be washed and separated into fractions sampled to determine their designation for either off-site disposal or placement on site. The DNT, nitrobenzene, TNT, TPH, and PCE impacted soils were excavated and disposed off-site. Arsenic- and lead- impacted soil from other areas of the Site were then placed in the PAs, and the PAs were capped as described above. Following completion of all soil removal remedial actions, the soil in the GC Area met the cleanup levels for industrial and commercial use (Pioneer 2007).

West of the Golf Course

Remediation within the area west of the golf course (remediation areas CM-01, CM-02 and CM-03) includes the most intensive manufacturing areas and the most intensive small unit remediation (SMU) sites. The full range of remediation was performed in 2003-2007 including interim remedial actions (IRAs) to remove soil and/or debris from specific areas; miscellaneous small units (MSUs) were isolated, small occurrences were removed and often placed in capped areas; large-scale excavation (LSE) where one foot of soil was removed over most of the area; and tree root zone remediation for retained trees. In Subarea A-1 a remediated glacial kettle known as Old Salt Lake is located, which received liquid and slurry wastes from the main powerhouse tank moats; oil residues from boilers, boiler blow down, and sewer drainage; and waste salts from the former nitric acid plant. The remedial actions completed within the area removed elevated levels of metals (i.e., arsenic, copper, and lead), explosives (i.e., 2,4-DNT, 2,6-DNT, nitrobenzene, and 2,4,6-TNT), and TPH (specifically Bunker-C fuel oil and motor oil). Upon the completion of the remedial actions, the soil in all of the CM Area met the applicable cleanup levels for industrial and commercial use (Pioneer 2007).

East of the Golf Course

Remediation within the area east of the golf course (remediation areas CM-04, CM-05 and CM-08) had few operational areas related to manufacturing. Cleanup included interim remedial actions (IRAs) to remove soil and/or debris from specific areas miscellaneous small units (MSUs) where isolated, small occurrences were removed and often placed in capped areas and large-scale excavation (LSE) where one foot of soil was removed over most of the area. The exception was the forested area to the far east (CM-08) where only small unit removal occurred in limited areas. Cleanup was based on meeting statistical compliance with cleanup levels due to the concern that burial sites were potentially located in this area, so substantial excavation and remediation activities were avoided. Additional investigation, including ground penetrating radar surveys, have not documented burial sites in this area (Adams, 2022). The Works Magazine Landfill was located in Subarea location F-1 near the southern boundary north of the current pedestrian trail near the Charles Street Alley and was used as a landfill for materials related to explosives packaging, auto shop wastes, empty ammonium nitrate drums, and residual water gel. It was subject to interim remedial action. The variety of remedial actions completed in the area removed elevated levels of arsenic, lead, 2,4-DNT, 2,6-DNT, and TNT to levels designated for industrial use (Pioneer 2007).

Historical Areas

Remedial actions completed in the HI Areas included MSU remediation and capping. Minimal remediation was done in the HI Area RUs to ensure the preservation of the historical artifacts. The remedial actions completed in the HI Areas included small-scale excavations of lead-contaminated soil in HI-01 and capping in the remaining three HI Areas. The constituents that were present above cleanup levels were aldrin, arsenic, and lead. Soil concentrations of arsenic and lead in HI-02, HI-03, and HI-04 were higher than the cleanup levels in some instances. A protective cap was placed over these areas to prevent exposure by human and ecological receptors (Pioneer 2007).

Open Space Areas

Remediation completed within the OS Areas designated in the remediation plan (not the same as the Old Fort Lake Subarea open space) included IRAs, MSU remediation, tree remediation, and large-scale excavation. Minimal large-scale excavation was conducted in these areas in an effort to protect ecological habitat. Following completion of the remedial actions, soil in the OS Areas met cleanup levels for industrial use (Pioneer 2007).

Surface Water

Three surface water bodies (Puget Sound, Sequelitchew Creek, and Old Fort Lake) occur within or adjacent to the Site. Puget Sound is a large saltwater body west of the Site. Puget Sound directly or indirectly receives all groundwater and surface water discharge from the Site. Sequelitchew Creek is a perennial stream that originates in Sequelitchew Lake east of the Site and discharges into Puget Sound. In the dry season, the upper and lower reaches of the creek within the Site are dry. Old Fort Lake is a glacial kettle lake that has no inlet or outlet. The lake is fed by groundwater and the lake level is an expression of the aquifer.

Dissolved lead and dissolved copper have been detected at elevated concentrations in one or more samples collected from Old Fort Lake and Sequelitchew Creek. Dissolved copper was the only constituent with confirmed elevated detections. Dissolved lead was detected infrequently at marginally elevated concentrations in both Old Fort Lake and Sequelitchew Creek.

Based on the analytical data, Ecology provided verbal agreement that No Further Action was required for surface water at the site, indicating that constituents detected in surface water on-site do not require cleanup or any further action (Pioneer 2007).

Groundwater

The only constituents detected at elevated concentrations in groundwater since 1996 were the isomers 2,4-DNT and 2,6-DNT. Because detected DNT concentrations were consistently low, were not affecting the regional aquifer, were not affecting surface water, and the aquifer was not used as a drinking water source, Ecology determined that no active remedial action was necessary, and long-term monitoring at selected wells was deemed sufficient. Periodic groundwater monitoring occurred at the Site until 2014 (Pioneer 2014), at which time it was deemed no longer necessary. Restrictive covenants remain in place to restrict the extraction of groundwater for use as drinking water (Pioneer 2024).

Freshwater Sediment

Lead was detected in Old Fort Lake sediments but at relatively low concentrations. Detected concentrations of metals were comparable to available background sediment datapoints for the Puget Sound region. Based on these data, Ecology provided verbal agreement that No Further Action was required for freshwater sediment at the Site, indicating that constituents detected in freshwater sediment on-site do not require cleanup or any further action (Pioneer 2024).

2008 to 2014 Groundwater Monitoring

Between 2008 and 2014, periodic groundwater monitoring was required to evaluate dinitrotoluene [DNT] concentrations in groundwater until the total DNT groundwater concentrations were below the applicable cleanup level for four consecutive sampling rounds. DNT levels declined below cleanup levels. As a result, monitoring was discontinued in late 2014 and was determined to be no longer required. Restrictive covenants prohibit the use of groundwater for drinking purposes (Pioneer 2024).

2016 Ecology Periodic Review and Hazardous Sites List Removal

In 2016, Ecology removed the Site from the Hazardous Sites List because the Site was determined to have been cleaned up and met approved cleanup levels (Ecology 2016a). Additionally, Ecology's 2016 Periodic Review determined that the remedial actions conducted at the Site continue to be protective of human health and the environment. The Periodic Review stated that requirements of the restrictive covenants were being satisfactorily followed and no additional remedial actions were required. The restrictive covenants and a requirement for further reviews every 5 years remained (Pioneer 2007).

2022 Albatross Agreed Order

In 2022, Ecology entered into a new Agreed Order DE 21135 with Albatross for the portions of the Site currently owned by Albatross. Albatross owns the majority of the CM Areas of the Site and is the potentially liable party responsible for additional cleanup at the site. Albatross plans to remove additional contamination, thereby making areas of restricted land use suitable for unrestricted (e.g., residential) land use. The Albatross Agreed Order provides that Albatross will undertake a series of sampling and remediation actions (Ecology 2022).

3.4.5 Impacts - Existing Subarea Plan and Zoning

The existing Subarea Plan and zoning which allows largely office, business park, industrial and commercial uses can be expected to allow a range of uses generally comply with the industrial standards to which the site was cleaned up or restored pursuant to the 2003 plans.

The covenant on the property (AFN 200611010855) limits the property to "...commercial use as allowed under the City of DuPont zoning regulations and Comprehensive Plan and under MTCA, provided, however, that the Property shall not be developed and used for any of the following: residential uses, schools, daycare, parks, recreational uses (with the exception of potential future golf course expansion) or any other use in which the likelihood of children having sustained access to soils can reasonably be anticipated."

The city changed its zoning regulations and Comprehensive Plan in 2017, after the October 2006 imposition of the covenant. The current zoning allows the following uses that are not within the terms of the covenant and would require Ecology approval of a modification of the covenant and possibly additional cleanup and remediation: Commercial recreation facilities such as golf, tennis, swimming and all indoor commercial recreation facilities; Multifamily residences; single-family residences; Family day care; Public uses other than parks and K-12 schools; Cultural/community center; Educational institutions. The land use code notes that "These uses may be further restricted based on a State of Washington Department of Ecology Consent Decree and/or private restrictive covenant. These uses may only be allowed when not prohibited/restricted by a consent decree and/or restrictive covenant. The applicant shall demonstrate compliance as part of the land use and/or building permit review."

Potential measures to allow such uses are address below under the proposed Subarea Plan and zoning amendments.

3.4.6 Impacts - Proposed Subarea Plan and Zoning Amendments

In order to accomplish the proposed residential and recreational uses in the proposed amendments to the Old Fort Lake Subarea Plan and zoning regulations, additional cleanup or remediation will be required where sampling indicates that materials exceed the levels deemed to be safe to protect human health and specifically where there is a likelihood of children having sustained access to soils.

Ecology has the jurisdiction to require that a property previously cleaned up to industrial standards is cleaned up to a more stringent applicable standard as a condition of conversion to nonindustrial use (RCW 70A.305.030(2)(f)).

The responsibility for cleanup of this site to residential land use (unrestricted per Ecology nomenclature) is solely the responsibility of the owner proposing the use. The City of DuPont has no formal role in such cleanup except the requirement that Ecology provide an opportunity for comment by the public and by the state agencies and local governments that would otherwise implement local laws regarding land alternation (RCW 70A.305.090). The cleanup is entirely under the jurisdiction of the State Department of Ecology (Ecology) under the Model Toxics Control Act (MTCA) and other authorities. Ecology is responsible for analysis under the State Environmental Policy Act (SEPA) of the remediation plan that is considered for approval. This analysis is of the City of DuPont proposal to amend the Old Fort Lake Subarea Plan and zoning within the subarea. It addresses the potential range of impacts and remediation activities available, however it does not analyze a specific remediation plan, nor does it accomplish SEPA review for any remediation plan that may be developed by the applicant or considered or adopted by Ecology.

The proposed Subarea Plan would allow residential use over almost all the areas previously restricted to industrial or commercial use.

The current landowner submitted a plan for additional investigation of contaminants on site in January 2024. The status of implementation and results is unknown. This will be reviewed by Ecology, who will employ their public notice, environmental review and decision-making process. Contaminants that have been identified include:

Aldrin

Aldrin (an insecticide) was analyzed prior to 2003 at 32 pre-remediation sample locations on the site. The samples were collected between 1986 and 1992. Of the 32 total samples analyzed for aldrin, only one sample contained measurable amounts (i.e., concentrations greater than the laboratory reporting limit). The concentration of aldrin in this single sample (0.60 mg/kg) exceeded the aldrin unrestricted SL (0.059 mg/kg). This sample remains in place as it was located within historical shell midden at the southwest corner of the subarea (remediation area HI-04). Remedial activities of this sample at original depths of 0 to 0.5 feet included the placement of a cap to protect archeological artifacts and to be an exposure barrier. The cap consisted of gravel 18 inches thick. Assuming this cap remains in place and maintained (per the restrictive covenants), the human health exposure or ecological risk posed by aldrin in soil at the site is at the levels approved in 2003 Consent Decree as protective of human health and the environment under the specified exposure conditions. The Nisqually Tribe who now owns the site has not discussed any plans for management of this site. It is currently not fenced or designated by other physical features (Pioneer 2024).

Arsenic

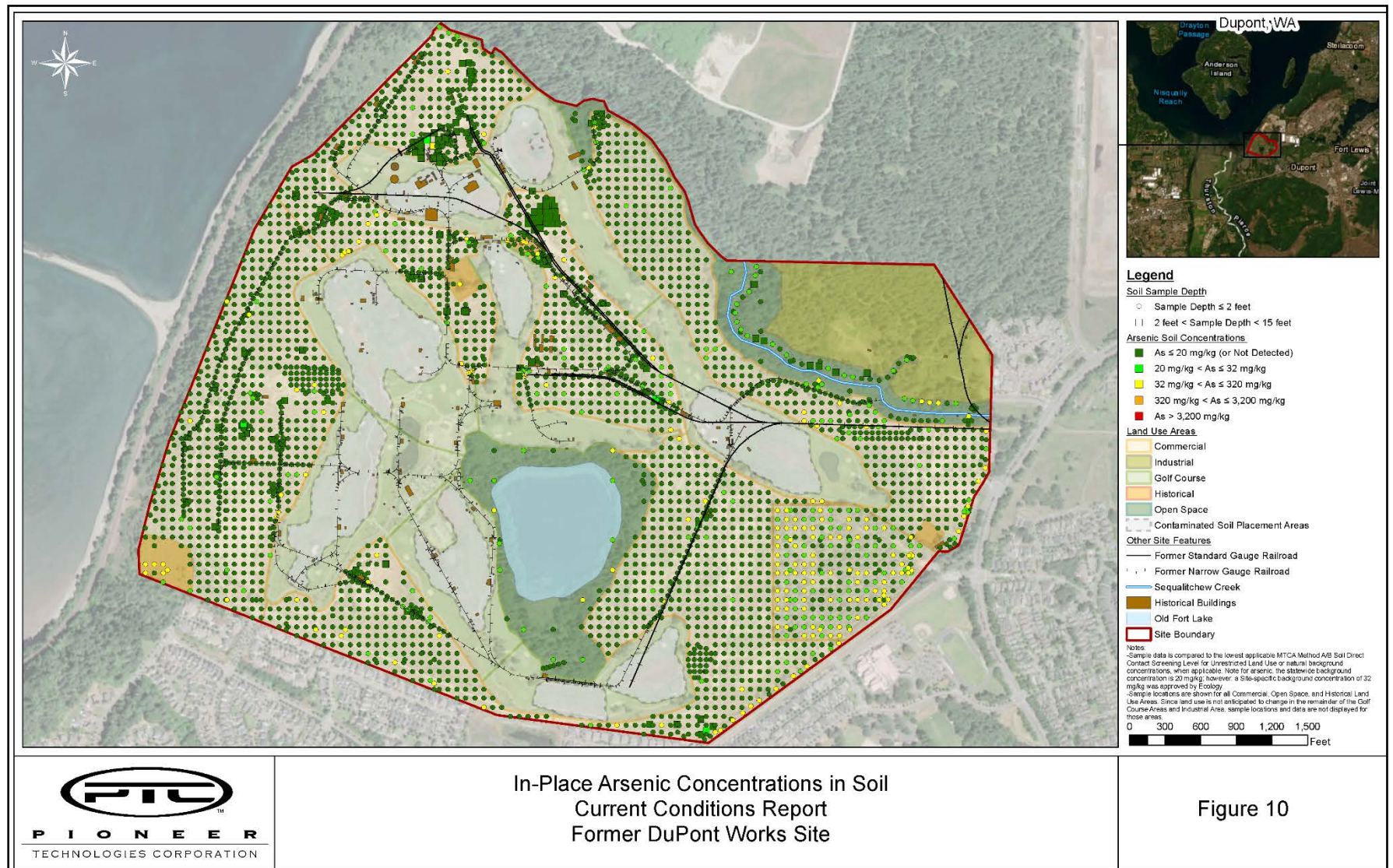
Prior to the 2003 remediation, elevated arsenic concentrations were located throughout the site, generally aligned with narrow gauge railroad locations. Arsenic was sprayed along the rail lines and building foundations to inhibit weed growth in order to prevent potential fires. The Tacoma Smelter Plume was also responsible for generating arsenic concentrations generally between 40 and 100 mg/kg (Ecology 2022b). A site-specific background concentration for arsenic of 32 mg/kg (or parts per million (ppm)) was approved by Ecology in 1996. The current soil cleanup level of arsenic for unrestricted land

uses, including residential, is 20 mg/kg as provided in WAC 173-340-900. The Washington State Department of Ecology and the United States Geological Survey have determined that the natural background level of arsenic in Puget Sound soil is 7 ppm (parts per million). (San Juan 194) Ecology will determine the cleanup level as part of approval of the remediation plan.

After the 2003 remedial activities, consisting of removal of one foot of soil over most of the site, IRAs, and MSU remediation, arsenic remained in soil at concentrations greater than the 20 mg/kg Puget Sound natural background. A total of 368 arsenic samples representing in-place soil exceed 20 mg/kg and 173 samples exceed 32 mg/kg. The exceedances are generally focused in:

Arsenic concentrations decrease with depth, consistent with herbicide application and airborne deposition from the former ASARCO smelter. A total of 262 of the 271 samples with arsenic detections of greater SLs are located in the uppermost six inches of soil. Five additional samples with arsenic exceedances are located between six inches and one foot below the surface. Only four samples with arsenic exceedances are located at depths greater than one foot, with the deepest exceedance occurring between three and six feet. The most uniformly contaminated portion of the site is the forested area generally north of the Pioneer Middle School designated as open space to meet tree preservation requirements (designated as remediation site CM-08). This portion of the site is most likely contaminated primarily by airborne arsenic and lead contamination from the ASARCO Tacoma Smelter Plume. This area was not subject to removal of topsoil in the general remediation program because it had lower levels of contamination and few munitions manufacturing facilities and presumably, was expected to be subject only to future industrial and commercial development (Pioneer 2024). Management of this area of 20 to 30 acres as presumed open space has not been determined and may present challenges to avoid human exposure as outlined below.

Figure 3-30 Location of Exceedances of Arsenic Levels



Lead

Prior to the 2003 remediation, elevated lead concentrations were located throughout the site, similar to arsenic levels. After remedial activities were completed (sitewide scraping, IRAs, and MSU remediation), sporadic lead concentrations remained greater than 118 mg/kg and 250 mg/kg (the terrestrial ecological SL and MTCA Method A levels, respectively). A total of 14 samples representative of in-place soil contain lead at concentrations greater than 118 mg/kg, all of which are located 0 to 0.5 feet of the surface. The samples are located in the area designated as open space in the proposed Subarea Plan in the easterly portion of the site (remediation area CM-08). Lead concentrations in CM-08 are less than the MTCA Method A level of 250 mg/kg. Surface soils were not removed from this area, as allowed under MTCA since the area was determined to be in statistical compliance and the “average” concentration is less than the industrial remediation level. The standard Ecology selects for cleanup of this area is likely to depend on the type of public access provided in this area and methods used to limit access to contaminants.

Exceedances were found in the Nisqually Cemetery (remediation area HI-02), and the midden site in the southwest corner of the subarea (remediation area HI-04). Remedial activities in these areas included the placement of an 18-inch-thick exposure barrier (Pioneer 2024).

Assuming this cap remains in place and maintained (per the restrictive covenants), the human health exposure or ecological risk posed by lead in the soil at the site is at the levels approved in 2003 Consent Decree as protective of human health and the environment under the specified exposure conditions.

MMAN

MMAN (an explosive) was analyzed in 180 samples prior to remediation. Out of those 180 samples, MMAN was detected in only 19 samples. A total of 54 soil samples remain representative of in-place soil, including 5 with MMAN detections. All MMAN samples were collected between 1987 and 1992; MMAN was not analyzed in soil after remediation was completed. Only 2 samples representative of in-place soil contain MMAN at concentrations greater than the SL (1,904 mg/kg), collocated at different depths within CM-04 in the southeast portion of the Site. The samples were collected at depths of 0 to 3 feet (3,600 mg/kg) and 3 to 6 feet (30,000 mg/kg) from test pits advanced in a former works magazine landfill area.

It should be noted that MMAN readily dissociates in water to monomethylamine (MMA) and nitrate and is not expected to be persistent in the environment. MMA is a natural ingredient in many foods including vegetables. Evidence from occupational studies have shown no long-lasting health effects when workers were exposed to MMAN via inhalation and dermal contact. (Pioneer 2024) Future land use in this area is middle housing/townhomes.

Petroleum Compounds

Soil at the site has historically been analyzed for many different petroleum compounds including Bunker C fuel, diesel fuel, Fuel Oil #6, gasoline, Kensol, kerosene, motor oil, oil & gas, Stoddard solvent, and generic total petroleum hydrocarbons (TPH). There are currently five locations with exceedances of residential (unrestricted) levels for motor oil, and oil & grease. The remaining petroleum compounds were either not detected or did not exceed SLs in samples representative of in-place soil.

Total petroleum hydrocarbons (TPH) associated with Bunker C fuel was analyzed in 491 samples collected in 1992 and 1993 prior to remediation. Most occurrences were in the location of the former Bunker C Pipeline and above-ground storage tank located in the northwesterly portion of the site in

Subareas designations A-1 and A-2 (remediation area 01). Remedial actions removed the TPH contamination from the Site to concentrations less than the 7,600 mg/kg level for residential (unrestricted) with the exception of one soil sample at a concentration of 36,000 mg/kg located in the Subarea designation F-5 (remediation area CM-04) at a depth of 3 to 5.5 feet (Pioneer 2024). Future proposed land use in this area is middle housing/townhomes.

3.4.7 Mitigation

The implementation of a cleanup and remediation plan approved by the Department of Ecology may be expected to provide mitigation of impacts of hazardous materials to the standards of the Model Toxics Control Act RCW 70A.305.030 and WAC 173-340-360, which generally are designed to be protective of human health and the environment.

As part of the 2003 remediation effort, confirmation sampling for arsenic and lead remediation was completed using five-point composite sampling patterns with 75-foot spacing. This was deemed sufficient in 2003 given the planned commercial/industrial use. For use of the site for residential uses, the decision/exposure units (e.g., individual residential parcels) may be much smaller (e.g., less than a quarter acre), which may result in some exposure units having limited to no samples. Refined sampling may be required in any future residential exposure units that have no sample data and/or in areas with exceedances.

At the time of specific development proposals, more detailed sampling and specific remediation plans may be required because the spacing of existing sampling is not sufficient to identify all “hot spots” where contaminants may exceed the levels required for residential use.

The requirements for residential (or unrestricted) use would require areas where there are current exceedance of levels approved for unrestricted use either be remediated to levels allowing unrestricted use or would require avoidance of those areas through various actions such as isolating those areas under paved parking areas or other barriers that preclude human contact, or by effectively precluding access through fencing or other controls, particularly by children.

The level of remediation will be determined by the Washington Department of Ecology. Only Ecology has the legal authority to determine the appropriate level of remediation under the Model Toxics Control Act (MTCA). It is unknown whether they will impose a uniform standard for all areas with residential use or impose specific standards for specific use areas based on the plans developed for specific site and building plans.

Strategies for different types of residential use may vary depending on the ability to control use and exposure.

Single-family and middle housing/townhouse areas likely will require cleanup of the entire lot area outside of impervious surfaces of road surfaces and sidewalks because it is difficult or impossible to reliably predict or restrict human access to the entire lot area.

Multifamily use may include specific designation of different activity areas with different sampling and remediation requirements for areas where exposure to soils can be isolated, such as multifamily parking areas where contaminants can be isolated by pavement.

Commercial and entertainment areas may require a specific level of remediation based on the specific uses proposed and whether they include recreation or education facilities that might expose children to soils.

A school site is proposed within the subarea which will likely require the highest level of cleanup and remediation since it will serve a concentration of children and has among the highest potential for children to be exposed to soils.

The forested open space area designated as Parks, Recreation, and Open Space in the Subarea Plan which is generally north of the Pioneer Middle School and bisected by the main access road (designated as remediation site CM-08) may present challenges for establishing appropriate cleanup measures. This portion of the site is contaminated by arsenic and may have lead contamination, likely primarily by airborne arsenic and lead contamination from the ASARCO Tacoma Smelter Plume. This area was not subject to removal of topsoil in the general remediation program because it had lower levels of contamination and few munitions manufacturing facilities, was suspected to be a burial site, and presumably, was expected to be subject only to future industrial and commercial development. Specific parameters for land use and management of this area of 20 to 30 acres as presumed open space has not been determined. One strategy would be to avoid human exposure, however isolation of this large area from human contact may be difficult. It is possible that perimeter fencing could be employed to prevent human entry, rendering the area a largely visual amenity, together with fulfilling to some extent the goals of protecting natural habitats, and providing some shade and some carbon sequestration that may relate to goals of mitigating climate change. The location is likely to be an attraction to children's desire to explore, which renders maintenance of fencing a challenge. It may be possible to limit access to specific fenced trail corridors, including the current asphalt roadway, which would allow some enjoyment of the open space amenity value while limiting the area that would need to be remediated. It is possible that options for covering or capping to limit direct exposure to contaminants in the surface soils may be explored.

Infrastructure involves potential exposure during construction and maintenance. Excavation for utilities such as water, stormwater and sewer may involve excavation at depths greater than the depths at which current samples have been taken. Sampling of the locations of excavations at greater depths will be required prior to excavation to determine whether additional remediation is required. Hot spots encountered during excavation may require isolation of excavated materials and either isolation on-site or removal off-site to approved disposal sites. Protection of workers during construction also will require measures to isolate or protect workers from exposure during construction. This likely will be addressed by specific plans tailored to specific areas and activities. Occupational Safety and Health Administration (OSHA) rules require work plans to address identification of hazards, periodic inspection and maintenance of process and controls, designation of procedures to perform a task to minimize exposure, worker, regular housekeeping to remove accumulations on equipment or clothing, and hygienic practices to allow workers to have hazard-free areas for eating and drinking and to change into clean clothing before leaving the worksite and a supervision program to ensure maintenance of practices.

The current landowner has explored remediation through soil mixing involving the blending of the top 12 inches of soil with either clean imported soils, or clean soils underneath the contaminated surface soils to reduce soil arsenic and lead concentrations to below cleanup levels. A second option is select consolidation and capping which would involve the excavation of soils to depths where soil

concentrations are below the cleanup level. The excavated soils would be placed at a location where they could be isolated from human contact by pavement or another barrier.

If the City of DuPont wished to further the cleanup and remediation of the site through issuance of municipal revenue bonds, it would be possible to establish a Brownfield Renewal Authority pursuant to RCW 70A.305.160.

3.4.8 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, the implementation of either alternative will introduce a variety of land uses that will require clearing and excavation to address existing hot spots of hazardous materials inconsistent with residential uses and other uses that might involve sensitive populations, particularly children coming into contact with those materials. The clearing and excavation and other measures has the potential for short term exposure of workers and through the release of wind-blown particulates or during transportation the inadvertent exposure of populations outside the subarea.

3.5 TRANSPORTATION

Technical studies that form the basis of the analysis presented in this section may be found at <https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>

3.5.1 Affected Environment

This section covers multiple aspects of the transportation network serving the subarea. Included is a high-level assessment of the roadway, transit, active transportation, and freight networks, in addition to safety for all modes and parking conditions in and around the subarea.

3.5.1.1 Roadway Network

The City of DuPont lies along the Interstate 5 (I-5) corridor northwest of Joint Base Lewis McChord (JBLM), along the southwest border of Pierce County. There are two interchanges on I-5 that provide connection to the City of DuPont, with one of those interchanges also shared with JBLM. However, the city experiences access challenges to and from I-5 as a result of its proximity to JBLM, which is a major employer in both Pierce and Thurston Counties. Peak hour commute traffic to JBLM often causes congestion around the Barksdale Interchange and interchanges to the north, leading to high delay for DuPont residents and others attempting to access I-5. DuPont-Steilacoom Road does serve as a potential access point to the north but is not a high-demand corridor for regional travel.

The major vehicular circulation routes in the city include the DuPont-Steilacoom Road at the easterly boundary of the city which extends from I-5 on the south to the City of Steilacoom 5 miles to the north and passes through JBLM for about 3 miles. The other major arterial is Center Drive which connects to I-5 about a mile and a quarter south of the DuPont-Steilacoom Road interchange and loops to the west and north to connect to DuPont-Steilacoom Road about a mile north of the I-5 interchange. Wilmington Drive connects the two and is generally parallel to I-5 and provides the only other east-west connection across the city besides Center Drive. The majority of residential and commercial development in the city is oriented to Center Drive.

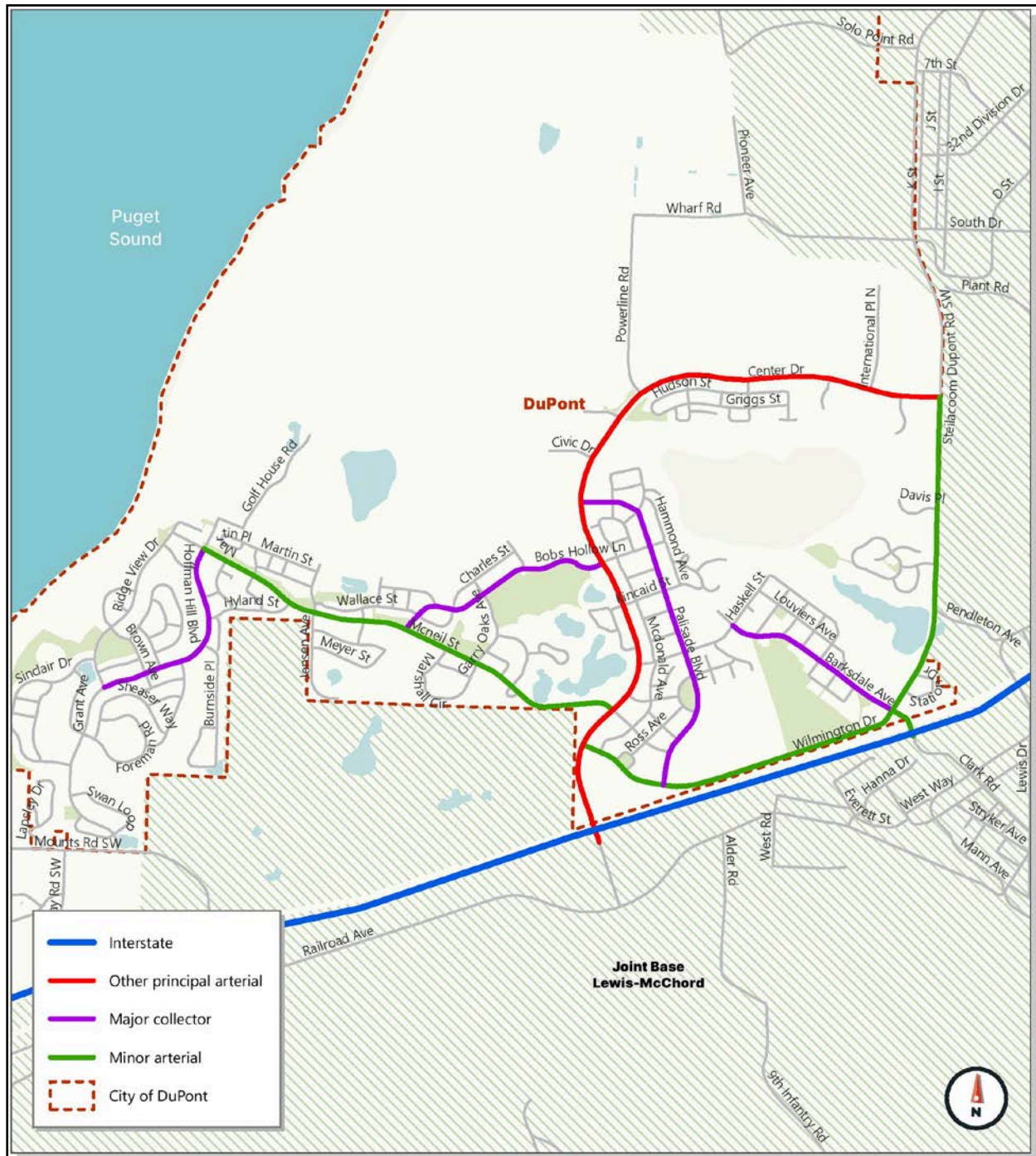
The city has four roadway classifications: Local Roads (comprising the majority of roadways within the city), Major Collectors, Minor Arterials, and Principal Arterials. These functional classifications are

aligned with FHWA and WSDOT definitions and are summarized in Figure 3-31. Center Drive from I-5 exit 118 to DuPont-Steilacoom Road is the only Principal Arterial in the City, with McNeil Street and DuPont-Steilacoom Road classified as Minor Arterials.

DuPont has posted speed limits throughout the city ranging from 25 to 45 miles per hour.

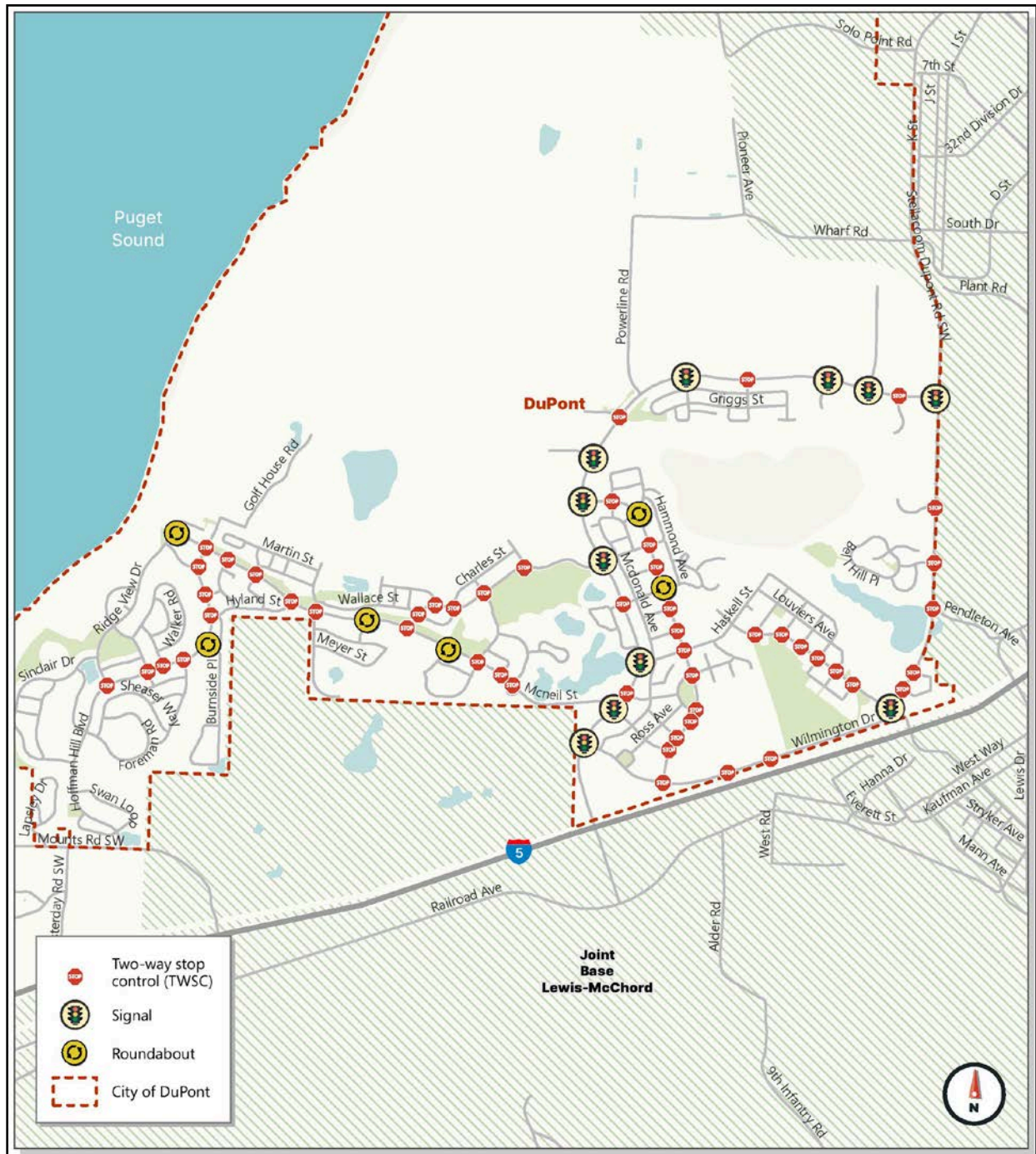
Figure 3-32 shows the locations of all controlled intersections along a collector or arterial within the city. There are currently 11 signalized intersections with the majority located along Center Drive. Separate from Center Drive and the intersection of DuPont-Steilacoom Road and Barksdale Avenue, the intersections either have a roundabout or are stop controlled. The majority of intersections along McNeil Street, Hoffman Hill Boulevard, Palisade Boulevard, and Barksdale Avenue are two-way stop controlled (side-street stop controlled).

Figure 3-31 Roadway Functional Classification



Source: Fehr and Peers, 2023.

Figure 3-32 Intersection Controls on Collectors and Arterials in DuPont



Source: Fehr and Peers, 2023.

3.5.1.2 Transit Network

DuPont Station, located on the southeast corner of Wilmington Drive and Palisade Boulevard, serves as the transit hub for the community. This transit center contains 12 bus bays, 126 parking spaces, bike racks, and bike lockers. DuPont Station is served by two regional commute bus routes; ST 592 and ST 594, operated by Sound Transit:

- **ST 592:** Connecting DuPont and Lakewood to Downtown Seattle, with 30-minute headways. Runs during peak hours only.
- **ST 594:** Connecting Lakewood to Downtown Seattle, with one bus in the AM and one bus in the PM that also stops in DuPont.

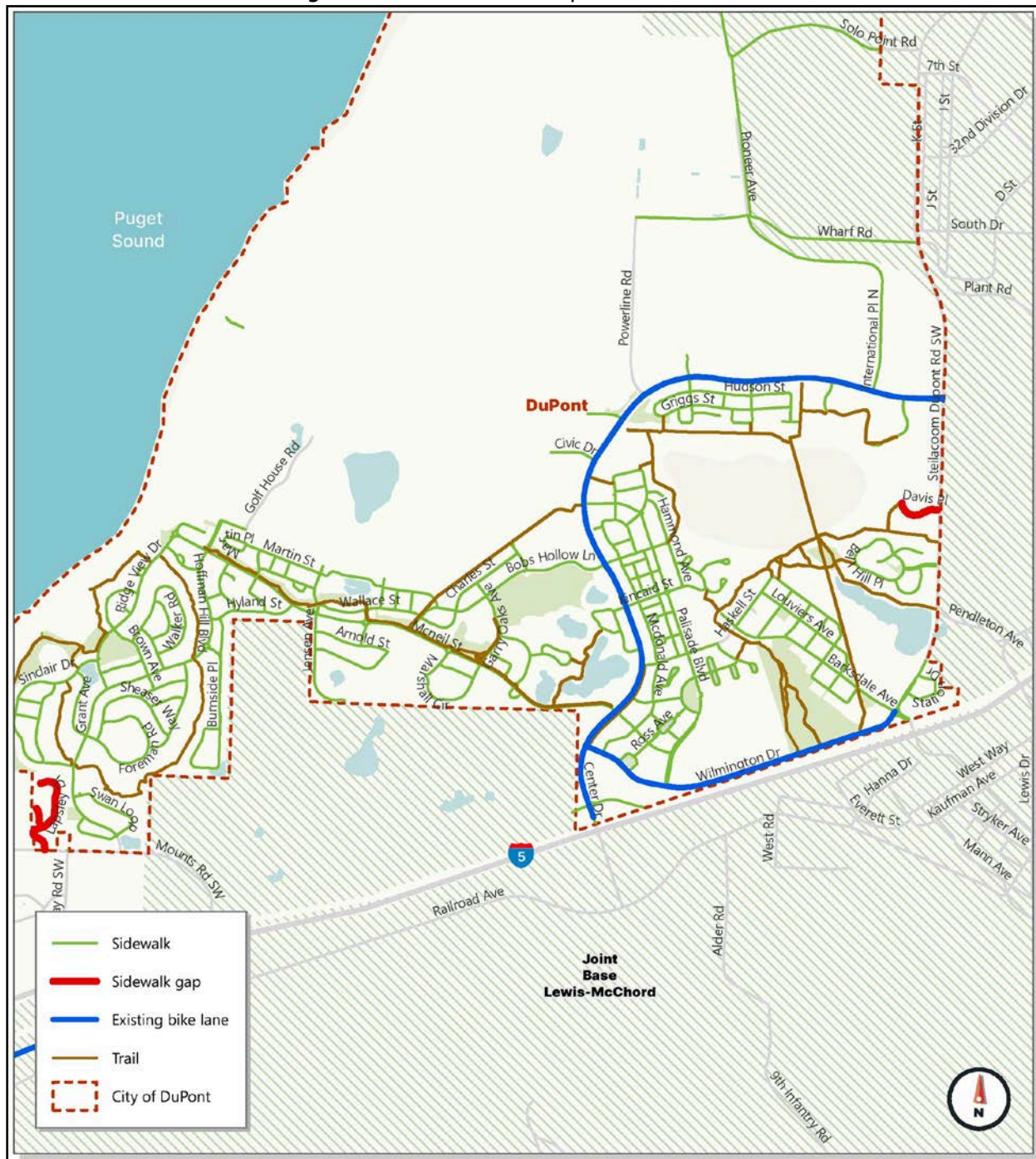
DuPont Station is served exclusively during the peak commute periods of the day, with ST 592 being the only route that has multiple busses stop in DuPont over peak period. Additionally, Go Transit is an independent transit service that connects Joint Base Lewis-McChord (JBLM) to DuPont Station, in addition to other nearby park and rides. Intercity Transit and Pierce Transit currently do not offer service to the facility.

There is currently no transit service within other areas within the city, including the Old Fort Lake Subarea. As the city expands its employment base with pipeline projects, local transit service may be beneficial. This can be achieved through adding a limited-service fixed route or on-call micro mobility service in coordination with Pierce Transit and/or Intercity Transit.

3.5.1.3 Active Transportation Network

Active transportation describes human scaled and often person-powered ways of getting around, such as walking, bicycling or rolling a wheelchair. The Old Fort Lake Subarea is adjacent to Center Drive, which includes a mix of active transportation infrastructure. Some stretches of the corridor contain sidewalks on both sides and striped bicycle lanes, but these facilities do not extend the full length of Center Drive. Outside of the Center Drive corridor, bicycle facilities are limited. Sidewalks exist on both sides of the street throughout most of DuPont, with the exception of DuPont-Steilacoom Road and Lapsley Drive (in the southwest corner of the city). DuPont-Steilacoom Road lacks paved shoulders and would require widening to provide sidewalks and bicycle facilities. In addition to the previously discussed facilities, there is an extensive trail network away from roadways connecting areas throughout the city. All of these active transportation facilities are shown in Figure 3-33.

Figure 3-33 *Active Transportation Facilities*



Source: Fehr and Peers, 2023.

3.5.1.4 Freight Network

DuPont-Steilacoom Road serves as the principal freight corridor within the city, connecting freight to the industrial, manufacturing, and fulfillment warehousing uses to the north. Center Drive at DuPont-Steilacoom Road and Barksdale Avenue at DuPont-Steilacoom Road are the intersections with the highest percentage of heavy vehicles in the city, with 8-10 percent of vehicles passing through these intersections during the AM peak hour considered to be heavy vehicles. Per DuPont Municipal Code 16.05.020, commercial vehicles, with or without trailers, having a gross vehicle weight in excess of 14,000 pounds shall be permitted on DuPont/Steilacoom Road, Center Drive from its intersection with Interstate 5 to McNeil Street, Center Drive from its intersection with DuPont Steilacoom Road to Palisade Boulevard, Center Drive from its intersection with Williamson Place to Barksdale Avenue, and the entire length of Wharf Road.

3.5.1.5 Parking

The Old Fort Lake Subarea is currently undeveloped, so there are no parking facilities within the Subarea itself. On a citywide level, on-street parking exists on all local (residential) roadways, in addition to along McNeil Street. Neither Center Drive nor DuPont-Steilacoom Road has on-street parking facilities.

3.5.1.6 Safety

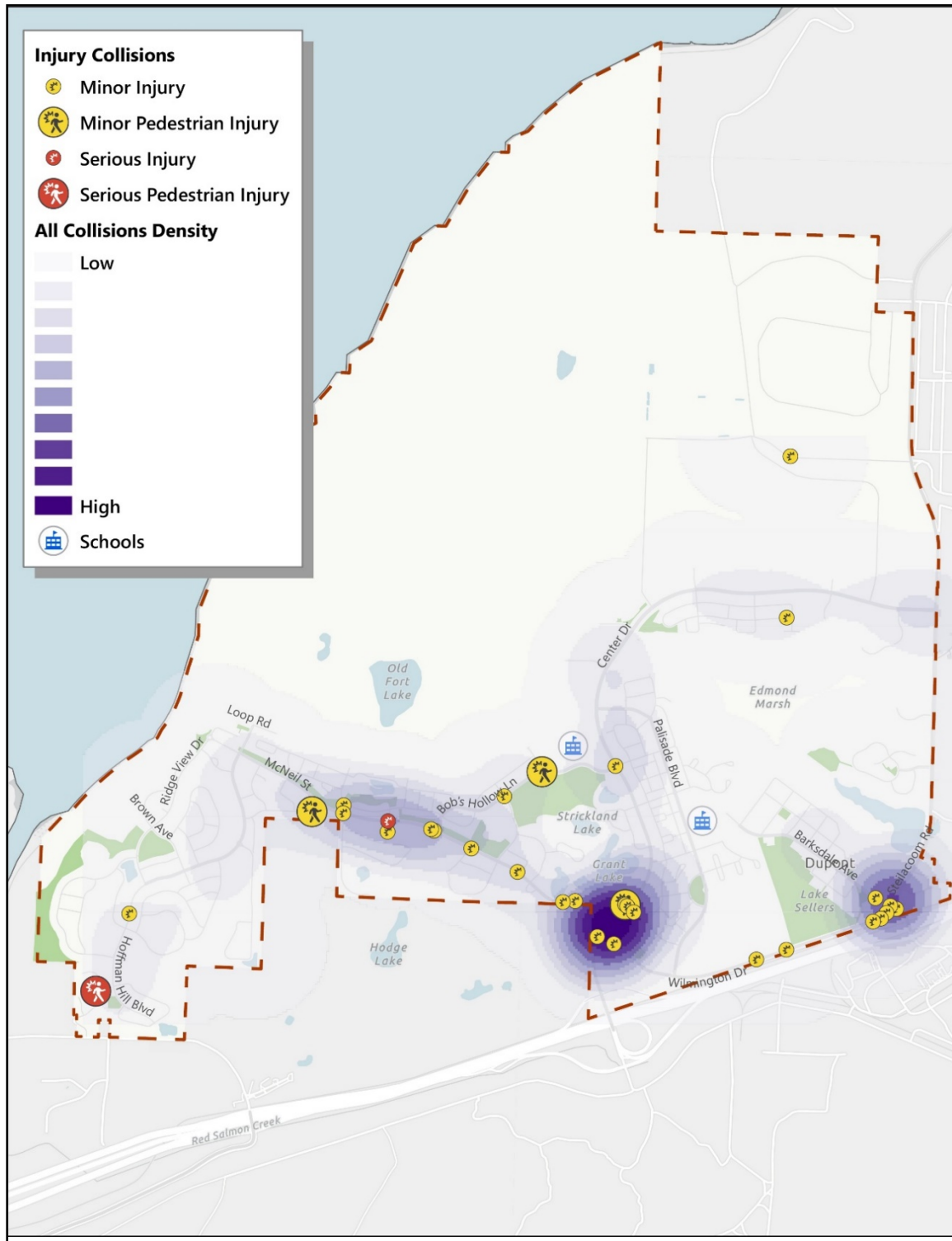
The DuPont Local Road Safety Plan (LRSP), completed in March 2022, analyzed safety trends citywide based on five years of WSDOT collision data (2017-2021). Of the collisions that occurred on DuPont streets between 2016 and 2020, one percent of collisions had a serious injury (2 out of 209 total), which is similar to the proportion of fatal and serious injury collisions in other cities in Washington. In addition, there were 37 injuries, 4 pedestrian collisions, and 4 bicycle collisions in the past five years.

Figure 3-34 shows a heat map of all collisions in the City of DuPont, overlaid with injury and bicycle/pedestrian collisions. Of the study intersections, three higher-volume intersections have higher collision histories when compared to trends citywide:

- Center Drive and Wilmington Road (17 collisions)
- Center Drive and McNeil Street (11 collisions)
- DuPont-Steilacoom Road and Barksdale Avenue (15 collisions)

These intersections all serve as gateways between I-5 and the City of DuPont and will likewise serve as important pass-through intersections to access the Subarea. The Barksdale Avenue intersection will be rebuilt and relocated to the north of the existing intersection. The existing intersection will be revised to be an all-way stop control intersection, per recent conversations with WSDOT.

Figure 3-34 Heatmap of All Collisions



Source: City of DuPont Local Road Safety Plan, 2022

3.5.1.7 Study Intersections

The existing conditions analysis included eight study intersections throughout the City of DuPont that may be affected by land use changes in the Subarea. These study intersections were defined in scoping conversations with city staff. The following intersections were analyzed:

1. Center Drive & Wilmington Drive
2. Center Drive & McNeil Street
3. Center Drive & Bob's Hollow Lane
4. Center Drive & Palisade Boulevard
5. Center Drive & Civic Drive
6. Center Drive & DuPont-Steilacoom Road
7. DuPont-Steilacoom Road/ Wilmington Drive & Barksdale Avenue
8. Bobs Hollow Lane & McNeil Street

Traffic counts were collected on Tuesday, October 4th, 2022 at seven of the above study intersections during the AM and PM peak periods (7-9 AM and 4-6 PM, respectively). The counts for Bobs Hollow Lane & McNeil Street were from the Patriots Landing Elementary School Transportation Impact Analysis, completed in 2022.

It should be noted that an imbalance in volumes was observed in the counts on Center Drive between Civic Drive and Palisade Boulevard, as well as between Bobs Hollow Lane and Palisade Boulevard. Some imbalance can be expected in traffic counts due to nearby driveways or differences in the peak hour of the counts being compared. However, as there are no driveways or other accesses on these segments, the imbalance was corrected.

3.5.1.8 Intersection Level of Service

LOS Methodology

Level of Service (LOS) is a term that describes the operating performance of an intersection or roadway. LOS is measured quantitatively and reported on a scale from A to F, with A representing the best performance and F the worst.

Table 3.5-1 provides a brief description of each LOS letter designation and an accompanying average delay per vehicle for both signalized and unsignalized intersections. The Highway Capacity Manual 6th Edition (HCM 6) methodology was used in this study to remain consistent with "state of the practice" professional standards. This methodology has different quantitative evaluations for signalized and unsignalized intersections. For signalized intersections, the LOS is provided for the overall intersection (weighted average of all approach delays). For side-street stop-controlled intersections, the LOS is provided for the worst performing movement. Synchro Traffic Analysis Software, 11th Edition, was used to perform the calculations.

The city currently has an LOS D standard. There are exceptions to the standard outlined in the 2015 Comprehensive Plan:

- The intersection of DuPont-Steilacoom Road/Wilmington Drive and Barksdale Avenue, which is allowed to reach an LOS E.
- The city can consider a variance to the Public Works Standards at locations failing the city standard where the potential mitigation is not reasonable or desirable.

Table 3.5-1 Level of Service Descriptions

LOS	Description	Signalized Intersections	Unsignalized Intersections
		Avg. Delay (sec/veh) ¹	Avg. Delay (sec/veh) ²
A	<i>Free Flow / Insignificant Delay</i> Extremely favorable progression. Individual users are virtually unaffected by others in the traffic stream.	< 10.0	< 10.0
B	<i>Stable Operations / Minimum Delays</i> Good progression. The presence of other users in the traffic stream becomes noticeable.	> 10.0 to 20.0	> 10.0 to 15.0
C	<i>Stable Operations / Acceptable Delays</i> Fair progression. The operation of individual users is affected by interactions with others in the traffic stream.	> 20.0 to 35.0	> 15.0 to 25.0
D	<i>Approaching Unstable Flows / Tolerable Delays</i> Marginal progression. Operating conditions are noticeably more constrained.	> 35.0 to 55.0	> 25.0 to 35.0
E	<i>Unstable Operations / Significant Delays Can Occur</i> Poor progression. Operating conditions are at or near capacity.	> 55.0 to 80.0	> 35.0 to 50.0
F	<i>Forced, Unpredictable Flows / Excessive Delays</i> Unacceptable progression with forced or breakdown of operating conditions.	> 80.0	> 50.0

1. Overall intersection LOS and average delay (seconds/vehicle) for all approaches.

2. Worst movement LOS and delay (seconds/vehicle) only.

Source: Fehr & Peers, based on *Highway Capacity Manual 6th Edition*.

3.5.1.9 Traffic Analysis Results

Table 3.2-22 contains the LOS and delay for each of the study intersections for both the AM and PM peak hours. All study intersections are operating at an acceptable level of service. Each intersection currently operates at LOS C or better. The longest delay of 20 seconds occurs during the PM peak hour

at the DuPont-Steilacoom Road/Wilmington Drive and Barksdale Avenue intersection, but that level of delay is still well within the city standard. As such, this analysis does not indicate there are any level of service deficiencies under existing conditions. Detailed level of service results for each study intersection are provided in transportation technical studies.

Table 3.5-2 Study Intersection 2022 Delay and Level of Service for AM and PM Peak Hours

ID	Study Intersection	AM LOS / Control Delay (s)	PM LOS / Control Delay (s)
1	Center Drive & Wilmington Drive	B/10	B/11
2	Center Drive & McNeil Street	B/11	B/14
3	Center Drive & Bob's Hollow Lane	B/11	B/10
4	Center Drive & Palisade Boulevard	A/7	A/8
5	Center Drive & Civic Drive	A/5	A/5
6	Center Drive & DuPont-Steilacoom Road	B/15	B/14
7	DuPont-Steilacoom Road/ Wilmington Drive & Barksdale Avenue	B/17	B/20
8	Bobs Hollow Lane & McNeil Street ¹	C/16 (SBL)	C/17 (SBL)

Notes:

1. Intersection 8 is a side-street stop control intersection. Per HCM 6th methodology, the worst movement LOS is reported.

Source: Fehr and Peers, 2023.

3.5.1.10 Transportation Plans

This section describes existing local area plans and planned improvements to the transportation network. Some long-range plans identify strategies for the development of the subarea, and others recommend specific roadway improvements such as new bicycle and pedestrian facilities. Future transportation improvements will be incorporated into No Action and Planned Action alternatives developed as part of this project.

DuPont Old Fort Lake Subarea Plan (2017)

The Old Fort Lake Subarea was originally studied in 2017, with a plan developed at that time. As part of that planned development, robust community outreach was performed, and priorities were created for the overall transportation network within the subarea itself. Based on this community feedback, the following priorities were defined for the subarea:

1. Provide a robust multimodal transportation network that serves a variety of users.
2. Provide excellent street design that complements desired future land uses and reflects community values.
3. Plan a well-connected and efficient road network.

The ongoing Old Fort Lake Subarea Plan serves as an update to the original Subarea Plan created in 2017. As part of this update, land use assumptions are anticipated to shift, in addition to the overall layout of the Subarea.

DuPont Comprehensive Plan (2015)

Last amended in 2021, the Comprehensive Plan articulates the City’s vision for its future for the next 20 years. Transportation-related goals and priorities from the Comprehensive Plan focus on improving access and flow to I-5, in addition to multimodal priorities, as follows:

1. Continue working with regional partners to develop and implement projects that reduce I-5 congestion, including improvements to DuPont-Steilacoom Road and the Mounts Road SW connection.
2. Support measures to restore local transit services, integrating the regional bus and rail mass transit services available in DuPont, Lakewood, Tacoma, and Olympia.
3. Maintain the existing transportation system and fill gaps in the non-motorized network (including pedestrian sidewalks, trails, and the bicycle facilities).
4. Monitor the progress of high-speed rail services and ensure that impacts on DuPont are mitigated.

Transportation Improvement Program 2022 – 2027

The Six-Year Transportation Improvement Program for 2022-2027 (TIP) outlines short- and long-term transportation projects – including the addition of new sidewalks, curb, gutter, and road overlays – throughout the city. The following projects were identified in the TIP as affecting roadway or active transportation capacity:

- Powerline Road Improvements – From Center Drive to Wharf Road, design and construct new arterial roadway along Powerline Road.
- Center Drive Traffic Signal Coordination – From I-5 Exit 118 to DuPont-Steilacoom Road, wireless connection of eight traffic control lights on Center Drive.
- I-5 Exit 119 Reconstruction – Reconstruct interchange at DuPont Steilacoom Road to include two separate interchanges, one connecting directly to DuPont Steilacoom Road and one at the existing interchange location at Barksdale Avenue.
- DuPont Steilacoom Road Improvements – Roadway improvements, including improvements at the intersection of DuPont Steilacoom Road and Center Drive.
- McNeil Street and Ridge View Drive Reconfiguration – Reconfigure the roundabout at this intersection.
- Sequalitchew Creek Pedestrian Crossing onto Center Drive – Study the type and feasibility of a pedestrian crossing on Center Drive at Sequalitchew Creek.
- Northeast City Access Feasibility Study – Study access improvements and future plans for vehicle access in the northeastern portion of the city.
- Vehicle Access to Puget Sound Feasibility Study – Study potential vehicle access options to the Puget Sound waterfront.

The TIP also notes that a South Loop Road will be constructed to connect Hoffman Hill Boulevard to Center Drive; this road lies within the subarea, and it is assumed that it will be constructed as part of the buildout of the Old Fort Lake Subarea.

I-5 JBLM Vicinity Congestion Relief Project

Numerous studies have been completed in relation to I-5 within the JBLM vicinity. This area has historically experienced elevated levels of congestion, related to JBLM Base traffic, and these studies have sought to relieve this congestion, improve local and mainline system efficiency, enhance mobility, and support the regional HOV network, improve safety, and increase transit and travel demand management opportunities. In the South Study Area Report (completed in 2020), the following build alternative was defined for I-5 near DuPont. It should be noted that some of these improvements are already under construction or completed:

- An added I-5 lane in each direction from Center Drive to north of the DuPont-Steilacoom Road interchange.
- Designation of one northbound I-5 lane for HOV use from Mounts Road SW to Thorne Lane and one southbound I-5 lane for HOV use from Thorne Lane to Steilacoom-DuPont Road.
- A new northbound auxiliary lane from Center Drive to DuPont-Steilacoom Road.
- A reconfigured interchange at DuPont-Steilacoom Road.
- A new access road to I-5 (to be named DuPont-Steilacoom Road).
- Reconfiguration of DuPont-Steilacoom Road intersection at Wilmington Drive/Barksdale Avenue.
- A new shared use bicycle and pedestrian path connecting the JBLM DuPont Gate to DuPont-Steilacoom Road and Wilmington Drive.
- Supporting features such as stormwater management, illumination, traffic signals, Intelligent Transportation Systems (ITS), and signing would also be included in the Project.

Sound Transit ST 3 System Plan

The goal of the Sound Transit ST 3 System Plan is to improve and expand the regional transit system by connecting the major cities in King, Pierce and Snohomish Counties with light rail, Bus Rapid Transit (BRT), express bus and commuter rail. Included in the planned system expansion is the Sounder Extension to DuPont project. As part of this project, Sounder South will extend south from Lakewood, adding new stations at Tillicum and DuPont, both with parking. This extension is anticipated to be open for service by 2045, and will provide commuter rail connection for DuPont residents, as well as for regional commuters accessing JBLM. It is anticipated that this could have an impact not only on transit usage within the city itself, but also on overall commuter traffic to JBLM.

3.5.2 Future Baseline

This subsection assesses future baseline conditions from regional growth and growth in DuPont outside the Old Fort Lake Subarea. The horizon year is 2040, which is consistent with the Puget Sound Regional Council (PSRC) travel demand model. Summarized in this subsection are the forecasted baseline volumes, and baseline traffic operations.

Forecasted Regional Volumes

Volumes were forecasted using the Puget Sound Regional Council (PSRC) model. Two methods were used to derive intersection movement volumes, and the higher of the two methods was chosen for each turning movement at each intersection. The first step was use of background forecasted growth from PSRC. The level of network detail within the City of DuPont in the PSRC model, however, is not sufficient to extract turning movement volumes at each study intersection directly. As such, an average growth rate was derived from AM and PM peak hour bidirectional link volumes from the PSRC model at Center

Drive between I-5 ramps and Wilmington Drive and DuPont-Steilacoom Road between Barksdale Drive and Station Drive. Annual growth rates for each segment direction and peak hour were calculated and averaged. The resulting projection is that the City of DuPont is anticipated to experience a linear growth of approximately 0.80% in trips annually. This rate was then applied to the existing traffic volumes at all study intersections to increase the volumes to 2040 conditions, with volumes being rounded to the nearest 5.

Pipeline Projects

Vehicle trips generated from nine pipeline (proposed development) projects throughout the City of DuPont were collected. The following proposed development projects were included in the analysis:

- Pioneer Aggregates South Parcel Project²
- Barksdale Station
- Bridge Point 220
- Civic Center Phase 2
- Civic Center Phase 3
- DuPont Industrial
- Patriots Landing
- DuPont Public Works Facility
- Williamson Place East

These pipeline projects were identified by the City of DuPont, and trips were summarized based on the various project level Transportation Impact Analysis (TIA) and trip generation studies performed for these proposed developments. The pipeline projects include approximately 280 new households and 1,200-1,600 new jobs. Should pipeline growth be added over top of the PSRC growth, this would lead to double counting land uses between the pipeline projects and PSRC model, resulting in an overestimation of trips. To avoid double counting land use growth, but also to remain consistent with the work previously completed for the pipeline projects, the higher volume from each forecast method were used for each turning movement.

Intersection Level of Service

Level of Service methodology is explained in Subsection 3.5.1.8, above. All study intersections are projected to operate at an acceptable level of service in 2040 without growth in the Old Fort Lake Subarea. Each intersection will operate at an LOS of D or above. The longest delay of 20 seconds occurs during the AM peak hour at the Center Drive and DuPont-Steilacoom Road intersection, but that level of delay is still within city standards. Therefore, this analysis does not indicate that there are any level of service deficiencies under No Action conditions.

Table 3.5-3 Intersection 2040 Baseline Delay and Level of Service for AM and PM Peak Hours

ID	Study Intersection	AM LOS / Control Delay (s)	PM LOS / Control Delay (s)
1	Center Drive & Wilmington Drive	B/10	B/11
2	Center Drive & McNeil Street	B/12	B/15

3	Center Drive & Bob's Hollow Lane	C/20	B/11
4	Center Drive & Palisade Boulevard	A/7	A/8
5	Center Drive & Civic Drive	A/6	A/6
6	Center Drive & DuPont-Steilacoom Road	B/17	B/14
7	DuPont-Steilacoom Road/ Wilmington Drive & Barksdale Avenue	A/9	B/10
8	Bobs Hollow Lane & McNeil Street ¹	C/16 (SBL)	C/17 (SBL)
9	I-5 Access Road & DuPont-Steilacoom Road A/7 A/8	A/7	A/8

Notes:

1. Study intersections 1-6 are signalized; Study intersection 7 is all-way stop-controlled; Study intersection 8 is a yield-controlled roundabout

Source: Fehr and Peers, 2023.

3.5.3 Impacts - No Action/Existing Subarea Plan and Zoning

3.5.3.1 Trip Generation and Distribution

This analysis assesses the impacts of buildout development under the existing Subarea Plan and zoning.

The trip generation is based on the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition (2021). For the easterly portion of the Subarea, land use assumptions are based on the vested Founders Ridge proposal for primarily light manufacturing use. Land use assumptions for the westerly portion of the site are based on the range of allowed uses provided for in existing zoning including 100 single-family units and 1,000 multifamily units, some retail use and office and research and development as shown in Table 3.1-1.

Trip generation was assessed separately for these two land use sets because trip distribution is anticipated to differ. Trips generated by the previously proposed Founders Ridge development are summarized in Table 3.5-4 with the balance of the Subarea in Table 3.5-5.

Due to the retail and service uses serving residential development within the Subarea, some trip internalization would occur, thus reducing overall vehicle trips generated. To identify this internalization, a model was used. that accounts for planned uses, size of the planned area, surrounding land uses and transportation infrastructure to determine reductions in trip generation related to internalization, pedestrian/bicycle infrastructure and transit usage. It was determined that there would likely be an internalization of at least 5% under both daily and AM/PM peak hour conditions.

Table 3.5-4 Trip Generation Rates for Founders Ridge Proposed Use

Planned Use	ITE Land Use Code	Units	Daily	AM Peak-Hour Trips			PM Peak-Hour Trips		
				In	Out	Total	In	Out	Total
Manufacturing	140	578 KSF	2746	299	94	393	133	295	428

Planned Use	ITE Land Use Code	Units	Daily	AM Peak-Hour Trips			PM Peak-Hour Trips		
				In	Out	Total	In	Out	Total
General Light Industrial	110	145 KSF	706	94	13	107	13	81	94
Total Trips			3,452	393	107	500	146	376	522
<i>Truck Trips</i>			-296	-11	-8	-20	-8	-11	-19
Vehicle Trips¹			3,156	381	99	480	138	365	503

Notes:

1. This total reflects passenger vehicles only. Truck trips were subtracted from the total and analyzed in the Truck Project Trips section of this report.

Source: ITE *Trip Generation Manual*, 11th Edition; Fehr & Peers, 2024.

Table 3.5-5 Trip Generation Rates for Balance of Existing Subarea Plan Projected Uses

Planned Use	ITE Land Use Code	Units	Daily	AM Peak-Hour Trips			PM Peak-Hour Trips		
				In	Out	Total	In	Out	Total
Single-Family Residences	210	100 Units	943	18	53	71	59	35	94
Multifamily Residence (24 dwelling units per gross acre)	220	1000 Units	6,740	96	30	400	321	189	510
Service ¹	822	70.8 KSF	3,855	100	67	167	233	233	466
Retail Trade (individual tenant spaces up to 20,000 sf)	822	70.7 KSF	3,850	100	67	167	232	233	465
Restaurant / Drinking Establishments	932	20 KSF	2,144	105	86	191	110	71	181
Office/Research & Development	760	1602.7 KSF	17,758	1,354	297	1,651	251	1,319	1,571
Hotel	310	90 Rooms	719	23	18	41	27	26	53
Total Generated Trips			36,009	1,796	892	2,689	1,234	2,106	3,340
Internalized Trips			1,801	90	46	137	61	106	167
External Trips	Total		34,208	1,706	846	2,552	1,173	2000	3,173
	Truck Trips		-11	-0	-1	-1	-0	-0	-0
	Vehicle Trips ²		34,197	1,706	846	2,551	1,173	2,000	3,173

Notes:

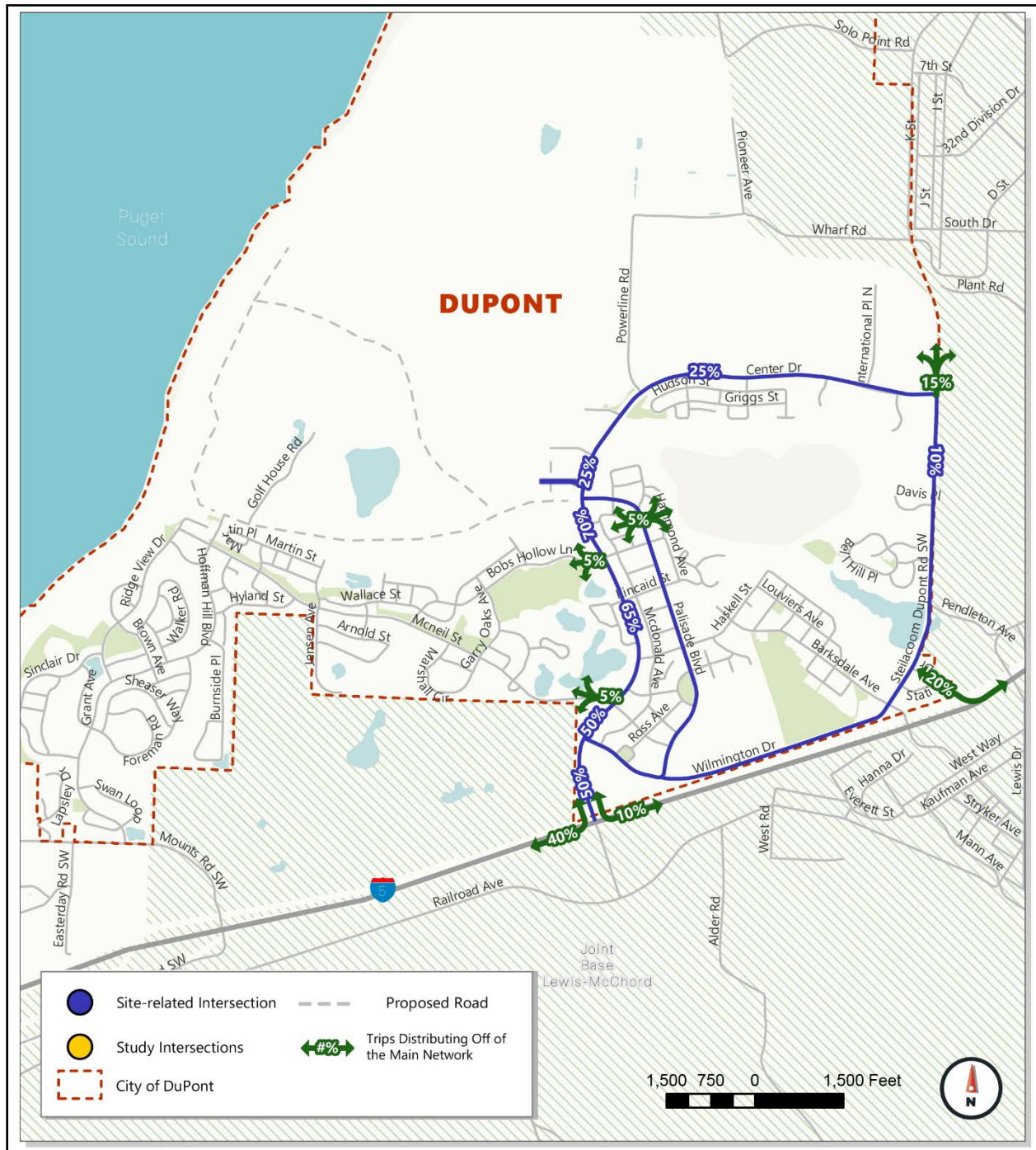
1. The "Service" use represents a variety of potential uses. To provide a conservatively high estimate of trip generation for this use, the ITE 822 "Strip Retail" rate was used, consistent with the "Retail Trade" use.
2. This external trips total reflects vehicles only. Truck trips were subtracted from the total and analyzed in the Truck Project Trips section of this report. It was assumed that internalized truck trips would be negligible.

Source: ITE *Trip Generation Manual*, 11th Edition; Fehr & Peers, 2024.

Trip distribution is a complex process of projecting the choices drivers will make in choosing alternative routes to destinations. There are two basic models in use, with one being the gravity model which presumes that drivers will choose the shortest route to a destination. The other basic model being used is a stochastic model, which presumes that there will be some randomness in choice of alternative routes that may be based on individual driver perceptions of preferred routes based on variation in individual estimates of travel time, or preference for routes based on familiarity or simply the aesthetic preference for a route that may have pleasant scenery. Trip route choice also may be affected by congestion along alternative routes and trip distribution can be affected by the choice or whether to implement improvements on a route that reduces congestion and therefore reduces trip time.

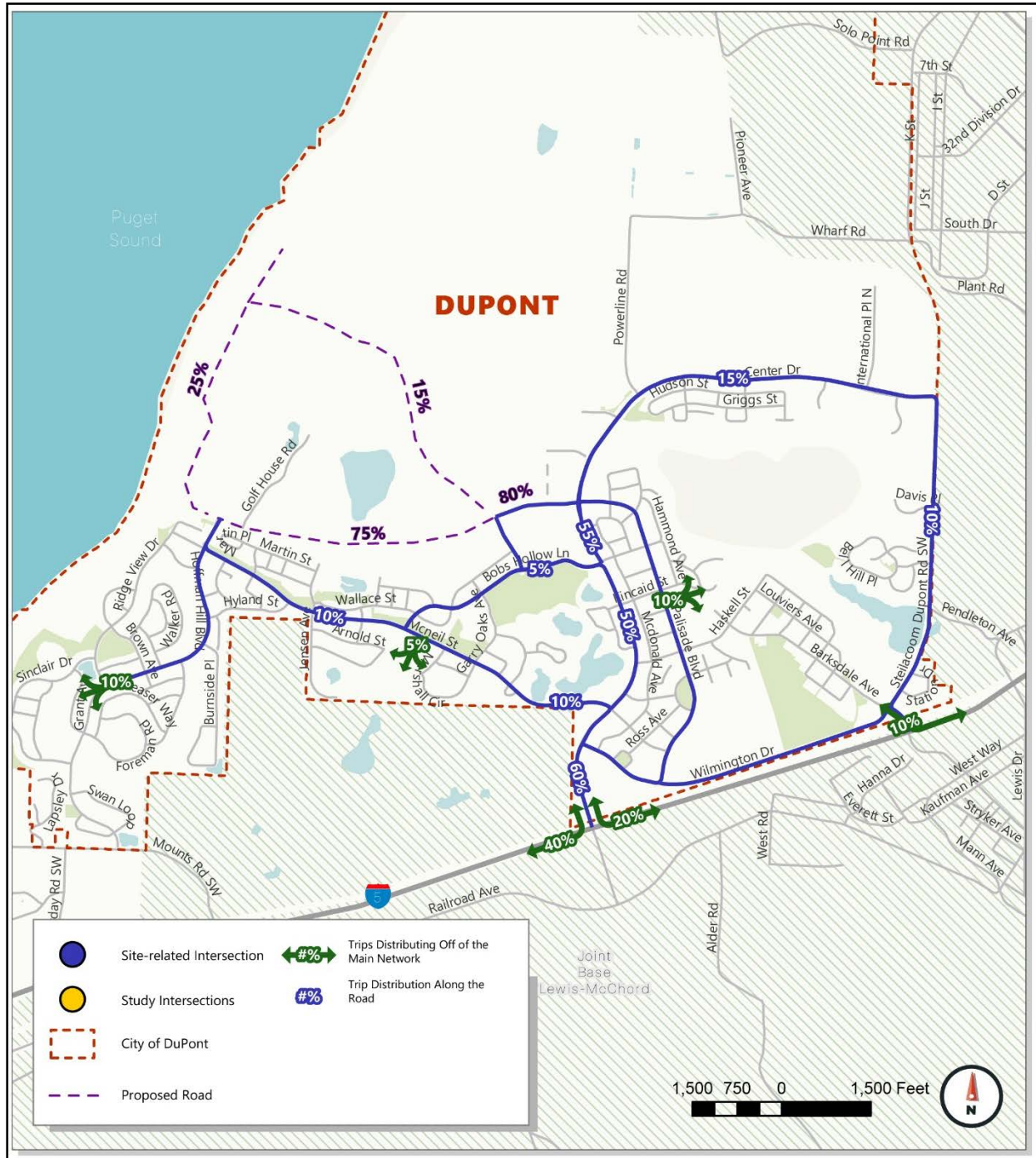
(Lenomrand 2016) To develop a trip distribution for project-generated trips that mirrors local and regional travel trends, likely travel paths between major activity centers and the proposed land uses were determined. To facilitate interpretation of trip routing for different land use types, two sets of trip distribution percentages are provided below.

Figure 3-35 Trip Distribution for Founders Ridge Residential Uses Existing Subarea Plan and Zoning



Source: Fehr and Peers, 2024

Figure 3-36 Trip Distribution for Old Fort Lake Other Uses Existing Subarea Plan and Zoning



Source: Fehr and Peers, 2024

3.5.3.2 Construction Trip Generation

Construction trip generation projections for daily trip generation depend on the type of use, the period of buildout, and the amount of construction performed in a particular period. For existing zoning, a short-term construction period of four years was selected for the light manufacturing uses on the Founders Ridge site with work over a typical spring/summer/early autumn construction season. These estimates presume that cut/fill material for grading of the site is about likely to be equal since geotechnical evaluation has concluded that soil and underlying deposits are suitable for structure fill, therefore little construction traffic would be related to earth moving. Projected construction truck trips for constructing the buildings would be between 25 and 115 trips, which would vary between different phases of development with the largest number of truck trips related to pouring concrete slab floors or parking lot paving. Estimated maximum number of construction workers on site is projected to be 540 workers at peak construction phases. As the number of trips is well below the average daily trip generation at buildout, a separate LOS analysis was not performed because impacts would be negligible. Truck trips may have impacts on other elements such as noise, which are discussed in the appropriate section.

3.5.3.3 Post-Construction Truck Trips

The ITE *Trip Generation Manual*, 11th Edition truck trip generation appendices indicate that the post-construction truck trip generation of all land uses would be negligible during the AM and PM peak hours, with the exception of the restaurant uses. As such, the light manufacturing uses of the Founders Ridge would represent the majority of truck trip generation with a small number of additional truck trips related to restaurant uses. Truck trip generation rates and volumes under the No Action condition are presented in Table 3.5-5. These trips are included in LOS analysis.

Table 3.5-5 Truck Trip Generation Rates Post Construction

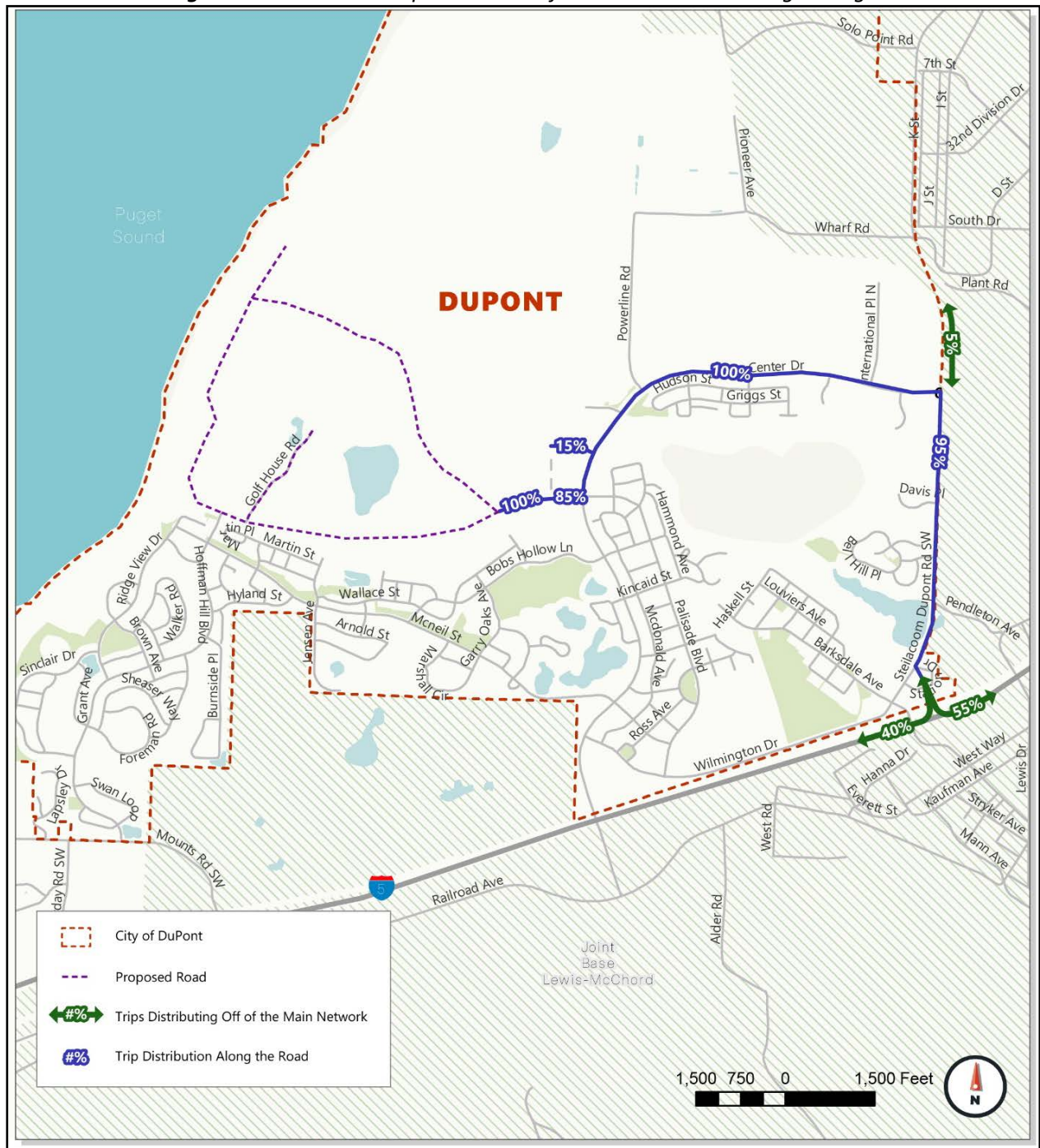
Planned Use	ITE Land Use Code	Units	Daily	AM Peak-Hour Trips			PM Peak-Hour Trips		
				In	Out	Total	In	Out	Total
Founders Ridge Development									
Manufacturing	140	578 KSF	260	11	8	19	7	10	17
General Light Industrial	110	145 KSF	36	1	0	1	1	1	2
Other Uses within No Action Condition									
Restaurant/Drinking Establishments	932	20 KSF	11	0	1	1	0	0	0
New Truck Trips			307	12	9	21	8	11	19

Source: ITE *Trip Generation Manual*, 11th Edition; Fehr & Peers, 2024.

Truck Trip Distribution

The proposed truck trip distribution is shown in Figure 3-37 below and reflects the City of DuPont restrictions on truck use on Center Drive south of Palisade Boulevard.

Figure 3-37 Truck Trip Distribution for Old Fort Lake Existing Zoning



Source: Fehr and Peers, 2024

3.5.3.4 Intersection Level of Service

Level of Service methodology is explained in Subsection 3.5.1.8, above. The Existing Subarea Plan and Zoning Level of Service (LOS) and delay for each of the study intersections for both AM and PM peak hours is shown in Table 5.5-6.

Under the No Action Condition Unimproved model, all study intersections would operate within the city LOS standards with the exception of the Center Drive & McNeil Street and Center Drive & Palisade Boulevard intersections in the PM peak hour. Queuing impacts include:

- The 95th percentile queuing for the northbound left at Center Drive & McNeil Street and Center Drive & Palisade Boulevard is anticipated to exceed available storage capacity during the PM peak hour.
- The 95th percentile queueing for the northbound left-turn of the intersection of DuPont-Steilacoom Road & Center Drive is anticipated to exceed available storage capacity during the AM peak hour.

Of planned intersections internal to the Subarea, it is anticipated that the Intersections along the proposed loop arterial would exceed the city's LOS and delay standards with basic side-street stop control configurations.

Keeping Hoffman Hill Boulevard open as a full access to the Subarea would lead to increased traffic along McNeil Street. The city has flagged this roadway as a particularly important connection for residents living in western DuPont, and has set priorities to limit total demand on the roadway. Approximately 3,400 daily trips (260 AM peak trips and 320 PM peak trips) are routed to this route under projected trip distribution. These trips would largely be comprised of commute trips from residents living in the housing planned within the subarea. This would represent a sizable increase in trips on McNeil Street. However, trips on McNeil Street oriented to the Hoffman Hill Boulevard access to the subarea provide access for those residents to employment opportunities and retail and service uses in the subarea. This alternative route also draws trips away from the more heavily utilized Palisade Boulevard main access to Center Drive.

Table 3.5-6 Intersection Delay and Level of Service Existing Subarea Plan and Zoning

	Study Intersection ¹	No Action Unimproved ²		No Action with Mitigation ^{2,3}	
		AM LOS / Control Delay (s)	PM LOS / Control Delay (s)	AM LOS / Control Delay (s)	PM LOS / Control Delay (s)
1	Center Drive & Wilmington Drive	B/11	B/17	B/11	B/17
2	Center Drive & McNeil Street	C/22	F/80	C/24	D/44
3	Center Drive & Bob's Hollow Lane	B/21	C/28	C/21	C/28
4	Center Drive & Palisade Boulevard	F/317	F/581	D/38	D/50
5	Center Drive & Civic Drive	A/6	A/6	A/6	A/6
6	Center Drive & DuPont-Steilacoom Road	D/46	C/30	C/23	C/22
7	DuPont-Steilacoom Road/Wilmington Drive & Barksdale Avenue	A/9	B/11	A/9	B/11
8	McNeil Street & Bobs Hollow Lane	F/79 (SBL)	E/38 (SBL)	A/7	A/8
9	Hoffman Hill Boulevard & McNeil Street	F/637 (SB)	F/260 (WB)	C/18	D/32
10	I-5 Access Road & DuPont-Steilacoom Road	A/7	A/9	A/7	A/9
101	OFL Civic Drive Connection & Civic Drive	A/9 (SB)	A/9 (SB)	A/9 (SB)	A/9 (SB)
102	OFL East-West Road & OFL Civic Drive Connection	F/142 (SB)	F/351 (SB)	A/5	A/5
103	OFL East-West Road & OFL North-South Road	F/2,380 (SB)	F/11,489 (SB)	A/6	B/13
104	Hoffman Hill Boulevard & OFL East-West Road	D/32 (NBL)	F/101 (NB)	A/7	A/9

Notes:

- Study intersections 1-6 are signalized; Study intersection 7 is all-way stop-controlled; Study intersections 8-9 are side-street stop-controlled; Study intersection 10 is a single-lane roundabout.
- Bold** represents delay that exceeds the City's LOS standard.
- Under the No Action Condition Improved model, study intersection 101 is side-street stop-controlled; Study intersections 102-103 are signalized; and Study intersection 104 is a single-lane roundabout.

Source: Fehr and Peers, 2024.

3.5.4 Mitigation - Existing Subarea Plan and Zoning

Based on the analysis above, the following improvements can be implemented to mitigate (or reduce) the effects on intersections external to and internal to the subarea. These improvements address LOS and 95th percentile queuing impacts identified under the traffic analyses:

External Intersections

Center Drive & McNeil Street (Int 2):

- Construct a dual left-turn for the northbound left-turn movement and extend left turn storage lanes.
- Construct a second receiving drop lane (at least 300 feet) on the eastbound approach to the intersection to receive northbound left-turning traffic.
- Offset the southbound and westbound approaches as needed to align with the adjusted eastbound and northbound approaches.

Undesirable features include:

- o Implementing dual left turns would require expansion of travel lanes and would encroach upon other elements of the right-of-way important to the city's desired street design including provision of a multi-purpose trail on the east side of the street and provision of a stormwater swale and trail on the west side;
- o It would encourage additional traffic on McNeil Street which is contrary to city policy of limiting traffic growth on this street: While the McNeil Street corridor is attractively designed, the entirety of the Hoffman Hill neighborhood relies on this corridor for access. This creates high peak-hour flows on McNeil Street, with a steady stream of cars – more than what would be expected in a residential area. An alternate vehicular route is planned to link Hoffman Hill Village through the Old Fort Lake Subarea to bypass Yehle Park Village. The mitigation measure of avoiding improvements and shifting traffic to other locations would address both of these undesirable features.
- Make no improvements and presume that sufficient drivers will make the choice to avoid congestion and delay by bypassing this left turn and forgoing the opportunity to travel via McNeil Street:
 - o Drivers re-routing would presumably continue north on Center Drive to less congested intersections with less delay.
 - o This option would be enhanced by the additional mitigation measures described below of rerouting Civic Drive to provide a second access for the subarea to Center Drive and therefore reducing left turn volumes at other intersections and providing for less congestion along the entire Center Drive corridor.
- It is also possible that the city could make an exception to the LOS standards to allow more congestion at this intersection as a trade-off to reducing traffic on McNeil and the resulting impact on the residential neighborhood through which it passes.

Center Drive & Palisade Drive (Int 4):

- Construct dual left-turn (with protected phasing), dual right-turn and a separated through lane for the eastbound approach to the intersection.
- Construct a dual left-turn for the northbound left-turn movement with protected phasing.
- Implement an eastbound right-turn overlap phase with the northbound left-turn protected phase.
- Offset the southbound and westbound approaches as needed to align with the adjusted eastbound and northbound approaches.

DuPont-Steilacoom Road & Center Drive (Int 6):

- Construct a dual left-turn for the northbound left-turn movement.

McNeil Street & Bobs Hollow Lane (Int 8):

- Change the intersection control from a side-street stop-control to a single lane roundabout.

Hoffman Hill Boulevard & McNeil Street (Int 9):

- Change the intersection control from a side-street stop-control to an all-way stop-control
- Implement the following turn storage lanes, by approach and movement:
 - o Northbound right-turn
 - o Southbound left-turn
 - o Westbound left-turn and right-turn
- Alternatively, a single-lane roundabout could be considered at this location

Internal Intersections

OFL Loop Roads East Section East-West Road & OFL North Connection at Boundary:

- Signalize this intersection, offsetting signal timing from the nearby Center Drive & Palisade Boulevard intersection to facilitate east-west throughput. This may require signal coordination between these two intersections.
- Construct an eastbound left-turn storage lane with permitted phasing.
- Construct separated southbound left-turn and right-turn lanes.
- Construct three through lanes in each direction for the eastbound and westbound approaches.
- Offset this intersection as far west as possible from the Center Drive & Palisade Boulevard intersection to build in adequate storage capacity.

OFL Loop Road East-West Road & OFL Loop Road North-South Road:

- o Signalize this intersection.
- o Construct an eastbound left-turn storage lane with permitted phasing.
- o Construct a dual left-turn for southbound left-turn movement, in addition to a separated southbound right-turn lane.
- o Construct a separated westbound right-turn lane.
- o Construct two through lanes in each direction for the eastbound and westbound approaches.

Hoffman Hill Boulevard & OFL Loop Road East-West Road (Int 104):

- o Construct a single-lane roundabout.

Road Segments

The Subarea Plan has specific adopted roadway sections for different roads within the subarea. The recommended roadway number of lanes is based on volumes of forecasted vehicle traffic anticipated

along these segments during the AM and PM peak hours. As such, they are dependent on final planned uses and the distribution of uses between the different areas and may be reevaluated as uses are developed. These cross sections represent travel lanes; individual turn storage lanes are also recommended where turn lane warrants are met. In areas where driveway access is allowed, a center left-turn lane may be appropriate at some locations:

- OFL Loop Entry East-West Road from Center Drive to intersection with North-South Loop Road: Six (6) lanes
- OFL Loop Entry East-West Road from intersection with North-South Loop Road to the (presumed) last parking lot intersection in the easterly portion of the subarea: Four (4) lanes
- All other roadways: Two (2) lanes

3.5.5 Impacts - Proposed Subarea Plan and Zoning Amendments

3.5.5.1 Trip Generation

This analysis assesses the impacts of buildout development under the proposed amendments to the Subarea Plan and zoning which would accommodate about 200 acres of residential use, about 50 acres of non-residential use, with the remainder being open space, such as the golf course and sensitive areas.

Projected land uses for a moderate and high intensity of residential development as well as a component of non-residential development are shown on Table 3.1-1. The potential for varying uses intensities of development is discussed in more detail in Section 3.1 Land Use and Housing. This analysis is based on the high intensity scenario, which is a projection of a reasonable level of development near the upper limits of allowed density. It does not represent the highest possible density on the site, which is difficult to predict because of the extent to which road dedications, park dedications, and specific design features of future proposals will have on the total unit count.

The trip generation is based on the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition (2021) for each of the uses projected for the subarea and are summarized in Table 3.5-7. Because the retail and service uses serve residential development within the subarea, some trip internalization would occur, thus reducing overall vehicle trips generated. To identify this internalization, a model was used, which accounts for planned uses, size of the planned area, surrounding land uses and transportation infrastructure to determine reductions in trip generation related to internalization, pedestrian/bicycle infrastructure and transit usage. It was determined that there would likely be as follows:

- AM Peak – 13% internalization (largely related to the proposed elementary school)
- PM Peak – 10% internalization
- Daily – 7% internalization

Table 3.5- 6 Trip Generation Rates for Proposed Subarea Plan and Zoning Amendments

Planned Use	ITE Land Use Code	Quantity	Units	Daily	AM Peak-Hour Trips			PM Peak-Hour Trips		
					In	Out	Total	In	Out	Total
Single-family residences	210	560	Dwelling Units	5282	98	295	393	332	195	527
Middle housing (Townhomes)	215	1860	Dwelling Units	13392	215	678	893	668	392	1060
Multifamily Residences (Low-Rise)	220	1360	Dwelling Units	9166	131	413	544	437	257	694
Service ³	822	40	KSF	2179	56	37	93	132	132	264
Retail Trade	822	145	KSF	7896	204	136	340	477	477	954
Restaurant/Drinking Establishments	932	61.5	KSF	6593	325	265	590	340	217	557
Office/R&D	760	40	KSF	444	34	8	42	6	32	38
Hotel	310	300	Rooms	2398	78	60	138	90	86	176
Convention Center ³	-	150	Attendees	300	113	0	113	0	120	120
Wellness Village - Retail	822	12	KSF	653	17	11	28	36	43	79
Wellness Village - Medical-Office	720	18	KSF	648	46	10	56	11	59	70
Auto Repair/Service	942	3	KSF	71	5	4	9	5	5	10
Entertainment or Cinema	445	200	Seats	352	0	0	0	30	28	58
Manufacturing (Processing)	140	20	KSF	95	10	4	14	6	9	15
Elementary School	520	500	Students	1135	270	100	370	34	46	80
Total Generated Trips				50,604	1602	2021	3623	2,604	2,098	4,702
Internalized Trips				3,542	208	263	471	260	210	470
External Trips	Total			47,062	1,394	1,758	3,152	2,344	1,888	4,232

Planned Use	ITE Land Use Code	Quantity	Units	Daily	AM Peak-Hour Trips			PM Peak-Hour Trips		
					In	Out	Total	In	Out	Total
	Truck Trips			-96	-1	-4	-5	-3	-1	-4
	Vehicle Trips ²			46,966	1,393	1,754	3,147	2,341	1,887	4,228

Notes:

1. "Service" use represents a variety of potential uses. To provide a conservatively high estimate of trip generation for this use, the ITE 822 "Strip Retail" rate was used, consistent with the "Retail Trade" use.
2. ITE does not have a Convention Center use. To develop trip generation estimates for the Convention Center, it was assumed that events are all-day events (with 75% entering in the AM Peak and 80% leaving in the PM Peak); and that vehicle occupancy would be a conservative 1.0 passengers per vehicle.

Source: ITE Trip Generation Manual, 11th Edition; Fehr & Peers, 2024.

3.5.5.2 Trip Distribution

Trip distribution is a complex process of projecting the choices drivers will make in choosing alternative routes to destinations. There are two basic models in use, a gravity model that presumes that drivers will choose the shortest route to a destination and stochastic models that presume that there will be some randomness in choice of alternative routes that may be based on individual driver perceptions of preferred routes based on variation in individual estimates of travel time, or preference for routes based on familiarity or simply the aesthetic preference for a route that may have pleasant scenery. Trip route choice also may be affected by congestion along alternative routes and trip distribution can be affected by the choice or whether to implement improvements on a route that reduces congestion and therefore reduces trip time. (Lenomrand 2016) To develop a trip distribution for project-generated trips that mirrors local and regional travel trends, likely travel paths between major activity centers and the proposed land uses were determined. To facilitate interpretation of trip routing for different land use types, two sets of trip distribution percentages are provided:

- Residential Use Distribution: This distribution is contained in Figure 3-38. The percentage breakdown of trips based on their origin/destination, as follows:
 - o 5% to/from internal to the City of DuPont
 - o 19% to/from the North via DuPont-Steilacoom Road
 - o 5% to/from JBLM across I-5
 - o 35% to/from the southwest via I-5
 - o 36% to/from the northeast via I-5
- Non-Residential Use Distribution: This distribution is contained in 3-39. The percentage breakdown of trips accessing at each major access point to the Subarea:
 - o 60% dispersing to/from the various residential neighborhoods within the City of DuPont
 - o 2% to/from the North via DuPont-Steilacoom Road
 - o 20% to/from the southwest via I-5
 - o 18% to/from the northeast via I-5

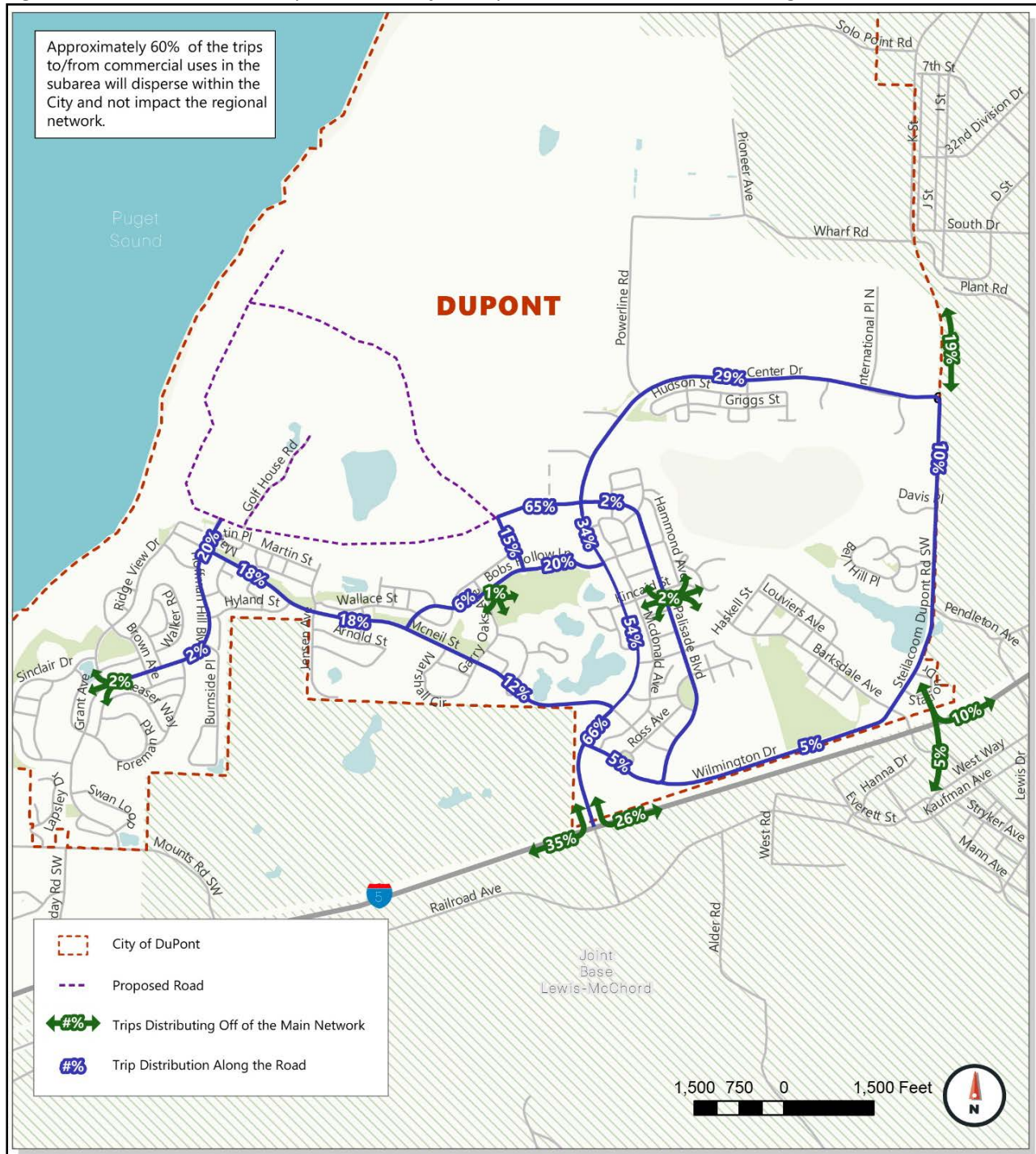
These figures also show the proportion of trips routed along each segment of the roadway network. Internalized trips were assigned consistent with the distribution and type of uses internal to the site, similar to the existing Subarea Plan and zoning. Based on these trip distributions, trips were assigned to the roadway network. Figure 3-38 shows the trip assignment for the proposed residential uses while

Figure 3-39 shows the trip assignment for the proposed non-residential uses. These assignments were combined with the Baseline forecast to create the final forecast.

Of vehicle trips generated, the following are expected to use each of the two I-5 interchanges serving DuPont:

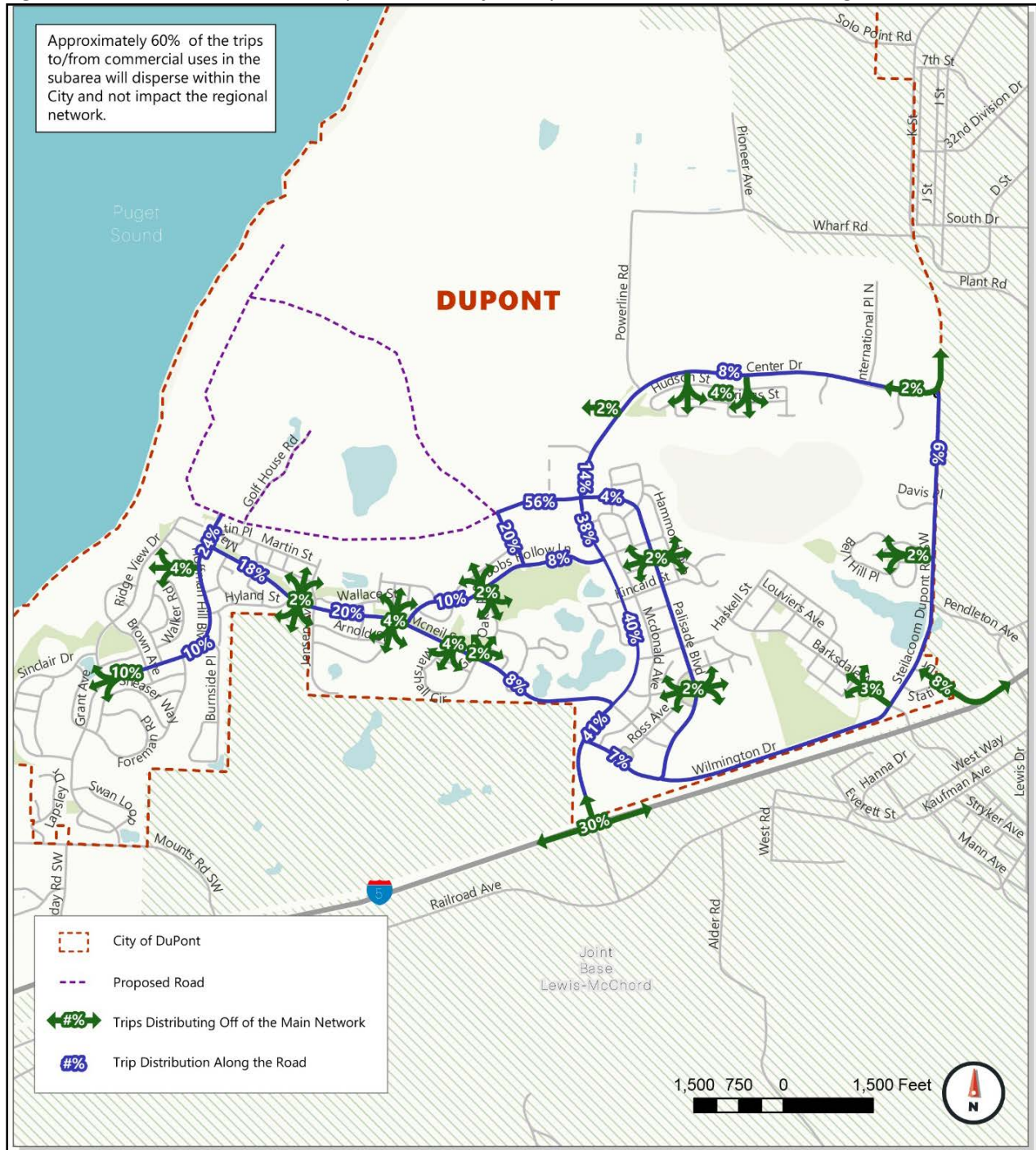
- Center Drive Interchange:
 - o AM Peak: 1,451 total vehicle trips, with 911 entering the freeway and 540 exiting
 - o PM Peak: 2,196 total vehicle trips, with 809 entering the freeway and 1,923 exiting
- DuPont-Steilacoom Road Interchange:
 - o AM Peak: 352 total vehicle trips, with 216 entering the freeway and 136 exiting
 - o PM Peak: 466 total vehicle trips, with 198 entering the freeway and 268 exiting

Figure 3-38 Residential Trip Distribution for Proposed Subarea Plan and Zoning Amendments



Source: Fehr and Peers, 2024.

Figure 3-39 Non-Residential Trip Distribution for Proposed Subarea Plan and Zoning Amendments



Source: Fehr and Peers, 2024.

3.5.5.3 Truck Trip Generation

During Construction

The exact phasing and intensity of buildout of the Subarea will depend on which areas are built out first, and what the final land use mix is. Because of this, determining exact construction truck trip generation will not be possible. It was projected that peak construction truck trip generation would occur during the buildout of Zones E and F of the subarea, which are among the largest zones and have the most intensive uses including commercial, entertainment and Multifamily, as well as components of single-family and middle housing. This buildout was assumed to take 10 years and was assumed to require work as part of construction of infrastructure such as the road network as well as construction of the largest complex of buildings on the site in the commercial and multifamily areas. A projection of average daily construction truck trip generation is shown in Table 3.5-7. The projection is divided into two construction truck types:

- Vendor Trucks: Trucks delivering construction materials. These trucks can be light, medium or heavy vehicles, depending on materials being delivered.
- Haul Trucks: Trucks delivering grade materials for roadway, paved area or foundation work. These trucks are typically heavy vehicles.
 - Trip generation for haul trucks is dependent on a variety of variables and will differ depending on the final construction plan. The following assumptions were used to develop these order-of-magnitude haul truck trip generation estimates:
 - 16 cubic yards of material per truck load
 - 6-foot excavation depth for foundations and piped infrastructure. Road/paved area excavation and replacement will likely be lower in terms of depth, but building excavation will likely be higher, so this average depth was assumed.
 - One-way load assumed, meaning trucks will not be phased to take materials and deliver in the same trip. This equates to 2 trips to drop off and 2 trips to pick up materials and carry them off-site, or a total of 4 trips per one load of new material. This is a conservatively high assumption.

Table 3.5- 7 Peak Construction Truck Trip Generation Projections

Planned Use	Rate per Unit ¹	Quantity Planned for Zones E and F	Unit	Daily Trip Generation
Vendor Trucks	-	-	-	150
Residential (Single-Family)	0.053/DU	144	DU	5
Residential (Multifamily)	0.053/DU	1,360	DU	115
Office	0.082/KSF	40	KSF	5
Commercial/Manufacturing	0.082/KSF	337	KSF	25
Haul Trucks	-	-	-	75
Approximate Construction Truck Trips		225		

1. These rates are adapted from studies performed as part of development of CAPCOA's *CaLEEMod* tools, with the daily trip generation rates halved to account for a 10-year buildout rather than a 5-year. This is an estimate, and will vary significantly depending on planned land use, construction phasing, and intensity of construction.

Source: Fehr & Peers, 2024. Rates adapted from California Air Pollution Control Officers Association's *CaLEEMod* Emissions Model (2022).

Post-Construction

Review of the *ITE Trip Generation Manual*, 11th Edition truck trip generation appendices indicates that the post-construction truck trip generation of all land uses under the High-End Condition would be negligible during the AM and PM peak hours, with the exception of the manufacturing and restaurant uses. Truck trip generation rates and volumes under the High-End Condition are presented in Table 3.5-8.

Table 3.5- 8 Post Construction Truck Trip Generation Projections

Planned Use	ITE Land Use Code	Units	Daily	AM Peak-Hour Trips			PM Peak-Hour Trips		
				In	Out	Total	In	Out	Total
Restaurant/Drinking Establishments	932	20 KSF	33	1	2	3	1	0	1
Manufacturing	140	140 KSF	63	0	2	2	2	1	3
New Truck Trips			96	1	4	5	3	1	4

Source: *ITE Trip Generation Manual*, 11th Edition; Fehr & Peers, 2024.

Truck Trip Distribution

The Puget Sound Regional Council (PSRC) model was used to inform the truck trip distribution.

Truck Trip Construction Impacts

The construction period for buildout of the subarea is expected to range from 15 to 25 years. The Northwest Landing development in DuPont was approved in 1989, infrastructure and the first homes were completed in 1994. The project was substantially complete by 2007. A similar timeline can be expected; however, Northwest Landing was largely built by a single development/construction company which likely expedited the process. Market conditions and financing will play a substantial role in the pace of buildout of the subarea.

Construction of infrastructure and buildings requires a variety of types of truck trips over a long period of time. Almost all construction materials will come to the site by truck. Truck impacts of construction include:

- Street deterioration is speeded by the greater weight of trucks compared to general traffic. It is often difficult to track impacts of increased traffic from deterioration caused by other vehicles, weather and age, however heavy trucks create disproportionate impacts compared to lighter vehicles.
- Potential congestion problems relating to queuing or storage of trucks waiting to get on-site or waiting to discharge loads.
- Noise and vibration impacts, particularly on sensitive receivers. Noise impacts are addressed in a separate section.

3.5.5.4 Intersection Level of Service

Level of Service methodology is explained in Subsection 3.5.1.8, above. The proposed Subarea Plan and zoning amendments Level of Service (LOS) and delay for each of the study intersections for both AM and PM peak hours is shown in Table 3.5-9 below.

This analysis scenario included four additional intersections not addressed under the existing Subarea Plan analysis:

- I-5 Interchange & DuPont-Steilacoom Road
- OFL Civic Drive Connection & Civic Drive
- OFL East-West Road & OFL Civic Drive Connection
- OFL East-West Road & OFL North-South Road
- Hoffman Hill Boulevard & OFL East-West Road

Supplemental analysis of these intersections was requested as a result of presentation of preliminary findings of environmental analysis and requests for additional information and mitigation.

Table 3.5-9 Intersection Delay and Level of Service Proposed Subarea Plan and Zoning Amendments

ID	Study Intersection ¹	No Action Unimproved ²		No Action with Improvements ^{2,3}	
		AM LOS / Control Delay (s)	PM LOS / Control Delay (s)	AM LOS / Control Delay (s)	PM LOS / Control Delay (s)
1	Center Drive & Wilmington Drive	B/11	B/17	B/11	B/17
2	Center Drive & McNeil Street	C/22	<u>F/80</u>	C/24	D/44
3	Center Drive & Bob's Hollow Lane	B/21	C/28	C/21	C/28
4	Center Drive & Palisade Boulevard	<u>F/317</u>	<u>F/581</u>	D/38	D/50
5	Center Drive & Civic Drive	A/6	A/6	A/6	A/6
6	Center Drive & DuPont-Steilacoom Road	D/46	C/30	C/23	C/22
7	DuPont-Steilacoom Road/Wilmington Drive & Barksdale Avenue	A/9	B/11	A/9	B/11
8	McNeil Street & Bobs Hollow Lane	F/79 (SBL)	E/38 (SBL)	A/7	A/8
9	Hoffman Hill Boulevard & McNeil Street	F/637 (SB)	F/260 (WB)	C/18	D/32
10	I-5 Access Road & DuPont-Steilacoom Road	A/7	A/9	A/7	A/9
101	OFL Civic Drive Connection & Civic Drive	A/9 (SB)	A/9 (SB)	A/9 (SB)	A/9 (SB)

ID	Study Intersection ¹	No Action Unimproved ²		No Action with Improvements ^{2,3}	
		AM LOS / Control Delay (s)	PM LOS / Control Delay (s)	AM LOS / Control Delay (s)	PM LOS / Control Delay (s)
102	OFL East-West Loop Road & OFL Civic Drive Connection	<u>F/142 (SB)</u>	<u>F/351 (SB)</u>	A/5	A/5
103	OFL East-West Loop Road & OFL North-South Road	<u>F/2,380 (SB)</u>	<u>F/11,489 (SB)</u>	A/6	B/13
104	Hoffman Hill Boulevard & OFL Loop East-West Road	D/32 (NBL)	<u>F/101 (NB)</u>	A/7	A/9

Notes:

- A. Study intersections 1-6 are signalized; Study intersection 7 is all-way stop-controlled; Study intersections 8-9 are side-street stop-controlled; Study intersection 10 is a single-lane roundabout.
- B. **Bold** represents delay that exceeds the City's LOS standard.
- C. Under the No Action Condition Improved model, study intersection 101 is side-street stop-controlled; Study intersections 102-103 are signalized; and Study intersection 104 is a single-lane roundabout.

Source: Fehr and Peers, 2024.

All study intersections would operate within the city LOS standards with the exception of the Center Drive & Palisade Boulevard intersection in the PM peak hour. These impacts are the same as with the existing Subarea Plan and zoning in many cases, which is not surprising since trip generation is almost the same. The pattern between the AM and PM peak is different however, which leads to differences in the movements that trigger issues.

Queuing impacts include:

- The 95th percentile queueing for the northbound through movement and the southbound left-turn movement of the intersection of Center Drive & Wilmington Drive are anticipated to exceed available storage capacity during the PM peak hour. This impact is new and does not occur with the existing Subarea Plan and zoning.
- The 95th percentile queueing for the northbound left-turn movement of the intersection of Center Drive & McNeil Street is anticipated to exceed available storage capacity during the PM peak hour.
- The 95th percentile queueing for the northbound left at Center Drive & Palisade Boulevard is anticipated to exceed available storage capacity during the PM peak hour. This impact is virtually the same as with the existing Subarea Plan and zoning.
- The 95th percentile queueing for the northbound left-turn of the intersection of DuPont-Steilacoom Road & Center Drive is anticipated to exceed available storage capacity during the AM peak hour. This impact is virtually the same as with the existing Subarea Plan and zoning.
- The 95th percentile queueing for the eastbound right-turn movement of the intersection of Center Drive & Bobs Hollow Lane is anticipated to exceed available storage capacity during the AM and PM peak hours.

For the planned intersections internal to the Subarea, it is anticipated that the Intersections at the OFL East-West Loop Road & OFL Civic Drive Connection, at the OFL East-West Loop Road & OFL North-South

Road, and at Hoffman Hill Boulevard & OFL Loop East-West Road 10-12 would exceed the city's LOS and delay standards for basic side-street stop control configurations.

Approximately 24% of residential use trips generated and 20% of non-residential use trips generated under the High-End Condition are expected to route to/from Hoffman Hill Boulevard via McNeil Street (approximately 6,550 daily trips, 460 AM peak trips and 610 PM peak trips). Many of these trips are expected to disperse into the neighborhoods along McNeil as they route to/from Hoffman Hill Boulevard. These trips would largely be comprised of resident trips to and from non-residential uses (such as retail and services) within the Subarea as well as commute trips from residents within the subarea to points both within and outside of DuPont. Although this would represent a sizeable increase in traffic on McNeil Street, several possible mitigation measures are discussed below that may divert trips from McNeil Street and reduce future growth in volumes.

3.5.6 Mitigation - Proposed Subarea Plan and Zoning Amendments

Mitigation for Level of Service and Queuing Impacts

Based on the LOS impacts disclosed above, the following improvements are recommended for both external intersections and segments internal to the Subarea. These improvements address LOS and 95th percentile queuing impacts identified under the traffic analyses.

External Intersections Outside the Subarea

Center Drive & Wilmington Drive (Int 1): This intersection meets LOS standards but queues exceed available storage for the left turn movement. The mitigation measures outlined below are one of two alternative mitigation strategies for this intersection and the intersection at McNeil Street at Center Drive.

- Implement signal coordination between Center Drive & McNeil Street and Center Drive & Wilmington Drive, including:
 - o Implementing a 130s cycle length at both signals. The shortened cycle length provides less time between cycles for left-turn movements, but also decreases the overall wait time for all movements at the intersection.
 - o Extend the southbound left-turn storage to be approximately 200 feet, aligning directly with the northbound left-turn storage of the Center Drive & McNeil Street intersection.

Center Drive & McNeil Street (Int 2): This intersection does not meet LOS standards during the PM peak period and produces queueing beyond the capacity of the current storage lane. The mitigation measures outlined below represent two potential alternative mitigation strategies:

- Implement northbound dual left turn lanes and increase the length to provide adequate storage. This is the same mitigation outlined above for Existing Subarea Plan and Zoning traffic distribution. The dual left turns would allow a 100s cycle length at signals. The dual left turns provide less time between cycles for left-turn movements, and decreases the overall wait time for all movements at the intersection.
 - o In order to accommodate two left turns from Center Drive, a second westbound receiving lane would be required to receive these two movements on McNeil Street.
 - o Extend northbound left-turn storage to be a total of 300 feet, aligning directly with the southbound left-turn storage lane of the Center Drive & Wilmington Drive intersection.
 - o Implement signal coordination between Center Drive & McNeil Street and Center Drive & Wilmington Drive.

This option would address the demand for PM Peak hour left turns northbound to westbound onto McNeil Street.

Undesirable features include:

- o Implementing dual left turns would require expansion of travel lanes and would encroach upon other elements of the right-of-way important to the city's desired street design including provision of a multi-purpose trail on the east side of the street and provision of a stormwater swale and trail on the west side;
- o It would encourage additional traffic on McNeil Street which is contrary to city policy of limiting traffic growth on this street: While the McNeil Street corridor is attractively designed, the entirety of the Hoffman Hill neighborhood relies on this corridor for access. This creates high peak-hour flows on McNeil Street, with a steady stream of cars – more than what would be expected in a residential area. An alternate vehicular route is planned to link Hoffman Hill Village through the Old Fort Lake Subarea to bypass Yehle Park Village.

The mitigation measure of avoiding improvements and shifting traffic to other locations would address both of these undesirable features.

- Make no improvements and presume that sufficient drivers will make the choice to avoid congestion and delay by bypassing this left turn and forgoing the opportunity to travel via McNeil Street:
 - o Drivers re-routing would presumably continue north on Center Drive to less congested intersections with less delay.
 - o This option would be enhanced by the additional mitigation measures described below of rerouting Civic Drive to provide a second access for the subarea to Center Drive and therefore reducing left turn volumes at other intersections and providing for less congestion along the entire Center Drive corridor.
- It is also possible that the city could make an exception to the LOS standards to allow more congestion at this intersection as a trade-off to reducing traffic on McNeil and the resulting impact on the residential neighborhood through which it passes.

Center Drive & Bobs Hollow Lane (Int 3): This intersection meets LOS standards, but queues exceed available storage for the left turn movement. Mitigation would be:

- Construct an eastbound right-turn storage lane.

Center Drive & Palisade Drive (Int 4): This intersection has both LOS and queuing impacts. Mitigation would include:

- Construct a dual left-turn for the northbound left-turn movement with protected phasing.
- Implement an eastbound right-turn overlap phase with the northbound left-turn protected phase.
- Offset the southbound and westbound approaches as needed to align with the adjusted eastbound and northbound approaches.
- Construct dual left-turn (with protected phasing), single right-turn and a separated through-right-turn lane for the eastbound approach to the intersection.

- Add dedicated right-turn storage lane to the southbound approach.
- Implement right-turn overlap for the eastbound and southbound right-turn movements.

DuPont-Steilacoom Road & Center Drive (Int 6):

- Construct a dual left-turn for the northbound left-turn movement.

McNeil Street & Bobs Hollow Lane (Int 8):

- Change the intersection control from a side-street stop-control to a single lane roundabout.

Hoffman Hill Boulevard & McNeil Street (Int 9):

- Change the intersection control from a side-street stop-control to an all-way stop-control
- Implement the following turn storage lanes, by approach and movement:
 - Northbound right-turn
 - Southbound left-turn
 - Westbound left-turn and right-turn
- Alternatively, a single-lane roundabout could be considered at this location.

OFL East-West Road & OFL Civic Drive Connection (Int 102): Under the existing Subarea Plan configuration, there is a north-south road right of way about 800 feet long on the easterly boundary of the Subarea that extends north-south from the main entry road to Civic Drive. It is located to the west of the two adjacent parcels that front on Center Drive. This roadway would create a T intersection about 500 feet west of Center Drive. Configuration would need to be coordinated with the Center Drive and Palisade Boulevard intersection design and the internal intersection to the west. Design features/mitigation include:

- Construct separated southbound left-turn and right-turn lanes.
- Construct three through lanes in each direction for the eastbound and westbound approaches.
- Offset this intersection as far west as possible from the Center Drive & Palisade Boulevard intersection to build in adequate storage capacity.
- Signalize this intersection, offsetting signal timing from the nearby Center Drive & Palisade Boulevard intersection to facilitate east-west throughput. This may require signal coordination between these two intersections.

It should be noted that a signal would not be warranted based on the volumes currently planned at this intersection. However, this route might be designated as a truck route to avoid truck traffic at Center Drive and Palisade Boulevard where residential uses are subject to noise impacts. In order to prevent vehicles turning left from blocking access to the intersection to the west, a signal coordinated with the Center Drive and Palisade Boulevard signal may be required.

Mitigation of Adding an Additional Access to the Subarea

Civic Drive Access Realignment: Another mitigation option to address overall traffic congestion along Center Drive would be to realign the existing Civic Drive access which is about 600 feet north of Palisade Boulevard to route to the southwest around Fairway 8 of the golf course and continue south of the fairway to intersect with the OFL Loop Road North-South section. This would divert traffic from the northwesterly portion of the subarea to this road as a primary route. It would also add a second route available to the commercial center in the easterly portion of the site. This would divert about one quarter of the total trips from the subarea to this additional route. It would potentially provide additional capacity for routes that otherwise might route through neighborhood roads to the south. It

also might divert additional trips routing from I-5 to the south and from destination to the north along DuPont-Steilacoom Road.

This route also would provide an option for routing truck trips entering and leaving the subarea to avoid noise impacts on existing residences in the Palisades Neighborhood to the east of Center Drive. It also would provide more direct emergency access to the subarea and provide a second access route if congestion or road blockage restricts access via the main roadway at Palisade Boulevard. The following mitigation measures would be required for this intersection to operate efficiently:

- Northbound Left-Turn:
 - o Convert Center Drive northbound to westbound left-turn to protect phasing.
 - o Optimize signal timing to provide priority to left-turn movement.
 - o Increase storage length of northbound left-turn to align with the southbound left-turn storage lane at Palisade Drive & Center Drive.
- Eastbound Direction:
 - o Provide one additional receiving lane on the south leg of the intersection on Center Drive to receive eastbound right-turning traffic from Civic Drive. This coincides with southbound right-turn improvements recommended at Palisade Drive & Center Drive, and the additional receiving lane may be extended to connect with those improvements.
 - o On Civic Drive eastbound, convert the eastbound right-turn to yield control, including channelization of the right-turn lane.
 - o On Civic Drive, increase the striped eastbound to northbound left-turn storage within the existing left-turn lane.
- Emergency Response Override Signal: At the intersection of the realigned road and the intersection with the existing roadway serving the fire and police departments, add a demand activated signal that would override other signals and provide access priority for emergency vehicles.

Road Segments

The Subarea Plan has specific adopted roadway sections for different roads within the Subarea. The recommended roadway number of lanes based on volumes forecasted vehicle traffic anticipated along these segments during the AM and PM peak hours. As such, they are dependent on final planned uses and the distribution of uses between the different areas and should be reevaluated as uses are developed. These cross sections represent travel lanes; individual turn storage lanes are also recommended where turn lane warrants are met. In areas where driveway access is allowed, a center left-turn lane may be appropriate at some locations.

Truck Traffic Mitigation

Alternative Access for Trucks: The city currently prohibits through truck traffic south of Palisade Boulevard to protect residential neighborhoods, Pioneer Middle School and other uses from truck traffic impacts including congestion and noise. As the main access point for the Subarea aligns with Palisade Boulevard and adds noise impacts from headlights, alternative truck access could be considered under the existing Subarea Plan configuration. There is a north-south road right of way about 800 feet long on the easterly boundary of the subarea that extends north-south from the main entry road to Civic Drive. This roadway could be designated as the access point for trucks both during construction and in the long-term.

The alternative mitigation of rerouting Civic Drive to connect to the north-south loop road discussed above also would accomplish this option of routing traffic to a location where it would avoid noise impacts on residential uses to the east of Center Drive on Palisade Boulevard.

Construction Mitigation: The proximity of the proposed roadway network (and the construction/freight trucks using it) to Pioneer Middle School is a potential impact largely during the construction phase and particularly during construction of the initial extension of the main access road into the site. Contractors would need to consider this proximity during construction to ensure safety concerns are addressed, and appropriate signage and/or barriers should be considered along the new roadway network.

It is anticipated that focusing on implementing measures for construction activities to mitigate any potential impacts would address truck trip generation during construction. There are several measures to mitigate any potential impacts due to truck trip generation during and post-construction. Examples of these mitigation measures include:

- During construction of the initial portion of the main access to the site, a construction staging area should be acquired off-site in an area away from Pioneer Middle School where equipment could be staged, and workers vehicles could be parked.
- After initial construction of access to the site, all construction activity staging and parking (workers vehicles and trucks hauling materials) must be provided on-site.
- Construction access would be limited during the AM and PM peak hours.
- Trucks must only access the construction areas via defined routes (as established by DuPont Municipal Code).
- Flaggers must be present to facilitate movement of construction traffic on public street access points.
- Construction measures and signage should minimize interference/obstruction of pedestrian, bicycle or transit trip-making.
- Information materials should be coordinated with the School District to provide heightened awareness to students and staff of the adjacent middle school as to construction impacts, particularly crossing Palisade Boulevard and specific measures enacted to ensure adequate safety measures regarding school-related activities. This might include measures such as closing the crossing of Palisade Boulevard east of Center Drive, or provide flaggers to control student movement as well as truck movement.

3.5.7 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, the implementation of either alternative will introduce a variety of land uses that will change the character of the subarea and affect areas outside the subarea by generating substantial volumes of traffic which will affect existing vehicular and pedestrian circulation systems and require changes to existing facilities to continue to meet the city's operational standards.

3.6 NOISE

Technical studies that form the basis of the analysis presented in this section may be found at <https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>

3.6.1 Affected Environment

3.6.1.1 Background on Noise Definition and Measurement

For the purposes of this analysis, noise can be described as sound that is undesired, in terms of its loudness (amplitude) and frequency (pitch). Magnitudes of typical noise levels are presented below.

Table 3.6-1 Common Sources of Noise

Noise Source	Decibel Level	Notes
Jet takeoff at 50 feet	140	Physical pain and immediate injury
Chain saw, sirens at close range	120	Uncomfortably loud
Loud entertainment venue	105-110	
Motorcycle at 50 feet	95	Very loud
Noisy urban street	85	
Washing machine or dishwasher	70	Possible annoyance
Range of normal human speech	50-70	
Average office	50	Quiet
Refrigerator hum	40	
Whisper, ticking watch	20-30	Barely audible

Sources: HUD 2009; CDC 2019.

Noise disturbance affects receiving populations according to both the sensitivity of the individual and the sensitivity of specific activities to noise. Noise levels sufficient to interfere with hearing others speak at normal distance and volume can include disturbance of normal domestic or educational activities dependent of receiving spoken communication. In a school environment, outside sources of sound at sufficient volumes can interfere with the instructional program. The extent of noise interference with certain tasks depends on the characteristics of the task, the extent to which sound is integral to the task, and the type and level of noise levels that may interfere. Noise interference with sleep is one of the most thoroughly researched and documented noise effects and has far reaching implications due to the importance of sleep to many physiologic and mental processes. (EPA 1981)

Since the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent rating relates noise to human hearing sensitivity. This is called the A-weighted decibel (dBA) scale. This scale accounts for the human perception of a doubling of loudness as an increase of 10 dBA. Therefore, a 70-dBA sound level will sound twice as loud as a 60-dBA sound level. People generally cannot detect differences of 1 to 2 dBA between noise sources of a similar nature (e.g., an increase in traffic noise compared to existing traffic noise); however, under ideal listening conditions, differences of 2 or 3 dBA can be detected by some people. Most people under normal listening conditions would probably perceive a 5-dBA change in noise of a similar nature. However, if an intruding noise is of a different nature than background noise (e.g., backup alarms in a quiet neighborhood), many people can perceive the intruding noise even if it increases the overall dBA noise level by less than 1 dBA.

A measure used to represent the average sound energy occurring over a specified time period is the equivalent sound level (Leq). Leq is the steady-state sound level that would have the same acoustical

energy as the time-varying sound that actually occurs during the monitoring period. The 1-hour A-weighted equivalent sound level (Leq 1 h) is the energy average of A-weighted sound levels occurring during a 1-hour period.

When distance is the only factor considered, sound levels from isolated point sources of noise typically decrease by about 6 dBA for every doubling of distance from the noise source. When the noise source is a continuous line, sound levels decrease by about 3 dBA for every doubling of distance.

Attenuation of noise at a distance is also affected by the type of intervening ground, with hard/reflective surfaces (e.g., pavement, water) resulting in less attenuation at a distance and soft/absorbent surfaces (e.g., vegetation, fluffy snow), resulting in greater attenuation.

Noise levels at different distances can also be affected by several factors other than the distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can affect the decreasing noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) can also affect the degree to which sound is attenuated over distance.

Echoes off topographical features or buildings can sometimes result in higher sound levels (lower sound attenuation rates) than normally expected. Temperature inversions and altitudinal changes in wind conditions can also refract and focus sound waves toward a location at considerable distance from the noise source. As a result, the existing noise environment can be highly variable depending on local conditions.

3.6.1.2 Regulatory Framework

The project site is within DuPont, in Pierce County, and is subject to the noise regulations established by the DuPont Municipal Code (DMC). DMC Section 9.09.040 specifies noise limits based on the limits set in the Washington Administrative Code (Chapter 173-60 WAC) and establishes limits on sounds crossing property boundaries based on the environmental designation for noise abatement (EDNA) of the noise source and receiving property. Section 9.09.040(b) of the DMC identifies Class A EDNAs as residential areas, Class B EDNAs as commercial areas, and Class C EDNAs as industrial areas. The maximum permissible noise levels are shown in Table 3.6-2.

Table 3.6-2 City of DuPont Maximum Permissible Noise Levels

EDNA of Noise Source	EDNA of Receiving Property (dBA)		
	Class A	Class B	Class C
Class A (Residential)	55	57	60
Class B (Commercial)	57	60	65
Class C (Industrial)	60	65	70

Between the hours of 10 p.m. and 7 a.m. (nighttime), the noise limitations in Table 3.6-2 are reduced by 10 dBA for the receiving property within Class A EDNAs.

At any hour of the day or night, the applicable noise limitations may be exceeded for any receiving property for certain periods of time:

- 5 dBA for no more than 15 minutes of any hour
- 10 dBA for no more than 5 minutes of any hour
- 15 dBA for no more than 1.5 minutes of any hour

These allowed sound level exceedances can be described in terms of the percentage of time a certain level is exceeded, using statistical noise descriptors (Lns). For example, L25 represents a sound level that is exceeded 25 percent of the time, or 15 minutes in an hour. Similarly, L8.33 and L2.5 are the sound levels that are exceeded 8.33 and 2.5 percent of the time, or 5 and 1.5 minutes in an hour, respectively. At no time can the allowable sound level be exceeded by more than 15 dBA, represented by the Lmax.

Current land uses were used to determine the appropriate noise limits for the various receiving properties. This approach is consistent with the more modern language and identification of EDNA designations based on actual uses and represents a more accurate reflection of current and expected future conditions.

DMC Section 9.09.050 exempts the following sources from the above-noted noise limits:

- Temporary construction noise, except when received by Class A EDNA properties between the hours of 10 p.m. and 7 a.m. (nighttime).
- Sounds created by motor vehicles when regulated by the state noise limit (Chapter 173-62 WAC), adopted by reference in DMC Section 9.09.040.
- Sounds created by motor vehicles, licensed or unlicensed, when operated off public highways, except when such sounds are received by Class A EDNAs.

Exemptions do not preclude the Noise Control Officer from requiring installation of the best available noise abatement technology consistent with economic feasibility. Exemptions for construction noise limits restrict hours when sleep is most likely to be disturbed. This time limit, however, does not address other impacts of construction noise which may be addressed on an individual site basis.

3.6.1.3 Traffic Noise

The Federal Highway Administration (FHWA) Noise Abatement Criteria (NAC) has been adopted by most state transportation agencies to ensure equitable treatment of citizens seeking relief from highway traffic noise. The FHWA NAC are not applicable to this project as it does not involve federally funded roadways; however, they are presented as one available set of quantitative noise criteria for evaluating the impacts of traffic noise on receivers.

The NAC establishes absolute noise levels for various land-use categories to determine whether traffic noise impacts occur. The NAC for residential areas, schools, active sport areas, parks, and trails is:

- 67 dBA at exterior use locations, reflected in WSDOT's peak-hour traffic noise level threshold of 66 dBA. Consistent with the NAC, WSDOT defines a traffic noise impact as either of the following:
 - o Peak-hour traffic noise level of 66 dBA (Leq) or greater at the exterior outdoor use area of any existing or future dwelling.
 - o Increase in peak-hour traffic noise of 10 dBA Leq or greater (future project level minus existing level) at the exterior outdoor use area of any existing dwelling (considered a "substantial increase").

3.6.1.4 Rail Noise

Noise levels from freight trains occur on the BNSF mainline at the bottom of the bluff adjacent to Puget Sound and from Amtrak trains on the bypass line adjacent to I-5. Amtrak currently runs 16 trains per day. BNSF generally runs 30 to 50 trains per day.

Typical noise levels from freight train locomotives engine exhaust and wheel noise range between 85 and 90 dBA at a distance of 50 feet from the source. This currently impacts the residents on the east side of the existing residential area near the top of the bluff above the BNSF tracks at the bottom of the bluff adjacent to Puget Sound. The earth blocks much of the sound, except that travelling up parallel to the slope which channels it away from receivers further from the top of the bluff and heavy vegetation on the slope muffles or scatters sound that passes up the bluff. The attenuation caused by these factors limits the volume to the extent that it is a periodic element of the sound environment as trains pass by, but represents little or no interruption of normal activities from noise disturbance.

Locomotive horns are required to sound at the rail crossings of public streets, which will result in noise levels of 110 dBA at crossings, 107 dBA 1/8 mile from crossings, and 101 dBA 1/4 mile from crossings. Amtrak trains use their horns at the at-grade crossing at Barksdale Avenue but generally do not sound horns further to the south as there are no further at-grade crossings. Intermittent freight services are provided along the line to Fort Lewis which involves very slow speed train traffic along the siding and branch line connection that extends from Barksdale Avenue to Center Drive. The closest public road crossings that would result in BNSF freight horn sounding is at the Solo Point Beach access which is 2.25 miles to the north. At 2.25 miles, horn noise from the crossing at Solo Point Beach also would be at levels that are discernable but not an interruption of activities. For the subarea, the sounds of rail operations are a background level of noise but are not at a level that would affect daily activities.

3.6.2 Existing Sound Level Measurements

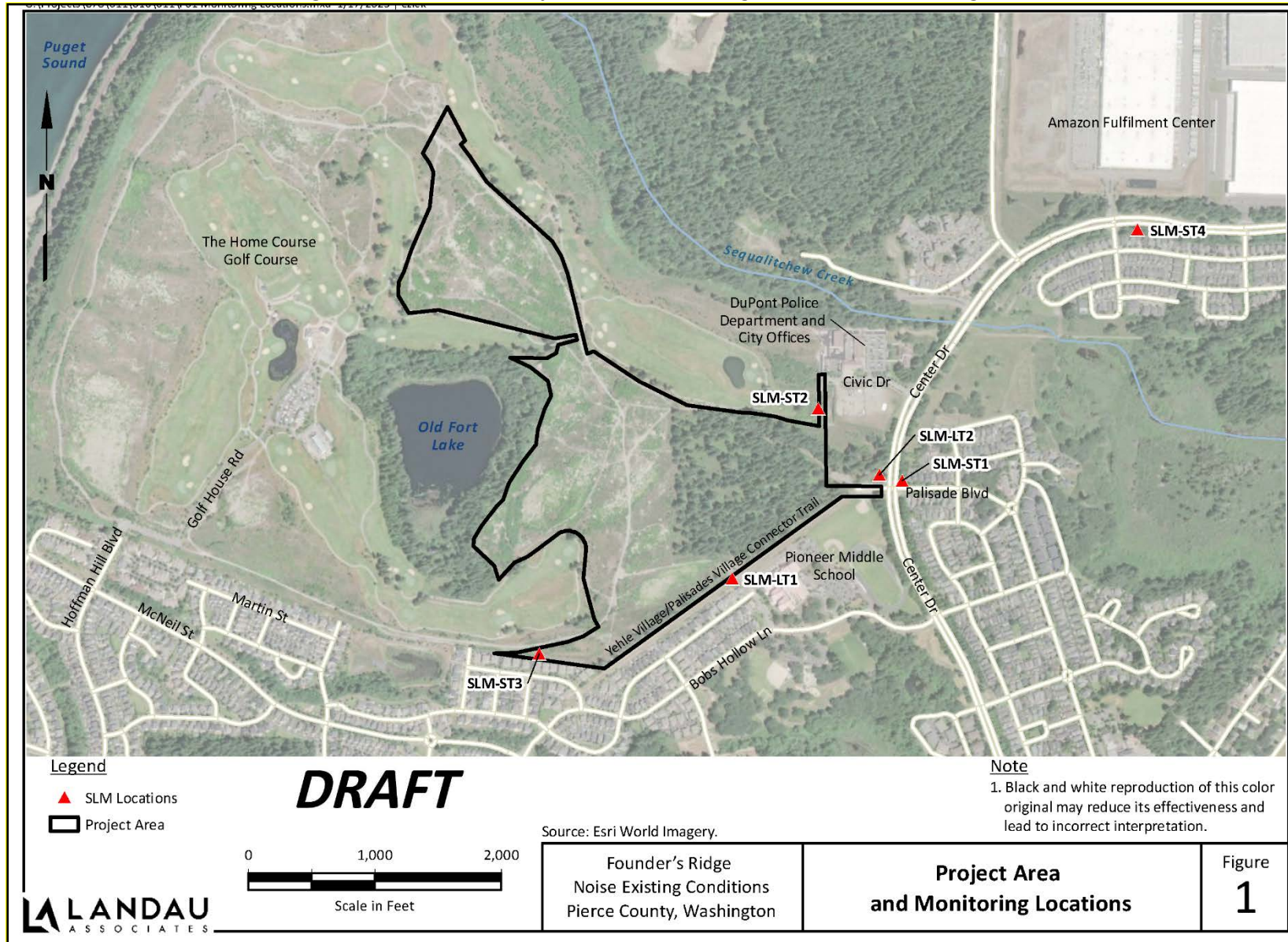
Four 1-hour short-term (ST) and two 24-hour long-term (LT) sound level measurements (SLMs) were collected on December 13 and December 14, 2022 at the following locations in or near the study area. The locations of each SLM are shown on Figure 3-40. Measured sound levels are shown in Tables 3.6-3 and 4.

- SLM-ST1 was located in the right-of-way nearest the property line of the residence northeast of the corner of Center Drive and Palisade Boulevard. Based on observed noise levels during the monitoring event, traffic noise was the predominant noise source at this location.
- SLM-ST2 was located along the eastern boundary of the project site, adjacent to the golf course and near the city of DuPont.
- SLM-ST3 was located along the southern boundary of the project site, adjacent to a residential area and a middle school.
- SLM-ST4 was the only SLM that was not located along the proposed project site boundary; it was located approximately 0.5 miles northeast, adjacent to the entrance of an Amazon Fulfillment Center. This location was selected to capture noise associated with large truck traffic entering and exiting the facility on Center Drive. Noise related to roofing work being done on an adjacent house was noted during the measurement at SLM-ST4 during an approximately 20-minute period. Average noise levels with and without roofing noise were calculated to be equal so the 20-minute period was not removed from the data.

Long-Term Sound Level Measurement Locations

- SLM-LT1 was located near the southern boundary of the project site, at a property line shared with residents and Pioneer Middle School, to represent the nearest receivers potentially affected by onsite noise.
- SLM-LT2 was located northwest of the intersection of Center Drive and Palisade Boulevard, near the southeast boundary of the project site, to represent the nearest receivers potentially affected by offsite (traffic) noise. Based on observed noise levels during setup and retrieval of the monitoring equipment, existing traffic noise was the predominant noise source at this location.

Figure 3-40 Location of Short-Term and Long-Term Sound Monitoring Locations



As shown in Table 3.6-3, the measured sound levels at SLM-ST1 and SLM-ST4 were higher than the noise limits defined in DMC Section 9.09.040 for residential receiving properties. Both of these SLMs were taken along Center Drive. As shown in Table 3.6-4, measured sound levels at SLM-LT2 were higher than the nighttime noise limit for residential receiving properties. Based on observed noise levels during the monitoring event at the SLM-ST locations and during setup and take-down of meters at the SLM- LT locations, traffic noise was the predominant noise source. As described in Section 3, traffic noise on public roadways (including public parking areas) is not subject to the noise limits defined in DMC Section 9.09.040. Traffic noise on private land (for example, access roadways and parking areas within a commercial or industrial facility) is also exempt from noise limits except when received by Class A EDNAs.

Table 3.6-3 Short-Term Sound Level Measurements

SLM ID	Description	Land Use/Zoning	Measured Noise Levels (dBA)				
			Leq	L25	L8.33	L2.5	Lmax
SLM-ST1	NE corner of the intersection of Center Drive and Palisade Boulevard	Residential 5 (R-5, Class A EDNA)	66	66	72	74	76
SLM-ST2	Eastern boundary of golf course	MUV-5, Class B EDNA	49	50	51	51	52
SLM-ST3	Southern boundary of golf course	MUV-4, Class B EDNA	46	48	51	53	54
SLM-ST4	SE corner of the intersection of Center Drive and Bronson Avenue, adjacent to the Amazon Fulfillment Center	R-5, Class A EDNA	60	61	66	68	69
Applicable noise limits for Class A EDNAs				60 (50)	65 (55)	70 (60)	75 (65)
Applicable noise limits for Class B EDNAs				65	70	75	80

- Noise limit for an industrial noise source on residential (EDNA Class A) or commercial (EDNA Class B) receiving properties. For EDNA Class A, value in parentheses represents the nighttime limit.

Table 3.6-4 Long-Term Sound Level Measurements

SLM ID	Description	Land Use/Zoning	Period	Measured Noise Levels (dBA)				
				Leq	L25	L8.33	L2.5	Lmax
SLM-LT1	SE boundary of golf course	MUV 4 (Class B EDNA)	Daytime (7 a.m.to 10 p.m.)	48	47	51	56	74
			Nighttime (10 p.m. to 7 a.m.)	40	41	42	43	48
SLM-LT2	NW corner of the intersection of Center Drive and Palisade Boulevard	R-5 (Class A EDNA)	Daytime (7 a.m. to 10 p.m.)	58	58	64	65	76
			Nighttime (10 p.m. to 7 a.m.)	52	53	56	60	66
Applicable noise limits for Class A EDNAs					60 (50)	65 (55)	70 (60)	75 (65)
Applicable noise limits for Class B EDNAs					65	70	75	80

1. Noise limit (Leq) for an industrial noise source on residential (EDNA Class A) or commercial (EDNA Class B) receiving properties. For EDNA Class A, value in parentheses represents the nighttime limit.

3.6.3 Impacts

3.6.3.1 Construction Noise

During construction of both of the alternatives, there would be a temporary increase in sound levels along the proposed new alignments and existing access areas due to the use of heavy equipment and the hauling of construction materials. The increase in noise levels would depend on the type of equipment being used, and the amount of time it is in use. Table 3.6-5 displays ranges of noise produced by typical construction equipment.

As shown in Table 3.6-5, sound levels 50 feet from construction equipment exceed the levels recommended for residential land uses. Construction noise associated with clearing and grading, public and private access roadways, and building construction, will primarily occur during the normal construction season of spring, summer and autumn for ground disturbance activities which tend to be limited by rainfall and erosion issues. Building construction noise can be expected year-round. In some areas where uncontrolled fill was placed during hazardous materials remediation, or where there are remaining depression or kettles on site, structural fill may need to be placed, or foundations may be placed on driven or drilled pilings.

The existing residences closest to the site are on the southern boundary and subject to both road construction and building construction noise. After construction of initial phases of residential development, on-site residences will experience construction noise. Construction impacts will be virtually the same for both alternatives, although there will be more residential receivers for the planned subarea and zoning amendments than for the existing plan and zoning.

Construction noise is exempt between 7 a.m. and 10 p.m. from the maximum permissible sound levels specified in the noise codes of Washington State (WAC 173-60) for residential receiving properties.

Table 3.6-5 Typical Construction Equipment Noise (dBA)

Construction Activity	Estimated Leq		Types of Equipment	Range of Noise Levels	
	50 feet	350 feet		50 feet	350 feet
Clearing	83	66	Bulldozer	77-96	60-79
			Dump Truck	82-94	65-77
Grading	75-88	58-71	Scraper	80-93	63-76
			Bulldozer	77-96	60-79
Paving	72-88	55-71	Paver	86-88	69-71
			Dump Truck	82-94	65-77
Building Construction	85-90				
Impact Pile Driving	90-105				
Vibratory and Drilled Pile Installation	85-95				

Source: EPA 1971

FTA, Noise and Vibration Technical Report, 1995

In addition to onsite construction noise, construction work on the site will temporarily increase traffic on surrounding roadways, including employee vehicles and truck traffic turning west into the project site from Center Drive at Palisade Boulevard. Noise associated with construction-related vehicles entering and exiting the site would be intermittent and limited in duration. Section 5.2 describes noise associated with heavy trucks stopping, starting, and turning from signalized intersections. Section 5.3 addresses noise associated with increased traffic along Center Drive.

3.6.3.2 Onsite Sources

Onsite noise includes noise created within the subarea after occupancy such as vehicles on public roads within the project, vehicles operating on private property within the project area, and other sources of noise created within the project area.

In addition to vehicular traffic noise, sounds associated with onsite uses are as follows (also subject to the noise limits described in DMC Section 9.09.040):

- Residential use: Noise sources associated with residential and outdoor uses include human voices and activity and maintenance work. The types and overall levels of noise would be similar to levels produced at existing residences to the south and east of the project area, would be controlled by the residential zoning noise limits applied to the site, would be consistent with the current zoning, and would result in less than significant noise impacts.
- Commercial, light industrial, and civic uses: Potential commercial and light industrial uses may include smaller-scale businesses that serve the subarea and city residents, such as retail and restaurants, personal services, professional and medical offices, and banks and credit unions, hotels, auto repair and light manufacturing. Civic uses could include schools, public parks, convention centers, community and cultural centers, churches, and public utilities. Noise sources associated with such uses generally include a greater amount of vehicle traffic (employees, customers, and delivery truck traffic), discussed separately below, in addition to

mechanical equipment (such as commercial boilers and heating or cooling units) are a common source of noise. Light manufacturing produces noise in fabrication and other processes, but is subject to noise regulations and generally can be contained within buildings.

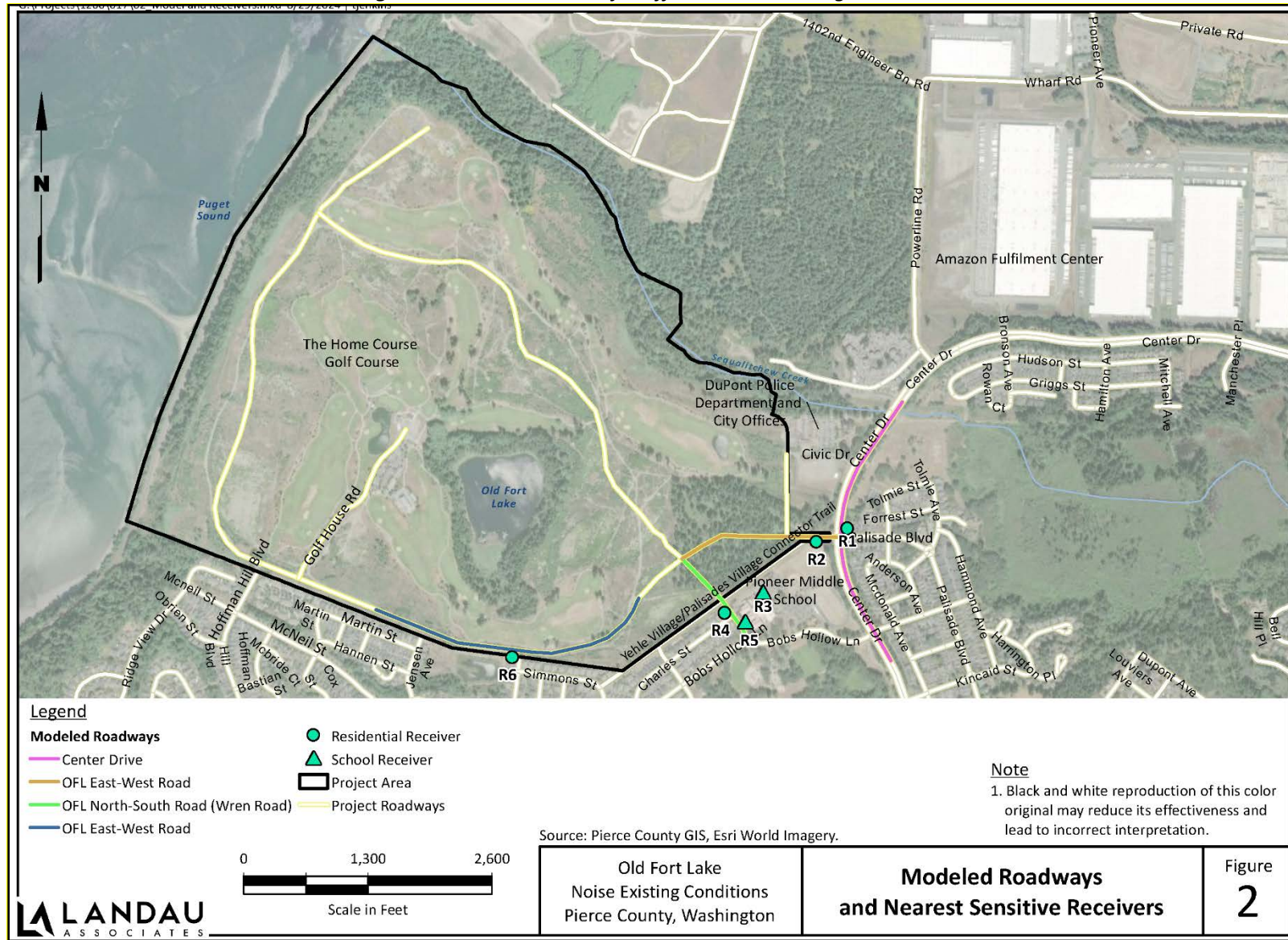
- Parks and open spaces: Public parks can produce noise associated with maintenance activities and human voices and activity. Noises associated with neighborhood parks would be similar to noise produced at the existing Home Course Golf Course, Pioneer Middle School's sports fields, and DuPont Powderworks Park, which are considered consistent with and appropriate for residential land uses, and any noise impacts would be less than significant.

3.6.3.3 Traffic

A screening-level traffic noise analysis was conducted to quantitatively assess the potential traffic noise impacts to existing sensitive receivers caused by increased traffic from the project on the following road segments shown on Figure 3-41. Noise analysis was performed for the Proposed Subarea Plan and Zoning Amendments Alternatives as traffic projections were slightly higher. The results would be virtually the same as the No Action/Existing Subarea Plan and Zoning Alternative.

- Center Drive at Palisade, representing existing residences to the south and east of Center Drive.
- OFL East-West Road West of Center Drive (primary entrance to the project area), representing Pioneer Middle School. Receivers were located near the sports field and at the nearest school building.
- Wren Road at Charles Street, representing existing residences and school buildings along Wren Road. A similar entrance to the project area is planned for Hoffman Hill Boulevard, in the southwestern portion of the project area. Forecasted project traffic volumes at Hoffman Hill Boulevard are expected to be similar to those at Wren Road, so Wren Road was considered to be representative of Hoffman Hill Boulevard, as discussed below.
- OFL East-West Road, representing existing residences to the south of the project area. A representative receiver was located at the residence nearest the planned roadway.

Figure 3-41 Location of Traffic Sound Modeling Locations



A screening-level traffic noise analysis consists of modeling a “straight-line” roadway design, consistent with WSDOT’s 2020 Noise Policy, “Screening Projects for Noise Impacts” (WSDOT 2020). Use of federal funds for roadway or intersection improvements would trigger the WSDOT requirement to model traffic noise impacts and evaluate traffic noise abatement, and to present the results of the noise abatement analysis in National Environmental Policy Act (NEPA) environmental documentation for any roadway projects. However, no federal funds are currently anticipated for roadway/intersection improvements for the proposed project.

Peak-hour traffic volumes along these streets in the project vicinity, projected for existing, construction and future project traffic, are listed in Table 3.6-6, below. All haul trucks were assumed to be heavy trucks. The distribution of all other heavy vs. medium trucks was based on “Vehicle Volume Distributions by Classification” (Washington State Transportation Center [TRAC] 1997). Center Drive was assumed to be an “urban principal arterial” and all other roadways were assumed to be “urban minor arterials.” No existing truck traffic was assumed for Wren Road.

Traffic noise associated with construction is not commonly modeled because of the intermittent and temporary nature of construction; however, it has been included in this analysis due to the 10-year proposed build-out period. The modeled construction-related vehicle volumes below would not be consistent throughout the build-out period, but could be expected during periods of active grading, demolition, and construction of non-residential buildings.

Table 3.6-6: Peak-hour Automobile and Heavy Truck Traffic Volumes

Road Segment	Automobile Volume (Truck Volume)			
	Existing	Future Baseline	Construction	Project (Full Build-Out)
Center Drive North of Palisade Boulevard	704 (18)	805 (20)	704 (41)	1835 (44)
Center Drive South of Palisade Boulevard	704 (18)	805 (20)	704 (18)	2338 (29)
OFL East-West Road West of Center Drive	None	None	0 (23)	2477 (14)
Wren Road at Charles Street	15 (0)	18 (0)	15 (0)	797 (17)
OFL East-West Road West of OFL North-South Road (Wren Road)	None	None	0 (23)	689 (5)

Source: F&P 2024

The FHWA Traffic Noise Model Version 3.2 (FHWA 2023) was used to predict existing and future noise levels during peak hours under the screening-level assumptions listed below. The model was configured as follows for the roads listed above:

- No field measurements were collected for this screening-level noise study. Baseline Sound Level Measurements (Section 4.2) have been provided for informational purposes only and do not correspond with specific modeled receiver locations.
- It was assumed that all receivers have a direct line of sight to impacted roadways; barrier analysis was not conducted.
- Traffic was assumed to travel at the posted speed of 35 miles per hour on Center Drive and at 25 miles per hour on all other roadways, in compliance with DMC 16.01.020.
- The ground surface type was conservatively defined as “hard soil.”

- The nearest sensitive receiver of each type (residence and/or school) to each roadway segment was selected as the representative receiver for that roadway.
- The roadway lane width of new project roadways was assumed to equal 12 feet and all traffic was conservatively assumed to be traveling on the lane nearest the receiver. For the existing roadway, Center Drive, all traffic was assumed to be traveling in the center of the multi-lane roadway.
- All roads were modeled as straight lines; the model was not configured to account for existing or proposed topography, roadway improvements, or configuration changes resulting from the project.
- All roads were conservatively modeled as extending a minimum of 1,500 feet beyond the receivers perpendicular to the roadway on either side of the project.
- Road segments 1, 2 and 3 (receivers R1, R2, R3) were modeled in a single model, to include noise contribution from both roadways at all receivers.

Table 3.6-7 below lists the modeled daytime Leq at each representative receiver location for the existing, construction, baseline without the proposal and full build-out of the Subarea. The traffic volumes from the proposed Subarea Plan and zoning amendments were selected for analysis because they are slightly higher. Noise impacts from the existing plan and zoning would be similar but slightly lower, although in most cases the slight differences in volumes would not produce differences in modeled results. As discussed in Section above, the FHWA NAC are not applicable to this project; however, they are useful as quantitative noise thresholds for evaluating the impacts of traffic noise on receivers within the study area.

Impacts at buildout in Leq was compared to the higher of the existing measured ambient or modeled Leq. Where the existing ambient is higher than modeled, other noise sources are assumed to be present in the area, such as other roadways, commercial, or industrial noises.

Table 3.6-7 Measured and Modeled Leq at Sensitive Receivers

Modeled Receiver Location (representative SLM)(a)	Existing Ambient (dBA) (b)	Modeled Leq (dBA)(c)				Project Increase over Existing (e)
		Existing	Baseline (Future No-Build)	Construction	Project (Full Build-Out)(d)	
R1 - Residence at Center Drive and Palisade (SLM-ST1)	66	60	60	62	64	-2
R2 - Sports Field Near OFL East-West Road West of Center Drive (SLM-LT2)	58	52	52	58	64	6
R3 - School Building Near OFL East-West Road, West of Center Drive (SLM-LT1)	48	47	48	50	54	6
R4 - Residence Near Wren Road at Charles Street (SLM-LT1)	48	43	44	43	62	14
R5 - School Building Near Wren Road at Charles Street (SLM-LT1)	48	39	39	39	58	10
R6 - Residence South of OFL East-West Road (SLM-ST3)	46	None	None	57	58	12

- a. Nearest SLM location to each modeled receiver. SLM-ST are short-term measurements (15 minutes); SLM-LT are long-term measurements (48 hours)
- b. Measured daytime noise level, including non-traffic background noise not included in modeled noise levels
- c. Modeled noise levels represent worst-case PM hour traffic counts (daytime)
- d. Bold values represent noise levels meeting or exceeding 66 dBA or a 10 dBA increase over existing
- e. Project minus the higher of existing modeled or ambient

The modeled peak-hour traffic noise at full buildout at the nearest residences to Center Drive at Palisade Boulevard (represented by R1) and the nearest corner of the Pioneer Middle School sports field (R2) are both 64 dBA, which would not be considered a noise impact under the FHWA NAC. Measured existing ambient noise levels were 66 dBA at SLM-ST1 and 58 dBA at SLM-LT2, so no significant increase over existing (defined as 10 dBA) would be expected at either location. The modeled peak-hour traffic noise at the nearest school building (R3) is 54 dBA, with an increase of 7 dBA over existing, which would not be considered a noise impact under the FHWA NAC.

The modeled increase in peak-hour traffic noise from existing to full buildout at the nearest residences to Wren Road at Charles Street (R4) and the school building at Wren Road (R5) are 14 dBA, which is greater than the FHWA NAC threshold of 10 dBA. This represents a substantial increase and the potential for a significant noise impact on the residences and the school building near Wren Road. A similar increase in traffic noise could be expected at the Hoffman Hill Boulevard entrance to the project area.

The modeled increase in peak-hour traffic noise from existing to full buildout at the nearest residences south of the future OFL East-West Road (R6) is 10 dBA, which equals the FHWA NAC threshold. This represents a substantial increase and the potential for a significant noise impact on the residences located south of the project area.

Modeled peak-hour traffic volumes occur during daytime hours, when higher noise levels are expected and generally less obtrusive. Traffic volumes during nighttime hours, when people are more sensitive to noise, would be lower than the traffic volumes modeled, resulting in lower noise levels.

3.6.3.4 Trucks

As currently designed, truck traffic will enter the project area at the intersection of Center Drive and Palisade Boulevard. Trucks will be required to access the project area from the northeast as city regulations do not allow truck travel on Center Drive or Palisade Boulevard south of the project area except for local delivery; therefore, all truck traffic will be turning right into the site or left out of the site at this intersection.

A large logistics center is currently operating north of Center Drive, accessed through the intersection of Center Drive and Bronson Avenue. Short-term noise measurements taken at that intersection at approximately 11:30 a.m. on Tuesday, December 13, 2022, shown as SLM-ST4 in Table 3.6-3 and Figure 3-41, are an example of potential noise levels associated with trucks accelerating out of a left turn. The measured Leq at that intersection was 60 dBA, at a distance of approximately 60 feet from the center of the roadway (compared to a measured Leq of 66 dBA at SLM-ST1, also located approximately 60 feet from the center of Center Drive at Palisade Boulevard).

Screening-level modeling of truck traffic at Center Drive east of Bronson Avenue, was conducted based on existing traffic data for the section of roadway between Civic Drive and DuPont-Steilacoom Road Southwest (F&P 2024). Peak-hour truck traffic noise at SLM-ST4 was modeled at 62 dBA (70 trucks) or 64 dBA (70 trucks and 716 automobiles).

Though not directly comparable, measured and modeled noise levels near the Bronson Avenue intersection support the results shown in Table 3.6-7 for the intersection of Center Drive and Palisade Boulevard, indicating that predicted noise levels associated with project-related truck traffic is not expected to approach or exceed 66 dBA or 10 dBA over existing, resulting in no significant impacts at that location according to FHWA criteria. Residents in the area to the east of this intersection may consider the increase from existing levels from the short-term impacts of individual trucks turning to be a disturbance. When averaged over the longer time period reported as Leq these levels are a relatively low 60 dBA. However, the shorter term Leq results and the maximum level of 69 dBA indicates that the short-term periodic results from individual trucks turning left, particularly during construction, when large daily truck volumes may be experienced, may be at variance with the comparative peace and quiet perceived by those residents.

3.6.4 Mitigation

The following mitigation measures are proposed to address the potential noise from construction and operation of the project.

3.6.4.1 Construction and Grading

Construction noise could be reduced by using enclosures or walls to surround noisy stationary equipment, installing mufflers on engines, substituting quieter equipment or construction methods, minimizing time of operation, and locating equipment as far as practicable from sensitive receivers. To reduce construction noise at nearby receivers, the following mitigation measures could be incorporated into construction plans and contractor specifications:

- Locate stationary equipment away from receiving properties.
- Erect portable noise barriers around loud stationary equipment located near sensitive receivers.
- Turn off idling construction equipment.
- Require contractors to rigorously maintain all equipment.
- Train construction crews to avoid unnecessarily loud actions (e.g., dropping bundles of rebar onto the ground or dragging steel plates across pavement) near noise-sensitive areas.

Local regulations require limiting construction activities to comply with applicable noise regulations when received by Class A EDNA properties between the hours of 10 p.m. and 7 a.m. (nighttime).

The potential impacts of construction truck turning movements exiting the subarea making eastbound and northbound left turns from a stop on the existing residential uses to the east may be mitigated by requiring construction trips to use Civic Drive. That could be accomplished in two alternative configurations. There is a north-south street right-of-way at the eastern boundary of the site that connects the main access extension of Palisade Boulevard with Civic Drive. Trucks could be required to use this route. For entrance trips it would involve a right turn at Civic Drive, a left turn at the new north-south street and a right turn onto the main access road. For exiting trips this would involve a left turn at the main access road, a right turn on Civic Drive, and a left turn northbound onto Center Drive. A second option is the re-routing of Civic Drive along Fairway 8 of the golf course to access the main north-south roadway within the subarea. The operational characteristics of such routings are discussed in the Transportation section. This routing would not change noise levels, and might increase overall noise somewhat at the intersection, however it would avoid the sensitive residential receptors at Center Drive and Palisade Boulevard as the adjacent uses are open space, mixed use, or governmental with the closest residences about 250 feet from the travel lanes as opposed to about 70 feet at Palisade Boulevard.

3.6.4.2 Operation

Most noise sources related to operation would be relatively insignificant and typical of residential and mixed-use communities.

Noise associated with vehicle traffic is positively correlated with vehicle speed. Roadway design and traffic-calming measures within the project site and on approaching roadways could reduce vehicle speed and associated noise.

Noise impacts from freight train traffic on the BNSF tracks at the bottom of the bluff will not change. The additional residential development under both alternatives will increase the number of receivers. Train noise will remain a periodic element of the sound environment as trains pass by, but will result in little or no interruption of normal activities from noise disturbance.

Some non-residential uses associated with commercial, civic, or light manufacturing uses may introduce mechanical equipment that could potentially exceed local noise limits. Such uses may require a focused noise study to ensure that all activities and equipment on the site demonstrate compliance with the local noise limits, thereby minimizing the potential for significant noise impacts.

3.6.5 Significant Unavoidable Adverse Impacts

Compared to pre-development noise levels, noise levels will likely increase in the study area from short-term clearing/grading, demolition and construction noise, as well as long-term vehicle traffic and human noise sources.

Non-vehicle operational noise associated with residential development and non-residential uses is expected to be minimal and no significant impacts are expected.

The increase in noise levels near the intersection of Center Drive and Palisade Boulevard associated with individual trucks turning at the intersection may produce frequent high intensity noise events which is disturbing to local residents, if construction truck traffic is maintained at this intersection.

As described, the screening modeling performed for this investigation indicates the potential for substantial increases in traffic noise at residences along Wren Road, the school building at Wren Road, the residences along Hoffman Hill Boulevard, and the residences bordering the southern portion of OFL East-West Road. These increases in traffic noise represent potential adverse impacts. A detailed traffic noise assessment should be completed for the project once roadway design and project area access locations have been finalized. The detailed traffic noise assessment could consider whether noise barriers (walls) or changes to site access locations could be used to mitigate adverse impacts, or whether those impacts are unavoidable.

3.7 AIR QUALITY AND CLIMATE CHANGE/GREENHOUSE GASSES

3.7.1 Air Quality

Air quality is generally assessed in terms of whether concentrations of air pollutants meet ambient air quality standards established to protect human health and welfare. Three agencies have jurisdiction over ambient air quality in the area: the U.S. Environmental Protection Agency (EPA), the Washington Department of Ecology (Ecology), and the Puget Sound Clean Air Agency (PSCAA). These agencies establish the regulations that govern the concentrations of pollutants in the outdoor air and contaminant emissions from air pollution sources. Unless the state or local jurisdiction has adopted more stringent standards, the EPA standards control.

3.7.1.1 Carbon Monoxide

Carbon monoxide (CO) is a by-product of incomplete combustion. CO is generated by vehicular traffic and other fuel-burning activities, such as residential space heating, especially space heating using solid fuels such as coal or wood. There are two short-term air quality standards for CO: a 1-hour average standard of 35 ppm and an 8-hour average standard of 9 ppm. CO is usually localized near congested roadways and intersections during periods of cold temperatures (autumn and winter months), light winds, and stable atmospheric conditions. Such weather conditions reduce the atmospheric mechanisms that disperse and dilute pollutants.

The Puget Sound region was designated as nonattainment for CO. In 1996, EPA determined that the Puget Sound ozone nonattainment area had attained the health-based CO standard in effect at that time. EPA then reclassified the Puget Sound region as attainment for CO and approved the associated air quality maintenance plan. The 20-year maintenance period ended in 2016 and the area is in full compliance.

The Puget Sound Regional Council (PSRC) performed a conformity analysis for the Regional Transportation Plan (RTP) 2022-2050. This analysis is required under the federal Clean Air Act and demonstrates that former nonattainment areas will meet and maintain the National Ambient Air Quality Standards (NAAQS). The positive conformity finding demonstrates that the RTP conforms to the Washington State Implementation Plan as required by the federal Clean Air Act and the state Clean Air Washington Act. This analysis included an emission analysis demonstrating that on-road transportation emissions are expected to be below the motor vehicle emissions budgets specified in the State Implementation Plan (SIP). This includes emissions generated within DuPont (PSRC 2022).

3.7.1.2 Ozone

Ozone is a reactive form of oxygen created by sunlight-activated chemical transformations of nitrogen oxides and volatile organic compounds (hydrocarbons) in the atmosphere. Ozone issues tend to be regional in nature because the atmospheric chemical reactions that produce ozone occur over a period of time, during which ozone precursors can be transported far from their sources. Transportation sources like automobiles and trucks are among the sources that produce ozone precursors.

DuPont is located near a past ozone maintenance area within the Puget Sound region. In 1997, EPA determined that the Puget Sound ozone nonattainment area had attained the ozone standard in effect at that time. EPA reclassified the Puget Sound region as attainment for ozone and approved the associated air quality maintenance plan. In 2005, however, EPA revoked the 1-hour ozone standard in most areas of the US including the Puget Sound region, which ended the ozone maintenance status of this region. The EPA adopted a new more stringent 8-hour average ozone standard of 75 parts per billion (ppb) in March of 2008. The 8-hour standard was later strengthened to 70 ppb for most areas, effective December 2015. In 1914 EPA designated the Puget Sound an ozone attainment area subject to a maintenance demonstration which shows how the area will remain in compliance with the 8-hour ozone standard for 10 years.

3.7.1.3 Particulate Matter (PM₁₀ and PM_{2.5})

Particulate matter air pollution is comprised of particles either emitted directly into the air (e.g., dust) or formed when hot gases cool and condense. Such air pollution is generated primarily by industrial activities and operations involving fuel combustion and material handling, and by other fuel combustion sources like motor vehicle engines, vessel engines, and residential wood burning. Federal, state, and local regulations set limits for particle concentrations in the air (i.e., weight per unit volume) based on the size of the particles and the related potential threat to health. When first regulated, particle pollution limits were based on "total suspended particulate," which included all size fractions. As

sampling technology improved and the importance of particle size and chemical composition became more apparent, ambient standards were revised to focus on the size fractions thought to be most dangerous to human health. Based on the most recent studies, EPA has redefined the size fractions and set new, more stringent standards for particulate matter based on fine and coarse inhalable particulate matter to focus control efforts on the smaller size fractions.

The previous PM10 maintenance area for health-based ambient air quality standards for PM10, or particles less than or equal to about 10 micrometers (microns) in diameter, was for all of Pierce County. The 20-year maintenance period ended in 2021 and is now classified as an attainment area for PM10. This site is close to a current maintenance area for PM2.5, or particulate matter less than or equal to 2.5 microns in diameter, which was designated in 2015. The latter size fraction and even smaller (ultra-fine) particles are now considered the most dangerous size fractions of airborne particulate matter because such small particles (e.g. a typical human hair is about 100 microns in diameter) can be breathed deeply into lungs. In addition, such particles are often associated with toxic substances that are deleterious in their own right and that adsorb to the particles and can be carried into the respiratory system.

In 2015 EPA approved the maintenance plan submitted by Ecology and redesignated the entire area to attainment status of the 2006 24-hour PM2.5 standard. Monitoring within the maintenance area is to continue until February 2025. DuPont is not in the maintenance area, but is in the vicinity of the southern extent of which is at approximately Camp Murray.

3.7.2 Climate Change

The issue of how emissions from human activities may affect the global climate has been the subject of extensive international research during the past several decades. There is now a broad consensus among atmospheric scientists that emissions caused by humans have already caused measurable increases in global temperature and are expected to result in significantly greater increases in temperature in the future.

Carbon dioxide (CO₂) is the primary greenhouse gas emitted through human activities. In 2022, CO₂ accounted for 80% of all U.S. greenhouse gas emissions from human activities. Carbon dioxide is naturally present in the atmosphere as part of the Earth's carbon cycle (the natural circulation of carbon among the atmosphere, oceans, soil, plants, and animals). Human activities are altering the carbon cycle—both by adding more CO₂ to the atmosphere and by influencing the ability of natural sinks, like forests and soils, to remove and store CO₂ from the atmosphere. While CO₂ emissions come from a variety of natural sources, human-related emissions are responsible for the increase that has occurred in the atmosphere since the industrial revolution.

The main human activity that emits CO₂ is the combustion of fossil fuels (coal, natural gas, and oil) for energy and transportation. Certain industrial processes and land-use changes also emit CO₂. The main sources of CO₂ emissions in the United States are described below.

3.7.2.1 Transportation

The combustion of fossil fuels such as gasoline and diesel to transport people and goods was the largest source of CO₂ emissions in 2022, accounting for 35% of total U.S. CO₂ emissions and 28% of total U.S. greenhouse gas emissions. This category includes domestic transportation sources such as highway and passenger vehicles, air travel, marine transportation, and rail.

3.7.2.2 Electricity

Electricity is a key source of energy in the United States and is used to power homes, business, and industry. In 2022, the combustion of fossil fuels to generate electricity was the second largest source of

CO2 emissions in the nation, accounting for 30% of total U.S. CO2 emissions and 24% of total U.S. greenhouse gas emissions. The types of fossil fuel used to generate electricity emit different amounts of CO2. To produce a given amount of electricity, burning coal will produce more CO2 than natural gas or oil.

3.7.2.3 Industry

Many industrial processes emit CO2 through fossil fuel consumption. Several processes also produce CO2 emissions through chemical reactions that do not involve combustion, and examples include the production of mineral products such as cement, the production of metals such as iron and steel, and the production of chemicals. The fossil fuel combustion component of various industrial processes accounted for 16% of total U.S. CO2 emissions and 13% of total U.S. greenhouse gas emissions in 2022. Many industrial processes also use electricity and therefore indirectly result in CO2 emissions from electricity generation.

3.7.2.4 Forestry

Forestry in the United States is a net sink and offsets 13% of these greenhouse gas emissions. Effects on Puget Sound include a suite of long-term changes that are consistent with those observed globally as a result of human-caused climate change. These include increasing air temperatures, a longer frost-free season, nighttime warming, and a possible increase in the intensity of heavy rainfall events. Continued increases in average annual and seasonal Puget Sound air temperatures are projected as a result of climate change, as well as increases in extreme heat. Projected changes in annual precipitation are generally small, although summer precipitation is projected to decrease and heavy rainfall events are projected to become more severe. Natural variability can have a strong effect on trends – as evidenced by recent regional cooling – and will continue to influence shorter-term (up to several decades) climate trends in the future.

Observed changes include:

- Air temperatures are increasing in the Puget Sound region. The lowland areas surrounding Puget Sound warmed about +1.3°F (range: +0.7°F to +1.9°F) between 1895 and 2014.
- Warm nights have become more frequent, but daytime heat waves have not changed.
- Short-term trends differ substantially from the long-term trend. The Puget Sound region's highly variable climate often results in short-term cooling trends, as well as warming trends larger than the long-term average. The cooling observed from about 2000 to 2011, for example, is similar to cooling observed at other times in the 20th century, despite overall long-term warming.
- Long-term air temperature trends are affected by natural variability. It has been estimated that about half of the observed increase in air temperature in the northern hemisphere (1900-1990) is a result of random natural variability.
- A new type of El Niño, the so-called "El Niño Modoki" (or "Central Pacific El Niño"), with changes in large-scale weather patterns that are very different than those that occur with a typical El Niño event.

Projected changes include:

- All scenarios project warming. Warming is projected to continue throughout the 21st century. For the 2050s (2040-2069, relative to 1970-1999), annual average air temperature is projected to rise +4.2°F to +5.5°F, on average, for a low and high (greenhouse gas scenario).
- Warming is projected for all seasons. The projected increase in summer air temperature is greater than for other seasons.
- More extreme heat events will become more frequent while extreme cold events will become less frequent.

- Ongoing variability will continue to play a role in regional climate. Natural variability will remain an important feature of global and regional climate, at times amplifying or counteracting the long-term trends caused by rising greenhouse gas emissions.
- The projected warming for the Puget Sound region is largely compared to year-to-year variability. The Puget Sound region is likely to regularly experience average annual air temperatures by mid-century that exceed what was observed in the 20th century.
- Summer precipitation is projected to decline by –22%, on average, for the 2050s (2040-2069, relative to 1970-1999) for both a low and a high greenhouse gas scenario.
- Projected changes in fall, winter, and spring precipitation are mixed. Heavy rainfall events – so called “Atmospheric River” events – are expected to become more severe. (Mauger 2015)

3.7.3 Initiatives

3.7.3.1 International

The United Nations’ Intergovernmental Panel on Climate Change (IPCC) has coordinated international action on climate change since 1987. Major agreements included:

1987 –The Montreal Protocol was ratified by all 197 member states of the United Nations. While the agreement was focused on ozone restoration, it unified the global community around urgent environmental issues.

1992 – Earth Summit: The United Nations Conference on Environment and Development in Rio de Janeiro, also called the Earth Summit, was ratified by 158 nations.

1995 – Conference of the Parties -1 (COP 1) laid the foundation for future meetings and delivered the Berlin Mandate, which set forth a process for combatting the climate crisis in the new millennium.

1997 – Kyoto Protocol: COP 3 produced the world’s first international treaty requiring the reduction of global warming pollution, with industrialized nations agreeing to cumulatively cut their greenhouse gas to 5 percent below 1990 levels within 10–15 years.

2001 – Marrakesh Accords: Representatives from 160 nations meet to further plan out implementation of the Kyoto Protocol, including differentiations between developed nations and transitioning nations.

2005 – After nearly a decade of work on its implementation, the Kyoto Protocol goes into effect.

2009 – COP 15: A non-binding accord was reached and the conference did produce some progress on setting targets and implementation mechanisms.

2011 – COP 17: Countries meeting in Durban agree to develop a “protocol, another legal instrument or an agreed outcome with legal force” that would be “applicable to all Parties.” The agreement in Durban lays the foundation for a binding, universal agreement to come in the following years.

2013 – Warsaw Mechanism for Loss and Damage: COP 19 saw the establishment of the first formalized international mechanism for dealing with loss and damage, a term broadly understood to mean the negative consequences of the climate crisis that cannot be avoided through mitigation and adaptation.

2015 –The Paris Agreement set an overarching goal to keep warming “well below” 2 degrees Celsius while “pursuing efforts” to keep it under 1.5 degrees, and included each nation offering specific, challenging targets that they felt were achievable.

2019 – Climate Action Summit led to 70 nations committing to cut emissions by more than their Paris pledges.

3.7.3.2 Federal

Most federal action regarding climate change and greenhouse gases is based on Clean Air Act authority and included a number of initiatives.

2009: EPA issued a final action under Section 202(a) of the Clean Air Act finding that six key well-mixed greenhouse gases constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause or contribute to climate change.

2010: EPA and the Department of Transportation finalize a joint rule to establish a national program consisting of new standards for light-duty vehicles to reduce greenhouse gas emissions and improve fuel economy.

2015: EPA issued a final rule establishing emission standards for greenhouse gas emissions from new fossil fuel-fired utility boilers and natural gas-fired stationary combustion turbines. Those emission limits remain in place today.

2016: EPA issued a final action under Section 231(a) of the Clean Air Act finding that emissions of the six well-mixed greenhouse gases from certain classes of engines used in aircraft also constitute a threat to public health and welfare and contribute to climate change.

2016: EPA finalized two rules updating both the 1996 New Source Performance Standards (NSPS) for new and modified landfills and the 1996 guidelines for existing landfills to reduce emissions of methane-rich landfill gas. EPA issued a Federal Plan implementing the 2016 emission guidelines in May 2021.

2021: EPA finalized federal greenhouse gas emissions standards for passenger cars and light trucks for Model Years (MY) 2023 through 2026.

2022: The Inflation Reduction Act includes about \$370 billion in clean energy and climate investments over the next 10 years.

2023: EPA proposed Clean Air Act emission limits and guidelines for carbon dioxide (CO₂) from fossil fuel-fired power plants based on cost-effective and available control technologies.

3.7.3.3 Washington State

In response to growing world-wide concerns, the Washington State Legislature and executive have implemented a range of policies, including:

In 2008, Engrossed Substitute House Bill (ESHB) 2885 codified GHG reduction goals and added a requirement to decrease the annual per capita VMT 18% by 2020, 30% by 2035, and 50% by 2050.

In 2019 the Clean Energy Transformation Act (CETA) (SB 5116, 2019) committed Washington to an electricity supply free of greenhouse gas emissions by 2045.

In 2020 the Motor Vehicle Emission Standards adopted California's vehicle emission standards and included new requirements to gradually increase the number of new zero-emission vehicles (ZEV) sold in Washington, until all new vehicles meet the ZEV standard starting in 2035.

In 2021, the Washington Legislature passed the Climate Commitment Act (CCA), which establishes a comprehensive program to reduce carbon pollution and achieve the greenhouse gas limits with a cap on greenhouse gas emissions from the state's largest emitting sources and industries, to find the most efficient paths to lower their carbon emissions, provides for environmental justice and equity in climate policy.

In 2021 the Clean Fuel Standard adopted a market-based policy that curbs climate pollution from the transportation sector by requiring fuel producers and suppliers to gradually reduce the carbon intensity of transportation fuels to 20% below 2017 levels by 2034.

Pierce County

Pierce County performed a community-wide geographic GHG emissions inventory in 2022 to inventory and quantify the annual emissions produced within community boundaries. The inventory concluded that:

- In 2019, Pierce County’s residents, businesses, employees, and visitors produced 10.8 million metric tons of CO₂ equivalent (MTCO₂). This equates to roughly 12.2 MTCO₂e per capita in 2019.
- Total GHG emissions in 2019 increased 16% compared to the last inventory year of 2015.
- Per-capita GHG emissions have increased 9% compared to the last inventory year of 2015.
- The largest GHG emissions sources are tree loss (~27%), on road transportation (~23%), building electricity (~14%), and building natural gas (~14%).

Analysis results in the following projections compared to 2015 baseline GHG emissions levels:

- Under a no-action scenario Pierce County GHG emissions are estimated to increase 54% by 2050.
- Existing federal, state, and regional policies are estimated to reduce Pierce County’s GHG emissions by 25% by 2050.
- Additional targets/reductions will be needed to achieve a 45% reduction by 2030, and hypothetical targets in line with Washington State goals of 70% reduction by 2040, and 95% (Pierce Co. 2022).

DuPont

DuPont’s Comprehensive Plan states that the city will address reduction in greenhouse gas emissions through land use and transportation-related development techniques that encourage a healthier community and region by promoting a more balanced, multi-modal transportation system and more dense mixed use development in the downtown and in identified activity centers.

3.7.4 Impacts - No Action/Existing Subarea Plan and Zoning

Under the existing Subarea Plan and zoning which emphasizes the Old Fort Lake area as a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses, it is projected that 56 acres of the site would be devoted to 100 single-family units and 1,000 multifamily units resulting in a residential population of about 2,300 primarily in multifamily dwellings with about 1.6 million square feet of office and research and development use (or about 800,000 square feet of office and 800,000 square feet of light manufacturing if the vested Founders Ridge proposal was built), about 70,000 square feet each of retail and service uses a moderate sized hotel and several restaurants.

3.7.4.1 Air Quality

The major contributor to air quality issues from the employment center provided for in the existing Subarea Plan and zoning is from transportation related carbon monoxide (CO) emissions.

The Puget Sound Regional Council (PSRC) Air Quality Conformity analysis has documented that the regional transportation system and the region-wide trip generation is in conformance with air quality standards.

In the Puget Sound region there are currently more than 14 million “person-trips” made in the region each day. This equates to more than 80 million vehicle miles of travel on the roads; 385,000 transit boardings; and 1.4 million bicycle and walk trips per day. By 2040, daily person trips are projected to exceed 19 million. (PSRC 2009). The projected trip generation of the Old Fort Lake Subarea under the

existing Subarea Plan and zoning is around 37,000 daily trips, which is a miniscule component of the existing 14 million total regional trips and is well within the margin of error of the models used. There will be no discernable impact on regional air quality from development under the existing Subarea Plan and zoning.

The construction phase of development of residential, commercial and manufacturing uses includes numerous tasks, each generating a variety of potential air quality pollutants. Land clearing and excavation would expose land to wind erosion leading to entrained soil particulates in the air. Contractors would have to comply with PSCAA regulations requiring all reasonable precautions be taken to minimize fugitive dust emissions. Construction activities would likely require the use of diesel-powered, heavy trucks and smaller equipment such as generators and compressors. These engines would emit air pollutants that could slightly degrade local air quality in the immediate vicinity of the activity. However, these emissions would be temporary and localized, and the resulting construction emissions would likely be far outweighed by emissions from existing traffic around the construction area. Some construction activities could cause odors detectable to some people in the vicinity of the activity, especially during paving operations that use tar and asphalt. Such odors would be short term and localized. Stationary equipment used for the construction activities must comply with PSCAA regulations requiring the best available measures to control the emissions of odor-bearing air contaminants.

3.7.4.2 Climate Change and Greenhouse Gasses

The construction and ongoing use of the residential, commercial and manufacturing uses provided for will involve contribution to climate change largely through carbon released into the environment, greenhouse gas emissions, as the result of embodied emissions in materials used in buildings, emissions related to construction, emissions related to use, and emissions related to decommissioning and reuse of components.

There are three general types of buildings provided for in the existing plan and zoning, 1) single-family residences, 2) multifamily residences, 3) non-residential buildings including office, research and development and light manufacturing. Each building type varies in materials, occupancy, size, and other characteristics.

Single-family dwellings in the Puget Sound area are usually of frame construction, as are almost all existing single-family units in DuPont. Embodied carbon in frame buildings typically is in the range of 119 kgCO₂e/m² (24.4 pounds per square foot), meaning that a 2,500 square foot house would have approximately 61,000 pounds, or 30 tons, of carbon in building materials. For 100 single-family residences, this would total 3,060 tons of carbon in building materials. (Goldstein 2020) Typical energy use for electric heated homes is about 14,726 pounds of carbon per year (EPA 2023), not including transportation. The 100 single-family residences would generate about 736 tons of carbon. Transportation emissions depend on vehicle miles travelled. The average CO₂ emissions from personal vehicles are 0.47 pounds per passenger-mile (EPA 2023). In the Puget Sound region the average household logs 29 miles per day, most of which are non-work trips (PSRC 2022a). On average, a household would generate about 15 pounds of carbon per day on transportation, or about 5,400 pounds of carbon per year. The 100 single-family residences would generate about 250 tons of carbon per year due to travel.

Multifamily dwellings in the Puget Sound area are usually of frame construction, or frame over concrete in the case of ground floor commercial or parking. In Old Fort Lake Subarea, the multifamily standards do not provide for ground floor commercial and under building parking likely is not competitive. Embodied carbon in frame buildings typically are in the range of 119 kgCO₂e/m² (24.4 pounds per

square foot) which means that a 1,000 square foot apartment would have about 24,000 pounds, or 12 tons, of carbon in building materials. (Goldstein 2020). The 1,000 units allowed would total 12,000 tons of carbon. Typical energy use would be in the range of 70% of single-family homes, which would be about 10,300 pounds of carbon per year. Transportation emissions would be similar to other households discussed above at about 5,400 pounds of carbon per year. Apartment dwellers have slightly smaller household size, but trip generation is not necessarily less. The 1,000 multifamily residences would generate about 12,000 tons of carbon in materials and about 5,100 tons of carbon per year due to occupancy and about 2,500 tons per year due to travel.

Non-residential uses include office, research and development, light manufacturing and some retail. The maximum Floor Area Ratio for such uses is 0.30, or 30 percent of the parcel area. This would equal about 1,764,300 square feet of building space. It is difficult to project the materials used for such buildings. Given the maximum height of 65 feet, it is presumed that construction materials would be steel or concrete. With embodied carbon of 185, and 228 kgCO₂e/m², respectively, (38 and 47 pounds per square foot, respectively) all the buildings on site at maximum FAR would have about 4,200 tons of carbon in building materials. (Goldstein 2020) Typical greenhouse gas emissions for office use range from 12 to 17 pounds of carbon per square foot per year (EPA 2023), not including transportation. This would equal about 10,600 to 15,000 tons of carbon per year. It is probable that research and development uses would be similar and light manufacturing uses would be somewhat less. Retail energy use and emissions tend to be somewhat higher. (EPA 2023) Transportation emissions depend on vehicle miles travelled by employees. The average CO₂ emissions from vehicles are 0.47 pounds per passenger-mile (EPA 2023). In the Puget Sound region, the average commute trip is about 11.1 miles per day (Ashour 2022). The trip generation for the projected uses have trip generation that varies by use. The projected trip generation for non-residential use is 34,197 daily trips, all of which equates to about 32,560 tons of carbon per year. The annual carbon emissions would be about 43,200 to 47,560 tons of carbon per year.

Under the existing Subarea Plan and zoning, the subarea at full development would generate about 4,350 tons of CO₂ embedded in materials and between 64,640 to 73,400 tons of CO₂ from operations and transportation.

3.7.5 Impacts - Proposed Subarea Plan and Zoning Amendments

Under the proposed amendments to the Subarea Plan and zoning changes the emphasis in the Old Fort Lake area to a primarily residential area from the previous range of office, research, light manufacturing, and commercial uses. It is projected that the Subarea would add 560 single-family residences, 1,860 middle-housing units, and 1,360 multifamily units. In addition to residential units, the Subarea would add approximately 410,800 square feet of non-residential uses including retail, restaurant, service, civic uses (including a school), and other uses.

3.7.5.1 Air Quality

The major contributor to negative air quality impacts is transportation related carbon monoxide (CO) emissions.

The PSRC Air Quality Conformity analysis has documented that the regional transportation system and the region-wide trip generation is in conformance with air quality standards.

As discussed above for the existing plan and zoning, in the Puget Sound region there are currently more than 14 million “person-trips” made in the region each day. The projected trip generation of the Old Fort Lake Subarea under the proposed Subarea Plan and zoning is around 47,000 daily trips. This is a miniscule component of the existing 14 million total regional trips and is well within the margin of error

of the models used. There will be no discernable impact on regional air quality from development under the proposed Subarea Plan and zoning amendments. The difference between the existing plan and zoning and the proposed Subarea Plan and zoning amendments is minor.

As discussed above for the existing plan and zoning, the construction phase of development of residential, commercial and manufacturing uses includes numerous tasks, each generating a variety of potential air quality pollutants. Similarly to the impacts of existing zoning, land clearing and excavation would expose land to wind erosion leading to entrained soil particulates in the air. Construction would involve the use of diesel-powered equipment that would emit air pollutants that could slightly degrade air quality in the immediate vicinity of the activity. However, these emissions would be temporary and localized, and would be far outweighed by emissions from existing traffic. Some construction activities could cause odors, especially during paving operations that use tar and asphalt. Such odors would be short term and localized. Stationary equipment used for the construction activities must comply with PSCAA regulations requiring the best available measures to control the emissions of odor-bearing air contaminants. The magnitude of impacts from this source would be similar for both the existing plan and zoning and proposed amendments.

3.7.5.2 Climate Change and Greenhouse Gasses

The construction and ongoing use of the residential, commercial and other uses provided for will involve contribution to climate change, largely through carbon released into the environment, greenhouse gas emissions, as the result of embodied emissions in materials used in buildings, emissions related to construction, emissions related to use, and emissions related to decommissioning and reuse of components.

There are four general types of buildings provided for in the proposed plan and zoning, 1) single-family residences, 2) middle housing, which includes townhomes and other residential building types, 3) multifamily residences, 4) Non-residential buildings including retail, services and a small component of office and other uses. Each building type varies in materials, occupancy, size, and other characteristics.

Single-family dwellings in the proposed plan and zoning scenario would generate the same greenhouse gasses as above. Embodied carbon in frame buildings would be about 30 tons of carbon in building materials; annual generation from use would be about 14,726 pounds of carbon per year; and transportation emissions per household would be about 15 pounds of carbon per day or about 5,400 pounds of carbon per year. The projected 560 single-family residences would generate about 16,800 tons of carbon in materials and about 4,140 tons carbon per year due to occupancy and about 1,400 tons per year due to travel.

Middle housing would have almost the same greenhouse gas emissions, except that embodied carbon in building materials would be less because of presumed smaller building size. It is projected that middle housing units would be about 1,500 square feet and therefore would have embodied carbon emissions of about 36,800 pounds or 18 tons of carbon per unit. The projected 1,860 middle housing units would generate about 34,177 tons of carbon in materials and about 8,700 tons of carbon per year due to occupancy and about 4,950 tons per year due to travel.

The analysis of greenhouse gases for multifamily dwellings under the existing Subarea Plan and zoning scenario is applicable to this case. Using the same factors, a 1,000 square foot apartment would have about 24,000 pounds or 12 tons of carbon in building materials; occupancy would produce about 10,300 pounds of carbon per year; a household would generate about 15 pounds of carbon per day on transportation, or about 5,400 pounds of carbon per year. The projected 1,360 multi-family residences

would generate about 16,300 tons of carbon in materials and about 7,000 tons carbon per year due to occupancy and about 3,680 tons per year due to travel.

Non-Residential uses including retail, services, office, and entertainment uses serving the local community and a larger regional market are projected under the proposed Subarea Plan and zoning amendments with a projected 410,800 square feet of such uses. There would be a variety of building types, however, it is presumed that construction materials would be brick or other masonry or concrete with embodied carbon of 115 and 185 kgCO₂e/m² (24 and 38 pounds of CO₂ per square foot, respectively), and the nonresidential buildings on site would have about 5,000 to 7,800 tons of carbon embodied in building materials. (Goldstein 2020) Typical greenhouse gas emissions for retail use range from 15 to 24 pounds of carbon per square foot per year, not including transportation (EPA 2023). This would equal about 3,080 to 4,900 tons of carbon per year. It is probable that services, office and entertainment uses would be somewhat less (EPA 2023). Transportation emissions depend on vehicle miles travelled by employees, using the same factors as above, and the projected trip generation for non-residential uses of 22,126 daily trips, all of which equates to about 21,000 tons of carbon per year. The annual carbon emissions would be about 24,080 to 25,900 tons of carbon per year.

Under the proposed Subarea Plan and zoning amendments the subarea would generate from 62,430 to 66,070 tons of carbon, compared to 62,286 to 71,146 tons of carbon under the existing Subarea Plan and zoning, which is not substantially different.

3.7.6 Mitigation

Much of the mitigation to reduce air quality and greenhouse gas emissions is taking place on the national level. As emissions standards for vehicles has been the major factor in reducing pollution from that sources, the fleet fuel standards adopted at the federal level and programs to encourage electric vehicles is the likely major contributor to reducing greenhouse gas emissions from that source. Similar programs on the state level support such fleet emissions reductions.

The reduction in greenhouse gas emissions from stationary sources such as electricity generation and manufacturing processes also are addressed most effectively through emission standards. In Washington State, the mandates to utilities to meet goals of reducing greenhouse gas emissions is an additional emission control approach.

For projects that involve construction of residential and non-residential uses, the scope of potential reductions on-site is generally of less magnitude, but cumulatively may contribute to overall reductions. Measures include:

Increasing density of housing generally contributes to reduction of embodied greenhouse gasses if units incorporate less embodied emissions in manufacture of materials, in more efficient transportation of materials to sites, and in more efficient heating and cooling.

Higher density development may reduce emissions if greater use of transit or other more efficient travel modes are employed. In DuPont, any such efficiencies would require considerable expansion of the transit network.

The way housing is constructed can affect its contribution to greenhouse gas emissions. Offsite construction can streamline processes in ways that decrease overall energy consumption during construction and produce tighter building envelopes that reduce the amount of energy needed to heat and cool homes, however such measures are generally most practical in large scale development. For onsite construction, use of local materials and engaging in practices that reuse or otherwise recycle demolition and construction waste can lower energy consumed in the transport of materials.

Various building methods and materials can make homes more energy efficient, and, by extension, generate less greenhouse gas emissions. In addition to tight building envelopes, buildings that maximize insulation and passive solar gains can be more efficient.

Use of electricity for heating and air conditioning for all buildings, particularly use of heat pumps can be a substantial reduction in emissions. Residences use of electricity for clothes drying, heating water and cooking, can reduce emissions compared to on-site gas combustion systems, if electric generation is by other than fossil-fuels, which is addressed by Washington State standards for utilities.

Installation of photovoltaic systems can reduce consumption of energy produced off site and reduce greenhouse gas emissions.

An integrated strategy at all levels of the economy together is the most effective means to reduce greenhouse gas emissions and consequent climate change processes.

3.7.7 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, air pollutants and greenhouse gasses will increase in the short-term and medium-term from carbon emissions related to manufacturing construction materials like concrete, asphalt, metal products, and a variety of building construction materials; from space heating and air conditioning, cooking and other activities; and from transportation, given the current manufacturing, electric generation and transportation technology in use.

In the longer term, programs to curb carbon emissions through electricity generation and transportation fuel economy and electric vehicles, or other technology may reduce greenhouse gas emissions. Climate change is a world-wide phenomenon and whether combined efforts by a range of national programs will be ultimately successful in reducing world temperature increase and climate change is unknown.

3.8 HISTORIC AND CULTURAL RESOURCES

Technical studies that form the basis of the analysis presented in this section may be found at:

<https://wa-dupont2.civicplus.com/DocumentCenter/>

3.8.1 Affected Environment

3.8.1.1 Applicable Regulatory Compliance

The State Environmental Policy Act (SEPA) requires that impacts on cultural resources be considered during the public environmental review process. Historic and cultural preservation is one of the elements of the environment. The Department of Archaeology & Historic Preservation (DAHP) is considered the agency with expertise in this area. DAHP will only review eligibility determination for State and National Register listing. Eligibility for local listing is done through a city or county preservation program. Local jurisdictions have broad authority under SEPA to identify and mitigate adverse impacts and to define the extent of impacts and the appropriateness of mitigation for resources outside of cases where another agency has legislatively designated jurisdiction.

One approach for assessing the relative importance of cultural resources is to use the National Register Criteria for Evaluation (National Park Service [NPS] 1995). These guidelines state that to be eligible for listing in the NRHP, a property must be significant in American history, architecture, archaeology, engineering, or culture and must meet one or more of the four NRHP criteria:

- A. Be associated with events that have made a significant contribution to the broad patterns of our history; or

- B. Be associated with the lives of persons significant in our past; or
- C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. Have yielded, or may be likely to yield, information important in prehistory or history.

Additionally, to be eligible for the NRHP a resource must retain integrity. According to NPS (1995), integrity is the ability of a Historic Property to convey its significance. Integrity must be evident through historic qualities, which may include location, design, setting, materials, workmanship, feeling, and association.

In addition, the State of Washington requires compliance with the cultural resources management laws and regulations under the Revised Code of Washington (RCW) 27.53 Archaeological Sites and Resources, RCW 27.44 Indian Graves and Records, and RCW 68.50.645 Skeletal Human Remains—Duty to Notify. The Archaeological Sites and Resources Act (RCW 27.53) prohibits knowingly disturbing archaeological sites without a permit from the DAHP. The Indian Graves and Records Act (RCW 27.44) prohibits knowingly disturbing Native American or historic graves. RCW 68.50.645 provides a strict process for notification of law enforcement and other interested parties in the event of discovering any human remains, regardless of inferred cultural affiliation.

The City of DuPont has adopted policies to “Protect cultural resources by continuing to implement regulations that ensure cultural resources will not be destroyed, damaged, or disregarded during the planning and development process. The city operates under Municipal Code Title 25.89 which designates cultural resource sites; prohibits structures, roads or utilities within 50 feet of the markers identifying designated cultural resource sites. Requires review of construction within areas of potential historical or cultural resources to ensure that appropriate measures are taken to protect such areas and provides for coordination with the State Historical Preservation Office and/or the Nisqually Indian Tribe. The city may impose conditions on any plat, site plan or permit to assure that such resources are protected, preserved or collected.

In addition, the city is a party to a Memorandum of Agreement Regarding a Cultural Resources Management Program which covers the Old Fort Lake Subarea and other portions of the city among the Washington State Historic Preservation Officer, and the Weyerhaeuser Real Estate Company which annexes the previous 1988 Memorandum of Agreement between Weyerhaeuser Company and the Nisqually Indian Tribe regarding Native American remains and donation of Native American artifacts recovered from the Property to the Nisqually Tribe, and the 1983 Memorandum of Understanding Regarding Cultural Resources Potentially Affected by Weyerhaeuser DuPont Export Facility between Weyerhaeuser Company, the Washington State Historic Preservation Officer, the Nisqually Indian Tribe, the City of DuPont, and the U.S. Army Corps of Engineers.

The city has a robust coordination program with the Nisqually Tribe that provides for tribal participation in review of archaeological and cultural reports (including the report upon which this analysis is based) and participation in oversight of field work. The city recognizes that the subarea is located within a landscape of deep and enduring significance to the Nisqually Tribe and its members. This landscape of saltwater, shorelands and tidelands, forested uplands, glacial outwash prairies, and an interconnected system of fragile glacially-created wetlands and kettle lakes, is recognized as having sustained the Nisqually people for countless generations. The city recognizes that through living within and actively managing this landscape since time immemorial, the people of the tribe have left their legacy as represented within the pre contact and historic era archaeological sites and non-archaeological places of enduring historical, cultural, and spiritual significance encompassed in this area.

3.8.1.2 Cultural Setting

Precontact

The earliest evidence of human occupation on the Northwest Coast begins following the retreat of glacial ice across the landscape in the Late Pleistocene. The earliest cultures in the region are thought to have resided in the area beginning approximately 14,000 years before the present (YBP). Subsistence strategies included an adaptation to highly variable climates and a changing environment. Currently, archaeological evidence indicates patterns of high mobility and small groups reliant on large game and seasonably available resources. The earliest recognized culture in the Pacific Northwest is the Clovis culture, dated to 12,000 to 11,000 YBP. This culture, named for its distinctive fluted projectile points, was highly mobile and left little evidence of permanent base camps. These large fluted projectile points have been observed on the surface, distributed throughout Puget Sound. (Ames and Machner 1999; Croes et al. 2008; Matson and Coupland 2009)

Between 12,000 and 7,000 YBP, foraging strategies changed to include smaller inland game, aquatic animals, and various plants. Sites from this period are typically encountered on high marine and river terraces (current and abandoned), subalpine meadows, and saltwater shores. These site types indicate a continued high mobility pattern, subsisted by terrestrial game. This period provides the first indication of plant processing and the use of aquatic environments. Faunal and fish remains dating to this period are rare, but archaeological evidence has been reported (Chatters et al. 2011). Evidence from this period indicates a well-developed land use strategy (Chatters et al. 2011). The artifact assemblage from this period is distinguishable by large leaf-shaped and stemmed points, scrapers, flake tools, and blade cores. In the Puget Sound region, as well as regions along the Columbia, the introduction of larger laurel-leaf projectile points indicates a tradition that is part of the Cascade Phase (Carlson 1990; Ames 1999; Kirk and Daugherty 2007; Matson 2009)).

After 5000 YBP, populations appear to become larger and more complex as groups utilized a more extensive range of resources, including salmon and shellfish, land mammals, and plant resources such as berries, roots, and bulbs. Subsistence and settlement patterns are archaeologically evidenced to be distinct from those of earlier cultural adaptations. Settlements represent residential base camps with year-round re-occupation and access to multiple environments. Short-term base camps for smaller hunting or gathering groups, concentrating on specialized seasonally available resources, were introduced into the settlement pattern. Between 6,000 and 5,000 YBP, these predominantly sedentary lifestyles produced the first evidence of mass processing and storage of salmon and plants. By approximately 3,000 to 2,000 YBP, hunter-gatherer subsistence settlement patterns became focused on salmon fishing throughout the Puget Sound region and along the Columbia. Additionally, ground stone tools, microblades, and cores appear at this time, as well as bone and antler tools, ground shells, and harpoons. Canoe technology most likely developed around 2,000 to 3,000 YBP with the construction of large plank houses (Hebda and Matthews 1984; Donald 2003; Matson and Coupland 2009). Shell middens are also prevalent in this period and continued into the ethnohistoric period (Thomson 1978; Blukis Onat 1987; Ames 1999; Kopperl et al. 2016).

Ethnohistoric

The Area of Potential Impact (API) is located in the traditional territory of the Nisqually Indian Tribe. The traditional territory of the Nisqually is documented as extending along both sides of the Nisqually River from its delta at the southern end of Puget Sound to nearly 30 miles upstream. Along the river, Nisqually peoples lived primarily in the lower sections, fished in the middle sections, and avoided building homes in the heavily wooded sections near the middle of the river. Salmon was always a primary source of the Nisqually diet and the culture. Coastal Salish groups typically maintained strong social ties to neighboring groups in the pre-contact period. Ethnographic and archaeological information indicates

that local bands established permanent villages near the convergence of protective marine shoreline and freshwater drainage outlets, while temporary camps were established during the warmer months during seasonal gathering and harvesting. Before the arrival of Euro-American settlers, the Nisqually occupied at least 40 villages on the Nisqually River, where resources were plentiful. (R Suttles and Lane 1990; Carpenter et al. 2008; Ruby et al. 2010; Nisqually Indian Tribe 2023; Ruby et al. 2010;).

Nearest the API, ethnographers documented the Sequalitchew village, Sčegwa'liču (45PI54), located at the mouth of Sequalitchew Creek at Puget Sound. The village site is believed to have been located "on a terrace against the bluff a short distance inland from the mouth of Sequalitchew Creek on the south side of the creek." The village, named after the description of the long sandy beach at the mouth of the creek, consisted of two cedar longhouses with around 50 people. The lower powerhouse of the DuPont Company's Powder Works Plant reportedly was built "near the location of the Sequalitchew-Nisqually longhouses." (Welch 1989; Smith 1940; Hilbert et al. 2001; Carlsson 1990; Lyday and DuPont Historical Society 2021)

Historic

Non-native exploration and settlement in the Puget Sound region begins in the 1600s with Spanish exploration along the western coast of North America, including Puget Sound. In 1792, English Explorer Captain George Vancouver and his crew investigated Puget Sound. Vancouver subsequently sent Lieutenant Peter Puget and Master Joseph Whidbey on a six-day tour of the Sound in May of the same year. The pair named various landmarks, including Whidbey Island and Puget Sound, as well as Mount Rainier and Hood Canal. The team then returned to Britain, where Vancouver began preparing a report of his findings. Later, from 1802 to 1804, the Lewis and Clark Expedition traveled to the mouth of the Columbia River to explore the lands purchased by the United States from France.

In the early 1800s, the Hudson's Bay Company (HBC) established fur trade posts in the Pacific Northwest. The HBC established its first foothold in today's Washington State in 1825 at Fort Vancouver. HBC cultivated cattle, hogs, goats, apple trees, grapevines, potatoes, wheat, and other crops throughout the Northwest (Rowe 2018).

In 1833, the HBC and its subsidiary, the Puget Sound Agricultural Company (PSAC), established a temporary post, which they termed the Nisqually House, at the mouth of Sequalitchew Creek, just northwest of the API (Crooks 2021). That same year, a permanent fort was established further inland, now termed the Fort Nisqually 1833 Site (45PI55). The 1843 Fort Nisqually (45PI56) was constructed near Sequalitchew Creek and Edmonds Marsh for easier access to water, and was established another mile inland on the south banks of Sequalitchew Creek (Crooks 2021; DuPont Historical Society [DPHS] 2014).

In 1840, Methodist missionaries from Oregon built a mission house a few hundred yards west of today's Center Drive just north of Sequalitchew Creek. The mission lasted only three years and was abandoned in 1842; the building was burnt down later that year. An archaeological survey potentially identified the remains of the Mission in 1989, but later excavations by other archaeologists in 2011 found no sign (DPHS 2014; Moura 1989).

In 1841, the Wilkes Exploring Expedition constructed an observatory south of the Sequalitchew Creek estuary. The observatory and associated structures (45PI67) were destroyed with the construction of the Union Pacific Railroad, but the remaining clay piles in 1906 marked where the improvements once stood (DPHS 2014).

In 1846, the United States and Great Britain settled on the 49th parallel and leaving Fort Nisqually and other HBC properties on lands under the jurisdiction of the United States. The United States continued to encourage non-native settlement in the region, and waves of migrating Americans arrived. Territorial

Governor Isaac Stevens negotiated a series of treaties with the Native Americans (Rowe 2018). Both the Medicine Creek Treaty of 1854 which removed Native Americans from millions of acres of their traditional lands and granted reservations for them to share. The treaty provided rights to fish, hunt, gather roots and berries, and pasture horses; provided rules of conduct, and appropriated funds to be paid to the tribes over 20 years. Of the three initial reservations defined in the Medicine Creek and Point Elliot treaties, the largest was the Nisqually, with 1,280 acres. The Nisqually Reservation was home to people who identified with the Nisqually, Cowlitz, Muckleshoot, and other local area tribal groups (Kirk and Alexander 1990; Smith 1940; Suttles and Lane 1990).

In 1870 the HBC left the Nisqually area and the fort closed (Crooks and Crooks 2019; DPHS 2014, Nisbet and Nisbet 2011).

Homesteaders inhabited the DuPont-Steilacoom area around Sequelitchew Creek until 1903 when the joint Army-National Guard began holding training exercises by the creek. In 1903, a troop of all Black cavalymen marched to the site of the Methodist Mission and created Camp Nisqually, a temporary bivouacked army camp, has been excavated and recorded as site 45PI455.

In 1906, the land that once was occupied by Fort Nisqually was sold to the E.I. DuPont de Nemours who purchased five square miles of land and began construction of the DuPont Powder Works Plant (Crooks and Crooks 2019). During the initial construction of the plant, laborers lived in what has come to be known as a “tar paper village” or “Old Town.” In 1909, the DuPont Company began the construction of a permanent community roughly a mile east of the plant and 0.6 mile east of the former Huggins home. The town was incorporated in 1912, allowing liquor to be sold at the clubhouse, but was unincorporated during prohibition in 1920. (Munyan 1972; Crooks and Crooks 2019; Crooks 2021).

The DuPont Company’s Powder Works Plant had six designated areas of production including an operations area, an acid area, a nitroglycerin area, a powder line, a black powder line, and a magazine area, all within a fenced and heavily guarded facility. During the first 50 years of operation, the DuPont Company produced over one billion pounds of dynamite (Lewis 1983; Carlsson 1990).

In 1951, the town of DuPont became re-incorporated after the DuPont Company donated water, sewer, electrical, and parks. Additionally, the company began selling company homes to its residents (City of DuPont 2022).

In January 1976, the Weyerhaeuser Company purchased 3,200 acres of DuPont Company land. Weyerhaeuser greatly expanded the developed area and, by 1994, it planned the construction of Northwest Landing, a large-scale development estimated to house up to 12,000 residents from its original 601 at the time. The development mainly contained minimal traditional, craftsman, or neo-colonial style houses. (City of DuPont 2021).

Cultural Resources Studies

There have been 52 cultural resources studies previously conducted in, and within one mile of, the API (Table 3). Of these, twelve have been completed within the subject API. Specific information about sites is available from DAHP only to qualified professionals to preserve resources.

In 1977, the Weyerhaeuser Company contracted National Heritage, Inc. to conduct a cultural survey of the DuPont Site;

In 1987, Hart Crowser screened spoils and disturbed soils at the DuPont Powder Works Company property after an asbestos removal project identified human remains primarily pertaining to thoracic and cranial remains.

In 1989, Western Heritage, Inc. conducted a series of cultural resource surveys which included a pedestrian survey and the excavation of several test pits (Welch 1989b).

In the spring of 1989, Daugherty and Wessen (1989) excavated the human remains of one male and one female (45PI404) identified during asbestos removal in 1987. The Nisqually Indian Tribe reinterred the remains at the 1843 Fort Nisqually Native American Burial Site (45PI413).

As part of the preparation for a cultural resources management plan on the Weyerhaeuser Real Estate Company's lands, Western Heritage, Inc. (WHI) tested and evaluated a precontact shell midden site (45PI72) (Wessen 1989).

In July of 1990, Western Heritage, Inc. conducted a survey to locate the Palisade and bastions of the 1833 Fort Nisqually (45PI55) (Creighton et al. 1990). During the survey, the team identified trade beads, botanical and faunal remains, posts, metal artifacts, bricks, ceramics, clay pipes, a privy with artifacts, and other miscellaneous artifacts (Creighton et al. 1990).

In 1990, Cecilia Carpenter reported on known burials believed to be buried at the 1833 Fort Nisqually and 1843 Fort Nisqually (Carpenter 1991).

In 1995, the Weyerhaeuser Real Estate Company conducted archaeological test excavations on the beach near the mouth of Sequelitchew Creek due to blue beads and human remains having been previously discovered. (Daugherty 1995).

In 1997, Historical Research Associates, Inc. (HRA) conducted background research in preparation for the construction of the DuPont Golf Course in the former DuPont Powder Works property (Thompson and Carter 1997).

URS (2000) completed a cultural resources protection plan at Parcel 1 in the former DuPont Powder Works Plant that summarizes a chronological timeline of significant historical events at Northwest Landing, previous research and testing, protection measures, and all previous memorandums of agreement and understanding (Weyerhaeuser 2000).

In the fall of 2001, Wessen and Associates and Historical Research Associates, Inc. performed testing to delineate the boundaries at the shell midden site 45PI72 to permanently protect the site during remediation and construction activities (Wessen 2001a, 2001b). Testing identified debitage, fire-cracked rock, fragments of marine shell, and four formed tools, including two small lanceolate projectile points, a biface, and a retouched flake (Wessen 2001a, 2001b).

Between June 4 and September 18, 2001, HRA provided archaeological monitoring during the soil remediation activities (Maass 2003).

In the spring of 2004, archaeological monitors from HRA/ W&A discovered a prehistoric archaeological site 45PI576 in an area where soil excavation was already occurring and determined that the site was in very poor condition and would unlikely be eligible for the NRHP (Wessen 2004 a).

In June 2003, HRA staff discovered site 45PI713 while monitoring hazardous waste remediation and discovered sixteen pieces of chipped stone artifacts, fire modified rock, forty-eight shell fragments, and faunal remains of large terrestrial mammal bones. They concluded that the site was in very poor condition and was unlikely eligible for the National Register (Wessen 2004b).

In 2004, HRA conducted archaeological investigations in the vicinity of the 1833 Fort Nisqually site (45PI55) to determine the nature of cultural deposits identified during soil remediation activities near the site boundary. Cultural deposits were identified at six locations outside of the pre-established 63-foot buffer around the site during soil remediation activities (Maass 2004).

HRA and Wessen and Associates, Inc provided archaeological monitoring of soil remediation activities between 2003 and 2004. Over the 20-month period, 19 locations were identified with cultural resources varying from historic and prehistoric materials. (HRA 2022; Maass 2004; Wessen 2003a, 2003b, 2004a, 2004b 2004c; Dampf 2005).

Thompson (2006) compiled all archaeological survey work conducted between 2001 and 2005, which were conducted to “evaluate the extent and magnitude of contamination at the former DuPont Works Site...to design remedial activities, which included the removal of structures, debris, and contaminated soil”. (Thompson 2006)

In 2007, HRA completed archaeological monitoring of the construction at the Pioneer Middle School site and discovered archaeological site (45PI780) that consists of three loci containing charcoal and sparse historic artifacts including one bottle fragment from the Hudson Bay era occupation. (Hoffman and Thompson 2007).

The Archaeological Services of Clark County (ASCC) completed a cultural resource survey at the proposed Lower Sequelitchew Creek Fence and Re-Vegetation Project area and discovered the remains of an electric cable system with hanging buckets called a telpher tower ruins. No cultural materials were found in the shovel tests. (Gall 2010).

In March 2017, Northern Land Use Research Alaska, LLC conducted a ground-penetrating radar (GPR) survey of the eastern parcel in the subarea due to research and ethnographic accounts indicating the presence of burials in the area. The GPR survey revealed twenty-seven anomalies meeting the criteria for human burials and conducted an intensive-level excavation at seventeen of the GPR anomalies ((Bowman 2017); Adams 2022).

In 2021, ATCRC wrote a monitoring and inadvertent discovery plan for the City of DuPont Public Works Building Project. (DAHP 2021 as cited in Morris 2021).

HRA conducted a Phase 1 archaeological survey on an undeveloped 30-acre parcel in the API as part of the Founders Ridge Development Project (Adams 2021) including a pedestrian survey, 222 shovel probes, and shovel scrapes and identified four archaeological sites: 45PI209, 45PI221, 45PI510, and 45PI1524 (Table 3, Table 4) they recommended three as not eligible for listing in the NRHP and site 45PI1524 as potentially eligible for listing in the NRHP and WHR. Phase 2 consisted of an intensive-level excavation after a GPR survey identified an area with potential human remains that did not identify any evidence of burials, but did identify two archaeological sites, 45PI1571 and 45PI1572 (Table 4) recommended as not eligible for listing in the NRHP (Bowman 2017; Adams 2021; 2022).

Over 52 archaeological and historic sites have been investigated within a mile of the subarea, documented in greater detail in the technical report.

Based on review of environmental and cultural contexts, previously recorded cultural resource studies and sites, and review of the Washington Information System for Architectural and Archeological Records Data (WISAARD) state-wide site probability model, the subarea is in an area of very high potential for the presence of archaeological resources. In addition to the high probability for the presence of precontact cultural resources, the project area has been historically modified from its precontact setting due to Euro-American settlements from Fort Nisqually and the DuPont Company. Based on the project’s location within the traditional territory of the Nisqually peoples, its proximity to Puget Sound and Sequelitchew Creek, and its proximity to Fort Nisqually and DuPont Company’s Powder Works Plant, it is expected that precontact and historic materials could be present within the API.

From an archaeological perspective, precontact and ethnographic site types that could be encountered within the API include seasonally occupied base camps, short-term field camps, and seasonally utilized

resource- procurement and processing loci. Resource procurement and processing loci represent a wide variety of activities that vary according to resource types present and environmental setting. Activities occurring at such sites were generalized or focused on specific resources such as salmonid procurement, game hunting sites, plant gathering areas, felling trees for planks, canoe building, bark removal, and localities where flaked and groundstone material sources exist. In addition, other site types or features would have been present in the precontact and early contact period cultural landscapes associated with the occupation of upland settings. These include trails linking villages or accessing resource procurement loci, rock art, culturally modified trees, and burials, among others; however, it is unlikely that the latter set of site types are extant due to historic disturbance and utilization of the API leading to poor surface preservation conditions.

Archaeological sites dating to the historic period result from early/modern Euro-American settlement activities, including the original homesteading infrastructure. In addition, resource exploitation activities common to market-driven economies of the mid-to-late 19th century included common commercial activities that revolved around widespread timber harvesting and delivery to sawmills for processing along with harvesting of salmon runs. Sites of this period include farmsteads clustered around highly productive areas in river valleys, railways located throughout and around large swaths of company land to facilitate the transport of products, and road systems linking developing areas to developed areas and areas where resources were being exploited. The primary commercial activity in this area revolved around the DuPont Company's Powder Works Plant (45PI70). Features associated with the plant could include structural remains, foundation remains, and railroad infrastructure remnants.

The fact that most of the site subject to future development was the subject of ground disturbance due to hazardous materials remediation excavation of about one foot of soil over large areas of the site where elevated levels of arsenic and lead were present does not obviate the likelihood that additional cultural resources remain below the depth previously excavated.

3.8.2 Impacts

Based on the number of cultural resources previously recorded, and the character of the site, it is likely that a wide range of cultural resources are present on the site, but undiscovered.

The two alternatives are likely to have essentially the same impacts. It is likely that a range of resources will be encountered during further development of the site under the existing Subarea Plan and zoning or proposed amendments to the plan and zoning. It is particularly likely that deeper excavation for utilities and foundations will be the practices most likely to encounter cultural resources.

3.8.3 Mitigation

The city recognizes the need to enter into an updated Memorandum of Agreement (MOA) with the Nisqually Tribe and the Department of Archaeology and Historic Preservation (DAHP) to update the 1989 MOA to provide clear procedures for assessing cultural resources and clear avenues to coordinate with the tribe and DAHP to assure adequate assessment, protection and conservation of cultural resources.

Based on the potential for cultural resources on site, development projects within the subarea should involve a robust investigation of each site for resources, including a plan developed for each site subject to permits that includes a range of activities that may include, but is not limited to:

1. An initial survey of past investigations and resources identified in the appropriate Areas of Potential Impact.

2. A pedestrian survey of the site to ensure that general features of the site are considered in the development of a site-specific investigation plan.
3. Development of a detailed investigation report that details appropriate field surveys for reconnaissance and intensive studies, which may be phased. Specific standards are included in the DAHP Standards for Cultural Resources Cultural Resources Reporting. Requirements may include a variety of measures that may include, but are not limited to:
 - a. Specific near surface investigations through shovel probes.
 - b. Subsurface borings or other samplings on an appropriate grid.
 - c. Ground penetrating radar in locations where subsurface resources are likely and survey of anomalies is useful as an intermediate step in locating areas of high probability.
 - d. Extensive investigation of areas identified by other methods of having a high priority of the presence of resources.
4. Consultation with the Department of Archaeology and Historic Preservation (DAHP) and the Nisqually Tribe regarding appropriate methodology for detailed investigation.
5. Provision of a trained professional archaeologist on-site to monitor onsite soil disturbance activities during construction.
6. The city requires that owners allow a Nisqually Indian Tribe representative to be present during soil disturbance activities where there is a likelihood of the presence of cultural resources.
7. Any resources discovered must be evaluated in accordance with DAHP guidelines and appropriate avoidance or conservation strategies implemented.

A variety of measures may be implemented for mitigation for discovered cultural resources, which may include, but are not limited to:

- In-situ preservation
- Moving and/or salvage
- Reburial of human remains
- Museum Exhibits
- Interpretive signage or other on-site or near-site information
- General dissemination of information through publication, including websites, guidebooks, school curriculum and other means

3.8.4 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, construction of infrastructure and buildings on the site will change the existing character of the site and may lead to the discovery and displacement of existing cultural resources.

Development of the site for a range of urban uses will preclude the potential for restoration of a variety of features that reflect the cultural use of the site including the glacial outwash prairie habitat of the area that once hosted a wealth of *Camassia quamash*, or blue camas, a food of significance and nutritional value to the Nisqually people. The members of the tribe believe these areas were seeded with camas by a culturally central non-human Person and are, therefore, the tribe considers this area eligible for listing on the NRHP as a Traditional Cultural Property (TCP), a class of property that recognizes, celebrates, and protect places important to traditional communities.

3.9 PUBLIC SERVICES

3.9.1 Public Services Overview

3.9.1.1 Affected Environment

The Washington State Growth Management Act (GMA) RCW 36.70A.20(5) seeks to encourage economic development within the capacities of public services, and public facilities. A capital facilities plan element is required that includes a forecast of the future needs for such capital facilities. The city has adopted a public facilities element with the goal that public facilities and services are provided concurrent with development, which means that adequate public facilities will be in place to support new development or will be provided within a specified time thereafter. Concurrency requires that facilities have sufficient capacity to serve development without decreasing levels of service (LOS) below adopted minimum standards. While the GMA requires concurrency only for transportation facilities, the Washington State Department of Commerce recommends concurrency for water and sewer systems as well. The GMA also requires all other public facilities to be “adequate.” The city shall establish and maintain Concurrency Implementation and Monitoring Systems. The Comprehensive Plan also provides for a system of review of various applications for development permits to assure that no final development permit shall be issued, which results in a reduction in the levels of service below the standards adopted by the City.

The assessment of impacts on public services requires an orientation to how these services are supported by the revenue base of the entity providing the services. The following discusses the revenue base of the City of DuPont. The revenue base of other entities providing services, such as the School District, are discussed separately in that section.

City Tax Revenue Sources

DuPont is typical of many cities in Washington State in relying on the four major revenues sources

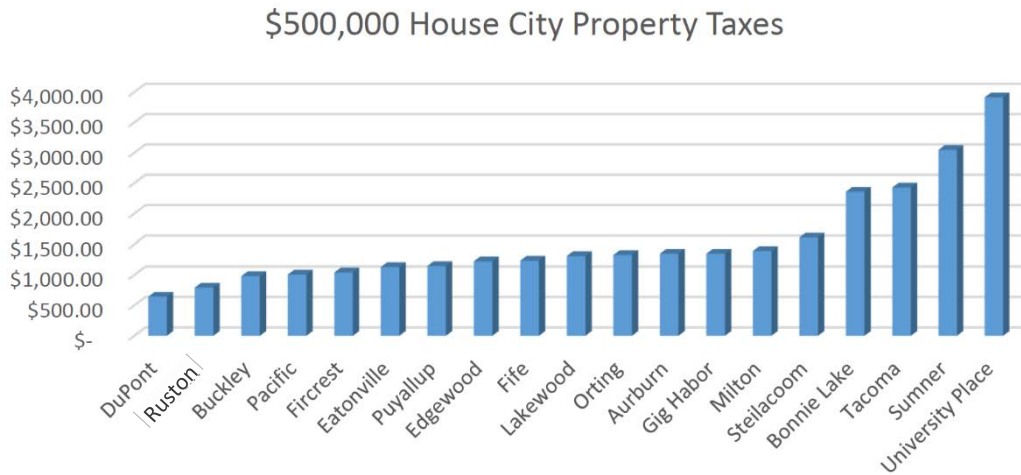
- Property taxes,
- Sales and use taxes,
- Utility taxes, and
- Business and occupation taxes (B&O).

Taxes made up 74% of the city’s overall revenue in 2021. The other 26% is largely from fees and state shared revenue.

Current Expense Property Taxes

Collection of property taxes by cities is limited to an annual increase in the dollar amount of the regular levy to one percent of the prior year’s levy (for cities less than 10,000) or the lesser of one percent or the implicit price deflator (IPD) for larger populations. New construction value and other adjustments are added after the application of the one percent. This limit was initially through the initiative process (Initiative 747) and subsequently by the State Legislature (RCW 84.55) in 2007 after the initiative was found unconstitutional. This limit has been a substantial limitation for DuPont because the city was very small and had a very limited budget before it was transformed by the new development of Northwest Landing approved in 1989 with first construction in 1994. Increases in the tax rate can be approved by local voters, most commonly for specific capital improvements such as parks or other capital facilities. The city has one of the lowest tax rates of cities in Pierce County as shown by the table below. In 2023, property tax levy was \$2,014,558.

Figure 3-42 Comparison of Effective Tax Rates



EMS Property Taxes

The city also collects a regular property tax for emergency medical services provided by the city. In 2023, property tax levy was \$877,716. The City Council is considering a proposal by the mayor to submit a levy request to voters to increase the revenue in 2024.

Local Option Retail Sales and Use Taxes

The second largest current revenue source for the city is the retail sales tax. Of the 9.4% sales tax currently collected in the city on general retail purchases, a 1% "local" share of the tax goes to local jurisdictions. The city receives 85% of the 1% local tax and Pierce County receives 15%. The local option sales tax generated revenue of \$1,557,853 in 2023, down from \$2,353,599 in 2021. This tax is levied not only on businesses in the area, but also on construction activity and some transactions that are related to housing, such as certain online purchases. Construction related sales tax largely accounts for the reduction from 2021 to 2023. Most construction sales taxes are assessed at the point at which a purchase of construction materials is made. The city collects sales tax on only those construction materials purchased in the city, and those purchased outside of the state. The city also receives a population pro-rata share of 90% of the city allocation of Pierce County's 0.1% criminal justice sales tax which was \$244,491 in 2023.

Business and Occupation Taxes

The city levies a Business and Occupation tax that applies to the gross revenues of most businesses with a rate of one-tenth of one percent. Business and Occupation taxes may be used for any governmental purpose. The B&O tax generated \$ 1,084,996 in tax revenues for the city in 2022 and was the fourth largest source of revenue.

Utility Taxes

The city levies a tax on utilities which is based on the total utility bill amounts and appears as a separate item on bills. The city levies different rates on different utilities: Electricity 6%; Water 12%; Sewer 6%; Stormwater 10%; Telephone 6%; Natural Gas 6%; and Solid Waste 8%. The utility tax produced \$1,656,764 in tax revenues for the city in 2022, the second largest revenue source for that year.

Hotel/Motel Tax

The city receives a sales tax of 2% on accommodations purchases, which is taken as a credit against the 6.5% state sales tax rate. The revenues must generally be used for tourism promotion, acquisition of tourism-related facilities, or operation of tourism-related facilities (RCW 67.28.1815-.1816), including:

tourism marketing, and operations of special events and festivals designed to attract tourists, operations and capital expenditures of tourism-related facilities owned or operated by a municipality or a public facilities district, including repayment of general obligation bonds or revenue bonds for eligible capital projects. Revenue in 2022 totaled \$274,327.

Real Estate Excise Tax (REET)

Local government may collect a real estate tax on real estate transactions in addition to the state sliding scale. The local tax may be up to 0.50 percent of the transaction and revenues are restricted to finance capital projects. DuPont revenues were \$1,642,880 in 2022 but they tend to vary widely according to sales in any year. City revenues were \$2,013,832 in 2021.

Admission Tax

The city charges a tax on admissions of 5% of the admission proceeds.

Fees

The city collects a variety of fees for services including franchise fees levied on private utilities for the right to use city streets, alleys and other public properties, state shared revenues including vehicle license fees, liquor taxes and cannabis license fees are shared with municipalities; the city collects building permit fees and fees for discretionary land use approvals, recreation fees are collected from participants in the City's recreation programs and activities; a variety of fees are collected for documents and records; processing of invoices, fingerprinting fees, false alarm fees, and civil service testing fees.

Table 3.9.1-2 City of DuPont Revenues

	2021 Actual	2022 Revised	2022 Actual	2023 Adopted	2024 Adopted
TAXES					
Property Tax	\$ 1,980,036	\$ 2,011,532	\$ 1,985,606	\$ 2,017,383	\$ 2,037,557
Property Tax- EMS	862,637	875,917	865,095	878,947	1,106,771
Local Sales & Use Tax	123,169	113,848	136,175	120,000	126,000
Retail Sales Tax	2,353,599	1,499,454	1,557,853	1,997,197	2,243,778
Local Criminal Justice Sales Tax	223,764	201,704	244,491	225,000	230,000
Business Taxes	750,152	1,274,306	1,084,996	1,211,892	1,289,892
Excise Taxes	199,810	173,604	193,729	188,068	189,078
Utility Taxes	1,647,376	1,671,533	1,656,764	1,646,000	1,763,000
Hotel/Motel Tax	220,854	257,347	274,327	270,000	275,000
Real Estate Excise Tax	2,013,832	565,600	1,642,880	800,000	800,000
TOTAL TAXES	10,375,227	8,644,844	9,641,917	9,354,487	10,061,076

3.9.1.2 Impacts

There are basically three methods commonly used for assessing the impacts of growth on public service provide by public agencies (Harrison 2023, Kotval 2006). These are:

- The per-capita multiplier method
- The service-standard method
- The comparable case method

This analysis primarily uses the “per capita multiplier” methodology as the most generally applicable. In some cases, it is supplemented with other methodologies to give additional perspective. For school impacts a variation of the service standard method is employed using census multipliers for student generation and a cohort progression model to move students through grades.

A brief assessment of the different methods is provided below.

Per Capita Multiplier Technique

The most common cost estimation technique, the per capita multiplier is applied on a jurisdiction-by-jurisdiction basis for all of an area's major service providers. Growth-induced public service costs are determined by multiplying the per capita cost by the total number of people, employees, and pupils introduced by development. The service standard technique uses averages of manpower and capital facility service levels. The analyst determines the local operating cost for additional personnel that contribute to local operating outlays and to an annual expenditure for capital facilities specific to the service function. The annual capital expenditure is obtained through capital-to-operating service ratios derived from budget trends or studies by service providers.

Assumptions:

- Current average service levels for both manpower and capital facilities of comparable service providers can be used to assign costs to future development.
- Service levels for both manpower and capital facilities vary according to population.
- Average servicing levels for the current population can be used for the new development.

Applicability:

- Most useful in communities where current service capacity is closely aligned with service demand, without considerable excess or deficiency.
- Most suited for mid-size, moderately growing suburban areas or slower-growing cities. More information about these areas is available than for rapidly growing or declining ones, making mean employment levels and median capital-to-operating ratios more reliable.
- Useful for general fiscal planning and for projecting impacts of annexation, given that public personnel costs make up the largest share of costs in these cases.

Benefits:

- The only technique, other than case studies, to provide information on personnel requirements.
- Not only predicts the financial consequences of population change, but also traces specific changes needed for each public service category.
- Results are easy to understand and widely accepted.
- Relatively simple and low cost to implement, requiring little specific knowledge of internal service provider operations.

Limitations:

- Assumes that current local performance is similar to current expenditure patterns in cities of similar size and location. Differences in actual performance (e.g., in terms of wealth, labor rules or public services) may result in under- or overestimates of costs.

Service Standard Technique

The service standard technique uses averages of manpower and capital facility service levels, obtained jurisdiction of similar size and geographic location, or in this case from the City of DuPont Comprehensive Plan Capital Facilities Element. The analyst determines the local operating cost for additional personnel that contribute to local operating outlays (salary, plus statutory and equipment expenditures) per employee by service function and to an annual expenditure for capital facilities specific to the service function.

The annual capital expenditure is obtained through capital-to-operating service ratios derived from census information and applied to the total local operating cost per employee. This approach uses mean

staffing levels and median capital-to-operating ratios obtained from a jurisdiction or survey of multiple jurisdictions.

Assumptions:

- Current average service levels for both staffing and capital facilities of comparable cities can be used to assign costs to future development.
- Service levels for both staffing and capital facilities vary according to population.
- Average servicing levels for the current population can be used for the new development.

Outputs of Analysis:

- Total number of additional employees by service function (financial administration, general control, police, fire, highways, sewerage, sanitation, water supply, parks and recreation, and libraries) required as a result of growth.

Applicability:

- Most useful in communities where current service capacity is closely aligned with service demand, without considerable excess or deficiency.
- Most suited for mid-size, moderately growing suburban areas or slower-growing cities.
- Useful for general fiscal planning and for projecting impacts of annexation, given that public personnel costs make up the largest share of costs in these cases.

Benefits:

- The only technique, other than case studies, to provide information on personnel requirements.
- Not only predicts the financial consequences of population change, but also may trace specific changes needed for each public service category.
- Results are easy to understand and widely accepted.
- Relatively simple and low cost to implement, requiring no detailed knowledge of internal service provider operations.

Limitations:

- Assumes that current local performance is similar to current expenditure patterns in service providers of similar size and location.

Comparable Case Method

As the name indicates, this method is based on finding a jurisdiction that provides comparable services, has a similar population and growth rate as the jurisdiction in question is projected to have. The underlying assumption of this method is that jurisdictions of comparable size and growth rates spend similar amounts on similar services.

Assumptions:

- Service providers of similar size and with similar growth rates will have similar changes in their costs by category.
- Current expenditure patterns of the service provider are a key indicator of future expenditures.
- Outputs of Analysis
- Effects of population change on service provider costs and revenues.

Applicability:

- Most applicable for communities where population gains or increases in growth rate are likely because of large-scale development.

- Often applied when analysts believe that the experience of other communities undergoing population change supports or corroborates the anticipated changes in the community under study.
- Also useful for communities experiencing decline because the multipliers take population decreases as well as increases into account.

Benefits:

- Given availability of required data can be undertaken quickly and inexpensively.

Limitations:

- Validity of expenditure multipliers is questionable because this technique assumes capital expenditures related to growth are similar for jurisdictions of comparable size and growth rate.
- Each jurisdiction has its own priorities, population mixes, government structures, and taxpayer priorities, reflecting variations in the needs, wishes, and spending. Any comparison that tries to fit various municipalities into simple categories misses these variations.

Fiscal implications of growth cannot generally be assessed at an individual service level for municipal services because a variety of services are funded from general tax revenues. Generally, fiscal impacts will be assessed in terms of whether a specific development type is likely to increase specific revenue sources and the extent to which those sources are important in the city's revenue mix. In a few cases, such as Emergency Medical Technicians, a separate levy provides funding. In this case, fiscal impacts can simply assume that if residents desire the service at current levels, they will pass future levies. If not, staffing and service levels will decline. The extent to which different types of development are likely to require types of levels of service that are generally not required will be qualitatively assessed and the extent to which fiscal implications can be assessed will be described in terms of a potential range of impacts.

As indicated above, the "per capita multiplier" methodology is used for most of the specific public services assessed individually below as the most generally applicable. In some cases, it is supplemented with the capital facility standards where the DuPont Comprehensive Plan has specific capital standards such as for police, fire, and parks. In some cases, different multipliers are used for administrative support functions where adding additional service personnel will not necessarily increase management oversight to the same extent. Conversely, in the case of DuPont the current management structure has single managers overseeing disparate functions that are usually managed separately and which may require discrete departmental managers in the future as population and the staffing of specific services increases.

The impacts are assessed below by individual services, largely paralleling the city's departmental structure.

3.9.1.3 Mitigation

The analysis which illustrates the staffing level and capital facilities needed to maintain current levels of service are presumed to be mitigated if future staffing and service levels are increased proportionately. In most cases, operational costs such as staffing are not amenable to collection of additional revenue from new development, except at rates collected from current uses.

Capital facilities cost may be recovered by a variety of means including development fees established under the authority of RCW 82.02.050-110 which are intended to ensure that adequate facilities are available to serve new growth and development and provides that new growth and development pay a proportionate share of the cost of new facilities needed to serve new growth and development. Such fee systems are required for a balance between impact fees and other sources of public funds and

cannot rely solely on impact fees. Such fees are limited to finance specific public facilities which are limited by RCW 82.02.090(7) to public streets, roads, and bicycle and pedestrian facilities that were designed with multimodal commuting as an intended use; publicly owned parks, open space, and recreation facilities; school facilities; and fire protection facilities.

Local Improvement Districts (LID) are a means to establish an assessment on a specific geographic area for LIDs permit improvements to be financed and paid for over a period of time through assessments on the benefitting properties. Road Improvement Districts (RID) are similar to LIDs, but have specific statutory requirements. A Community Facilities District (SFD) under RCW 36.145 could be formed to finance public facilities including virtually every facility local governments are authorized to own and operate. These districts are somewhat more difficult to form because they require participation by 100 percent of owners. The State Environmental Policy Act also provides supplementary authority in RCW 43.21C.060 to condition projects to mitigate environmental impacts which can include providing capital facilities or contribute to the cost of such facilities in a manner proportional to their contribution to impacts.

3.9.1.4 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, the implementation of either alternative will introduce a variety of land uses that will add population and employees and a variety of economic activities which will change the scale and character of public services provided by the city or other entities.

3.9.2 Public Services - General Government

3.9.2.1 Affected Environment

The Washington State Growth Management Act (GMA) RCW 36.70A.20(5) seeks to encourage economic development within the capacities of public services, and public facilities. A capital facilities plan element is required that includes a forecast of the future needs for such capital facilities. The city has adopted a public facilities element with the goal that public facilities and services are provided concurrent with development, which means that adequate public facilities will be in place to support new development or will be provided within a specified time thereafter. Concurrency requires that facilities have sufficient capacity to serve development without decreasing levels of service (LOS) below adopted minimum standards. While the GMA requires concurrency only for transportation facilities, the Washington State Department of Commerce recommends concurrency for water and sewer systems as well. The GMA also requires all other public facilities to be “adequate.” The city shall establish and maintain Concurrency Implementation and Monitoring Systems. The Comprehensive Plan also provides for a system of review of various applications for development permits to assure that no final development permit shall be issued which results in a reduction in the levels of service below the standards adopted by the City.

The city Governance Department is organized into (5) five sections as follows:

- Mayor and Council
- City Administrator’s Office
- Legal Services
- Community Relations and Communications/City Clerk
- Human Resources/Risk Management

Staff currently includes ten permanent positions: City Administrator, City Attorney, Community Relations/Clerk Director, Two Administrative Support Staff Members, Human Resources (HR) Director, (2) two HR Support Staff, and (2) two Administrative Support Staff.

The Mayor and City Council are the elected officials providing oversight for the City organization. The City of DuPont is an Optional Municipal Code city. The Mayor is the Chief Executive Officer of the city and is responsible for supervising municipal operations. The City Council is the legislative body of the city and as such is responsible for long-term policy; adopts the final city budget and any amendments to the budget; adopts laws and regulation; adopts personnel policies, a classification and compensation plan, and may direct comments to the Mayor on operational performance.

The City Administrator's Office functions under the authority of the Mayor and provides professional management for the municipal organization. The Community Relations/ Clerk department is led by the Director of Community Relations/ Clerk, who reports to the City Administrator. They manage the City's Communications and Community Relations, acts as the Administrator for the Civil Service Commission, and is the appointed City Clerk. Legal Services, led by the City Attorney provides support in all areas of municipal law, including land use planning, personnel and labor relations, law enforcement training and advice, ordinance and resolution drafting and development, municipal code analysis and development, liability analysis and advice, legislative analysis, and legal opinions. Human Resources (HR)/Risk Management department is led by the HR Director, who reports to the City Administrator. The HR/ Risk department is responsible for recruitment, personnel records, employee benefit administration, training and development, labor relations, the employee wellness program, workplace safety and compliance with personnel policies and regulations. The HR Director acts as our Risk Manager, developing, recommending, and implementing policies and procedures to maintain adequate protection for risks of loss, damage or liability to city property, equipment and personnel.

An additional general governmental service is organized in DuPont as the Support Services Department and is organized into three functions, including:

- Budget and Finance
- Information Services
- Central Services

The Support Services Department has a current staff of six employees: Finance Director, Assistant Finance Director, two Financial Specialists, Utility Billing Clerk, and Administrative Support.

Budget and Finance is responsible for managing the City's financial resources including budget development and monitoring; financial reporting and analysis to assist in decision-making processes; invests temporary cash reserves; and administers the City's debt program, including securing project financing. Additionally, the division provides accounting services including payroll, purchasing, accounts payable and receivable, utility billing, business licenses, business and occupation tax monitoring and reporting, grants management, fixed asset and equipment accounting and replacement.

Information Systems provides technical support to maintain the City's information infrastructure.

Central Services is responsible for procurement of central office supplies, copier and duplication services, postage operations, and citywide phone services.

The current budget for these functions summarized in table 3.9.1-2 with comparable budget items shown for other Washington State cities of similar size. The comparisons between cities cannot be considered equivalent because different jurisdictions include different functions in different departments. The overall expenditures for all the services together are more likely to be roughly comparable. In terms of an order of magnitude. Comparisons based on population must be substantially qualified by the many factors governing the demand for public services, the variety of resources different jurisdictions may have, and the considerable difference in priorities of different communities.

Table 3.9.1-2 DuPont General Government Current Costs and Comparison Cities

DuPont				Comparison Cities		
Category	2022 Actual	2023 Adopted	2024 Adopted	Snohomish 2024 Budget	Shelton 2024 Budget	Sumner 2024 Budget
Population	10,080			10,133	10,484	10,647
Mayor/Council	141,721	139,444	139,444	116,230	75,963	343,927
Executive	211,051	164,569	146,735	757,310	422,151	1,651,611
City Clerk	248,611	281,457	380,082	538,430	237,973	2,336,141
Human Resources	296,548	362,572	378,405	614,460	304,357	546,162
Legal	114,318	140,141	146,836	673,900	328,170	2,589,148
Finance/Support	492,212	522,652	529,483	1,577,710	1,079,083	2,336,141
TOTAL	1,504,461	1,610,835	1,720,985	2,700,330	2,447,697	9,803,130

Comparison of DuPont with these cities of similar population indicate that DuPont is generally on the lower end of the scale in terms of expenditures for these functions. This may be attributed, however, to substantially different community characteristics other than population. For example, all the comparison cities have a substantially greater commercial and industrial component.

Capital Facilities: No capital facility projects are anticipated or included in the 6-year planning cycle in the 2021 update of the Comprehensive Plan to serve general governmental functions.

3.9.2.2 Impacts – No Action/Existing Subarea Plan/Existing Zoning

Under the existing Subarea Plan and zoning which emphasizes the Old Fort Lake area as a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses it is projected that there would be a residential population of about 2,300 primarily in multifamily dwellings with about 1.6 million square feet of office and research and development use (or about 800,000 square feet of office and 800,000 square feet of light manufacturing if the vested Founders Ridge proposal was built), about 70,000 square feet each of retail and service use a moderate size hotel and several restaurants.

This use of the “per capita multiplier” methodology has limited applicability to this alternative since only about a quarter of the land area in the subarea would be devoted to residential use and this area of about 56 acres would support a population of about 2,300. This would result in an approximately 23 percent increase in population of DuPont, with a projected total population of approximately 12,400. Table 3.9.2-1 illustrates the raw increase in projected costs based on the proportional increase in residential use, which is a surrogate of the additional increased costs of personnel and other costs. It is important to remember that these costs are in constant dollars with no provisions for future inflation.

Table 3.9.2-1 DuPont General Government Projected Future Cost Existing Subarea Plan

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Mayor/Council	141,721	139,444	139,444	123%	171,516
Executive	211,051	164,569	146,735	123%	180,484
City Clerk	248,611	281,457	380,082	123%	467,501
Human Resources	296,548	362,572	378,405	123%	465,438
Legal	114,318	140,141	146,836	123%	180,608
TOTAL	1,012,249	1,088,183	1,191,502		1,465,547

The component of general government services accruing to the non-residential component of about 1.7 million square feet of office, research and development, light manufacturing and other non-residential uses is likely to be limited as the types and level of service demanded of local government by employers and employees is likely to be different in both character and volume than demanded by residents. General government services are likely to be affected in terms of their service functions to other city departments that provide direct services. Staffing of general governmental services is generally in terms of half to full full-time-equivalent (FTE) employees with some employees divided between different responsibilities. The additional demands of non-residential uses may combine with the demands of residential use to round up staffing demands to half or full FTEs in cases where residential use would not warrant such a unit. In general, the additional demands of non-residential use are likely to result in a 30 percent to 35 percent overall increase in demands on this government service when added to demand from residential use.

In the case of the various functions DuPont classifies as General Government, it is not clear that a 23 to 35 percent increase in demand from growth in the subarea would necessarily occur for all functions. The 16 employees in all of these functions likely would increase by 4 to 6 employees.

City Council would have the same number of members, would have as many meetings and presumably would have similar travel and training expenses. If additional costs were to be incurred, it might be for personnel to serve some of the administrative functions borne currently by council members or by city officials in other departments. The Mayor and the related functions of the City Administrator similarly might add personnel for administrative functions freeing up the executive for more oversight and management tasks. For these functions, the small size of the current budget would lead to a relatively small increase in available resources even with the maximum proportional increase.

For the Community Relations and Clerk Department with a three-person staffing level the 23 to 35 percent increase in budget might lead to several additional staff persons, or increases in professional services. The fact that this department provides city-wide functions such as records management, public disclosure, maintains the contracts and agreements, media relations and public information, the web site; in addition to providing administrative support for the Mayor, City Council, City Administrator and City Attorney indicates that a proportional increase in resources and personnel would be in the range of reasonable budget response to growth.

The Human Resources/Risk Management Department with three employees and city-wide responsibilities might see a need for one to two additional employees, depending on the extent of the expansion of overall city employment and the need for additional HR services. A proportional or slightly higher growth would be in the range of reasonable budget response.

The Legal Department with one full time professional and a wide range of responsibilities likely would experience the need for additional administrative support and legal assistance in the form of either part

time or retained counsel. An increase in staffing would be in the range of reasonable budget response to increases in the city's population and resulting additional challenges, particularly in the period of growth where development related issues likely would require frequent response.

This analysis reflects to some extent the organization structure of the City of DuPont at this time. The responsibilities might shift in the future, but the overall functions would likely require an increase in staffing and other costs in the 20 to 35 percent range. This would result in an increase from the current 16 employees in the governance and support services of 4 to 6 employees, or some mix of employees and professional services. There may be economies in management oversight that would shift the overall increase to the lower portion of that range.

Capital facility costs related to additional staffing is likely to cumulatively lead to a need for additional office space and expansion of City Hall, or other facilities that would allow some departments to move to other sites leaving City Hall to management and public service functions. Other capital facilities such as computers for staff, car-pool cars for additional staff transportation demand and a variety of other tools of the trade likely would be needed. The minor items are included in the proportional increase in costs, the major items such as expansion of City Hall are in addition and would need to be programmed through the city's capital budget process.

Cumulative impacts in conjunction with impacts on other public services are discussed under each service discussed below.

3.9.2.3 Impacts - Proposed Subarea Plan and Zoning Amendments

Under the proposed Subarea Plan and zoning amendments, the Old Fort Lake area would have about 3,800 dwelling units with a population of 8,782 with about 409,800 square feet of retail, service, restaurant, and two hotels serving both local residents and as a destination for golf and other amenity-oriented tourism.

This analysis primarily uses the "per capita multiplier" methodology as the most generally applicable to a general governmental function such as this in which the service is provided across the board to all residents with no readily identifiable difference in service demands by a particular use. The proportional increase in population is from the current estimated population of DuPont of 10,080 and the estimated increase from the high growth scenario for the Old Fort Lake Subarea Plan revisions of 8,782 at buildout with a resulting population of 18,737 or an 87 percent increase. Table 3.9.2-2 illustrates the raw increase in projected costs given an 87 percent budget increase based on population increase attributable to the Old Fort Lake Subarea Revisions proposed, which is a surrogate of the additional increased costs of personnel and other costs. It is important to remember that these costs are in constant dollars and provide a one-to-one comparison of existing costs.

Table 3.9.2-2 DuPont General Government Projected Future Cost Proposed Subarea Plan

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Mayor/Council	141,721	139,444	139,444	187%	260,760
Executive	211,051	164,569	146,735	187%	274,394
City Clerk	248,611	281,457	380,082	187%	710,753
Human Resources	296,548	362,572	378,405	187%	707,617
Legal	114,318	140,141	146,836	187%	274,583
TOTAL	1,012,249	1,088,183	1,191,502		2,228,109

Table 3.9.2-3 provides a comparison of similar budget categories for cities that currently have a population similar to the projected DuPont population of 18,737 at Subarea buildout. The budget categories and functions provided by similarly named departments may vary considerably, which makes direct comparison problematic. This comparison may be considered an order of magnitude comparison, at best. This comparison also may be an indication that demands and costs are not necessarily proportional to population. All comparisons based on population must be substantially qualified by the many factors governing the demand for public services and the variety of resources and priorities different jurisdictions may have.

Table 3.9.2-3 General Government Projected Cost Comparison

DuPont		Comparison Cities		
Category	Buildout Cost based on Multiplier	Aberdeen 2024 Budget	Centralia 2024 Budget	Monroe 2024 Budget
Population	18,737	17,196	18,269	18,574
Mayor/Council	260,932	88,857	123,655	1705,30
Executive	274,575	168,355	488,782	908,584
City Clerk	711,221	641,805	164,746	307,806
Human Resources	708,083	171,711	567,767	387,928
Legal	274,764	304,114	408,451	804,294
Finance/Support	990,785	695,668	792,913	423,431
Total	3,220,359	2,070,510	2,546,314	3,002,571

This analysis does not consider non-residential use as a separate generator of demand for governmental services because the amount of non-residential use proposed is typical or smaller than that found in most small cities. The 35 acres of commercial and related uses is considerably less than the areas devoted to such uses in the comparison cities. The city has about 325 acres of land designated for commercial and industrial uses outside this subarea.

In the case of the various functions DuPont classifies as General Government, it is not clear that an 87 percent increase would necessarily occur for all functions. City Council would have the same number of members and would have the same number of meetings as existing and therefore would presumably have similar travel and training expenses. If additional costs were to be incurred, it might be for personnel to serve some of the administrative functions borne currently by council members or by city officials in other departments. The Mayor and the related functions of the City Administrator similarly might add personnel for administrative functions freeing up the executive for more oversight and management tasks. For these functions, the small size of the current budget would lead to a relatively small increase in available resources even with the maximum proportional increase.

For the Community Relations and Clerk Department with a three-person staffing level, the 87 percent increase in budget might lead to several additional staff persons or increases in professional services. The fact that this department provides city-wide functions such as records management, public disclosure, maintains the contracts and agreements, media relations and public information, the website; in addition to providing administrative support for the Mayor, City Council, City Administrator

and City Attorney indicates that a proportional increase in resources and personnel would be in the range of reasonable budget response to growth.

The Human Resources/Risk Management Department with three employees and city-wide responsibilities might see a need for an additional two employees given the expansion of overall city employment. This growth would be in the range of reasonable budget response.

The Legal Department, with one full time professional and a wide range of responsibilities, likely would experience the need for additional administrative support and legal assistance in the form of either part time or retained counsel. An increase in staffing would be in the range of reasonable budget response to increases in the city's population and resulting additional challenges, particularly in the period of growth where development related issues likely would require frequent response.

This analysis reflects to some extent the organization structure of the City of DuPont at this time. The responsibilities might shift in the future, but the overall functions would likely require an increase in staffing and other costs in the 50 percent to 90 percent range. There may be economies in management oversight that would shift the overall increase to the lower portion of that range.

Capital facility costs related to additional staffing is likely to cumulatively lead to a need for additional office space and expansion of City Hall, or other facilities that would allow some departments to move to other sites leaving City Hall to management and public service functions. Other capital facilities such as computers for staff, car-pool cars for additional transportation demand and a variety of other tools of the trade likely would be needed. The minor items are included in the proportional increase in costs, the major items such as expansion of City Hall are in addition.

Cumulative impacts in conjunction with impacts on other public services, are discussed under each service discussed below.

3.9.2.4 Mitigation

Mitigation of operating expenses is dependent on General Fund Revenue from property taxes, sales taxes, Business and Occupation taxes, Utility taxes and other revenue sources keeping pace with general governmental expenses. Washington State does not provide taxing authority for cities that would vary tax rates between the Subarea and other parts of the city if expenses were related to specific growth within the subarea.

Capital expenses in the form of additional office space could not be mitigated by impact fees because they are not included in the listing of public facilities in RCW 82.02.090(7). A Community Facilities District under RCW 36.145 could be formed to finance public facilities. They could potentially be required as mitigation for environmental impacts under the State Environmental Policy Act supplementary authority in RCW 43.21C.060. Such mitigation could be included in the anticipated Planned Action Ordinance as a condition to be met in order to avoid additional environmental review. Developers could also enter into voluntary agreements with the city to provide funds for this and other city costs.

The Capital Projects Fund accounts for receipts and disbursements related to acquisition, design, construction and any other expenditures related to capital projects including public buildings, facilities and parks. The city's park projects, capital facility improvements, and general governmental projects make up the activity in this fund. The general tax-funded portion of the Civic Center debt payments was scheduled in this fund through the duration of the bonds until 2039.

The city also could allocate funds collected by the Real Estate Excise Tax (REET) which is currently placed in a Capital Projects Fund for acquisition, design, construction and any other expenditures related to capital projects including public buildings, facilities and parks. This tax, which is levied on all sales of real

estate, is likely to be substantially augmented by sales related to new development in the Old Fort Lake Subarea. These taxes could continue to be pooled citywide, or the component related to the OFL could be tracked geographically and considered as a mitigation source for expenses arising from development of the subarea.

3.9.3 Police

3.9.3.1 Affected Environment

Police service for the City of DuPont is provided by the City's Police Department. The Police Department headquarters are located at 1780 Civic Drive in DuPont. The building is 30,025 sq. ft. and shared by the Police Department and the Fire Department. The Police Department maintains mutual aid agreements with other Pierce County Cities and the County.

The Police Department is comprised of two primary divisions: the Administrative Services Division and the Operations Bureau.

The Administrative Services Division is staffed with both sworn and civilian employees, dedicated to supporting the administrative functions of the department.

The Operations Bureau consists of the Patrol Division and the Criminal Investigation Unit.

- The Patrol Division is responsible for patrol functions, including 24-hour response to the initial investigation of crimes and incidents, traffic enforcement and control, accident investigation, and community policing programs.
- The Criminal Investigations Unit is charged with investigating all major crimes that occur within the City of DuPont and with follow-up investigations.

Administration Services Division

The Administration Division consists of four persons the sworn Chief of Police, the Assistant Chief, the Administrative Specialist and the Police Records Clerk. The Chief is responsible for the overall management and administration of the Police Department. The Assistant Chief provides operational supervision as well as administrative assistance. The Administrative Specialist oversees records and handles administrative issues. The Police Records Clerk handles records and front desk duties.

Operations Bureau

The Deputy Chief is the commander of the Operations Division, which consists of a staff of 13: four Sergeants, eight Patrol Officer Positions including the School Resource Officer and one Detective.

Patrol Division

The Patrol Division is responsible for patrol functions, including 24-hour response to the initial investigation of crimes and incidents, traffic enforcement and control, accident investigation and community policing programs. Our Patrol Division includes elements such as uniformed patrol officers, off-road "trail" patrol, a certified explosive detection canine (K9) team, motorcycle /traffic units, participation in a multiagency tactical response team, and an active School Resource Officer (SRO) program. The Patrol Division also participates in crime education, community outreach and community event planning.

Criminal Investigations Unit (CIU)

This unit is charged with investigating all major crimes that occur within the City of DuPont and with follow-up investigations. Detectives are cross-trained to professionally investigate any type of criminal activity, to include crimes against persons (crimes including homicides, domestic violence, rapes, assault,

etc.) and crimes against property (fraud, burglaries, larcenies, forgeries, auto thefts, etc.). DPD's CIU is a member of the Pierce County Force Investigations Team (PCFIT) and the multi-agency major Crime Response Unit (CRU).

Emergency Management

The Police Department also oversees the City's Emergency Management program, responsible for ensuring a state of readiness for all potential hazards (natural, environmental, and human-caused). The mission of the DuPont Emergency Management program is to protect lives and property through preparedness and mitigation activities by developing emergency management plans, conducting exercises, and organizing response efforts in the event of a significant incident. A major focus of DPD's efforts is the collaboration with the Pierce County Department of Emergency Management.

The Department maintains 21 vehicles, 15 of which are equipped for patrol duties. Typically, the minimum staffing level for the Department is 2 officers on duty per shift and typical shift hours are 5 AM to 5 PM and 5 PM to 5 AM.

Calls for Service and Criminal Bookings

Calls for service to the Police Department are received by South Sound 9-1-1 and dispatched to patrol officers in the field. In addition, the Department occasionally receives calls directly to officers, headquarters, or City Hall, as well as walk-in requests to headquarters or officer-initiated calls. Over the past five years (since 2018), calls for service to the Department have almost doubled, see Table 3.9.3-1. Table 3.9.3-2 summarizes criminal bookings by type by the Department over the last five years. Table 3.9.3-3 summarizes the Police Department existing budget.

Table 3.9.3-1 DuPont Police Department Service Calls 2018-2023

Year	Calls for Service
2018	5,986
2019	4,721
2020	7,373
2021	9,022
2022	10,892
2023	11,648

Source: City of DuPont Police Department, 2024.

Table 3.9.3-2 DuPont Police Department Criminal Bookings 2018-2023

Arrest Type	2019	2020	2021	2022	2023
Felony Arrest	8	15	11	4	3
Other Arrest	60	84	77	27	22
Juvenile Arrest	4	0	0	0	0
Warrant Arrest	14	7	16	21	11
Total	86	106	104	52	36

Source: City of DuPont Police Department, 2024.

Level of Service Standards

The Washington State Growth Management Act (GMA) seeks to have public facilities and services provided concurrent with development. Concurrency means that adequate public facilities will be in place to support new development or will be provided in a specified time thereafter. Concurrency requires that facilities have sufficient capacity to serve development without decreasing level of service

(LOS). The City of DuPont 2015 Comprehensive Plan identifies the LOS standards for police as – 1.79 sworn and 0.21 staff per 1,000 population. With the existing city population of 10,080 this would call for 18 police officers. The department currently has 15 sworn officers, and is therefore at 83 percent of that standard. The department currently has two non-commissioned administrative staff, which meets the standard.

Table 3.9.3-3 DuPont Police Department Existing Budget

Category	2022 Actual	2023 Adopted	2024 Adopted
Police Administration	367,301	592,162	608,857
Staffing			4
Police Operations	1,833,785	2,046,561	2,151,752
Staffing			13
TOTAL	2,201,086	2,638,723	2,760,609
Staffing			17

Capital Facilities: No new Police Department capital facility projects are anticipated or included in the 6-year planning cycle in the 2021 update of the Comprehensive Plan. The Comprehensive Plan identifies the long-term (within 20 years, or by 2036) need to construct an outside training facility. This would be a joint facility for the use of law enforcement and fire protection personnel. No funding has been identified for the training facility. Possible funding sources include a public levy. Another goal of the Police Department is to replace/update equipment. Provision for vehicle maintenance and equipment (e.g., camera system, Lidar, trailer, and shed) were included in the City’s 2021-2022 Biennial Budget.

3.9.3.2 Impacts – No Action/Existing Subarea Plan and Zoning

Under the existing subarea plan and zoning which emphasizes the Old Fort Lake area as a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses it is projected that 56 acres of the site would be devoted to 100 single-family units and 1,000 multifamily units resulting in a residential population of about 2,300 primarily in multifamily dwellings with about 1.6 million square feet of office and research and development use (or about 800,000 square feet of office and 800,000 square feet of light manufacturing if the vested Founders Ridge proposal was built), about 70,000 square feet each of retail and service use a moderate size hotel and several restaurants.

Utilizing the city’s the population-based police LOS standards of 1.79 sworn and 0.21 staff per 1,000 population would result in 22 officers and 2.6 staff for a population of 12,380 with the addition of the subarea population. The department currently has 15 sworn officers and is therefore at 83 percent of that standard as it would apply to the existing city population of 10,080 which would call for 18 police officers. The department currently has two non-commissioned administrative staff. Meeting the adopted standard would result in adding less than an FTE staff position which could be accomplished by a part-time position or by a position shared with another department. There are, however, many complex issues relating to police service that can only be addressed during police planning and budgetary processes.

Use of either the LOS standard based on population or the “per capita multiplier” methodology has limited applicability to this alternative since only about a quarter of the subarea land area would be devoted to residential use and the majority is non- residential use. For the residential component, the following application of the per capita multiplier in Table 3.9.3-4 based on a 23 percent increase in

population provides a perspective on the residential portion of future growth and a proportional increase in budget and staffing.

Table 3.9.3-4 DuPont Police Projected Future Cost Under Existing Zoning

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Police Administration	367,301	592,162	608,857	123%	747,783
Staffing			4		5
Police Operations	1,833,785	2,046,561	2,151,752	123%	2,642,727
Staffing			13		16
TOTAL	2,201,086	2,638,723	2,760,609	123%	3,390,510
Staffing	17	17	17		21

The residential component of growth is likely to result in a population with characteristics similar to the existing population of DuPont, but related to the predominant multifamily use would likely involve smaller families and fewer children than the predominantly single-family character of the city at the present time. The type and frequency of police response is likely to be similar and increase roughly proportionally to population increases. For the residential component of growth the population multiplier methodology is likely to be roughly accurate.

The projected 1.8 million square feet of office and research and development use, light manufacturing, retail restaurant and service uses, a moderate size hotel and several restaurants would have a different character of police response compared to the primarily residential character of the existing community. Calls would increase in areas of employee/employer conflict, including theft. If organized protests over manufacturing or labor relations issues develop, police response could be beyond the capability of normal shift personnel.

Since this is the existing Subarea Plan and zoning, there opportunities to address additional costs under existing city codes is largely limited to the established development review process for specific projects which could address capital needs imposed by a specific development. Operational costs may be addressed through the planning and budgeting process for the police department.

3.9.3.3 Impacts - Proposed Subarea Plan and Zoning Amendments

Under the proposed Subarea Plan and zoning amendments, the Old Fort Lake Subarea would accommodate a higher intensity scenario up to about 3,800 dwelling units with a population of 8,782 with about 409,800 square feet of retail, service, restaurant, and two hotels serving both local residents and as a destination for golf and other amenity-oriented tourism.

This analysis primarily uses the “per capita multiplier” methodology as generally applicable to a predominant residential use which will involve police demand typical of existing residential use. The proportional increase in population is from the current estimated population of DuPont of 10,080 with the estimated increase from the high growth scenario for the Old Fort Lake Subarea Plan revisions of 8,782 at buildout, this results in a city population of 18,737, or an 87 percent increase. Table 3.9.3-5 illustrates the raw increase in projected costs which is a surrogate of the additional increased costs of personnel and other costs. It is important to remember that these costs are in constant dollars and provide a one-to-one comparison of existing costs.

Table 3.9.3-5 DuPont Police Projected Future Cost Under Proposed Zoning

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Police Administration	367,301	592,162	608,857	187%	1,139,312
Staffing			4		7
Police Operations	1,833,785	2,046,561	2,151,752	187%	4,026,423
Staffing			13		24
TOTAL	2,201,086	2,638,723	2,760,609	187%	5,165,735
Staffing					31

Table 3.9.3-6 provides a comparison of similar budget categories for cities that currently have a population similar to the projected DuPont population of 18,737 at Subarea buildout. The resources budgeted for police service by other jurisdiction should not be considered for direct comparison. This should not be considered a correlation but rather an order of magnitude analogy, at best. Police demands and costs are not necessarily proportional to population, but reflect the unique characteristics of a community. All comparisons based on population must be substantially qualified by the many factors that differ between communities and the variety of resources and priorities different jurisdictions may have.

Table 3.9.3-6 DuPont General Government Projected Cost Comparison

DuPont		Comparison Cities		
Category	Buildout Cost based on Multiplier	Aberdeen 2024 Budget	Centralia 2024 Budget	Monroe 2024 Budget
Population	18,737	18,564	18,269	18,574
Police Administration	1,139,312	NA	1,071,717	NA
Staffing	7	NA	6	NA
Police Operations	4,026,423	NA	5,151,369	NA
Staffing	24	NA	25	NA
TOTAL	5,165,735	4,850,000	6,223,086	4,853,571
Total Staffing	31	38	31	44

This analysis does not consider non-residential use as a separate generator of demand for police services because the amount of non-residential uses proposed as part of the updated Subarea Plan are typical or smaller than that found in most small cities. The 35 acres of commercial and related uses is considerably less than the areas devoted to such uses in the comparison cities for the subarea population of 8,782. This is about 175 square feet of non-residential land area per resident. The city has about 325 acres of land designated for commercial and industrial uses outside this Subarea with a current population of 10,080, which is about 1,400 square feet of non-residential land area per resident.

For the police department, an 87 percent increase in population served would approximate the average additional demand for services, if the type of incident responded to continues to be typical of the current profile of responses to areas characterized by residential use. The mix of residential uses projected in the Subarea are 15 percent single-family, 50 percent middle housing, and 35 percent multifamily, which departs from the current city distribution of about 70 percent single-family and 30 percent multifamily. The character of response, however is not expected to differ substantially.

The distribution of costs between administration and operations is shown in the table above as increasing at the same proportion. It is likely, however, that the increase in administrative staff and costs would be somewhat different with a larger department as the need for administrative functions is likely to increase at a lower rate than the demand for operations which would be directly responding to increased patrol area and increased number of incidents.

Capital facility costs related to additional staffing is likely to cumulatively lead to a need for additional office space and expansion of Police/Fire Building and associated parking, or other development of other facilities. Other capital facilities such as patrol cars with the full range of communication and other facilities would be needed. Administrative staff would require computers and other facilities as well as staff car-pool cars for additional transportation demand and a variety of other tools of the trade likely would be needed. The minor items are included in the proportional increase in costs, the major items such as expansion of facilities, patrol cars and other major expenses are in addition.

Cumulative impacts in conjunction with impacts on other public services are discussed under each service discussed below.

3.9.3.4 Mitigation

Mitigation of operating expenses is dependent on General Fund Revenue from property taxes, sales taxes, Business and Occupation taxes, Utility taxes and other revenue sources keeping pace with general governmental expenses. Washington State does not provide taxing authority for cities that would vary tax rates between the subarea and other parts of the city if operating expenses were related to specific growth within the subarea. The buildout of the subarea is projected to take 20 years or more and the additional expenses will occur gradually over that time period, giving the city many budget cycles to adjust staffing and other needs.

Capital expenses in the form of additional office space could not be mitigated by impact fees because they are not included in the listing of public facilities in RCW 82.02.090(7) which includes fire protection facilities but not police facilities. A Community Facilities District under RCW 36.145 could be formed to finance public facilities, including public safety facilities for police. Contribution of funds for capital costs could potentially be required as mitigation for environmental impacts under the State Environmental Policy Act supplementary authority in RCW 43.21C.060. Such mitigation could be included in the anticipated Planned Action Ordinance as a condition to be met in order to avoid additional environmental review. Developers could also enter into voluntary agreements with the city to provide funds for this and other city costs.

The city has a Public Safety Mitigation Fund which was established for the purpose of receiving payments that mitigate a direct impact that has been identified as a consequence of a proposed development. In cases where improvements to the City's emergency response services are reasonably necessary as a direct result of commercial and industrial development conditions may be imposed. The city can enter into mitigation agreements with developers as allowed by RCW 82.08.020. An additional option is that the city can impose impact fees on new residential, commercial and industrial development in the city pursuant to RCW 82.08.050 – 110 if warranted.

The Capital Projects Fund accounts for receipts and disbursements related to acquisition, design, construction and any other expenditures related to capital projects including public buildings, facilities and parks. The City's park projects, capital facility improvements, and general governmental projects make up the activity in this fund. The general tax-funded portion of the Civic Center debt payments was scheduled in this fund through the duration of the bonds until 2039.

The city could also allocate funds collected by the Real Estate Excise Tax (REET), which is currently placed in a Capital Projects Fund for acquisition, design, construction and any other expenditures related to capital projects including public buildings, facilities and parks. This tax, which is levied on all sales of real estate, is likely to be substantially augmented by sales related to new development in the Old Fort Lake Subarea. These taxes could continue to be pooled citywide, or the component related to the OFL Subarea could be tracked geographically and considered as a mitigation source for expenses arising from development of the subarea.

3.9.4 Fire Protection Service and EMS

3.9.4.1 Existing conditions

The City of DuPont Fire Department currently provides fire protection service and Emergency Medical Services (EMS) within the City of DuPont. There is one fire station in DuPont located at 1780 Civic Drive. The building in which the station is located is shared with the Police Department. The Department maintains mutual aid agreements with Joint Base Lewis McChord Fire Department, Thurston County Fire Protection District #3, and other agencies in Pierce County. Mutual aid agreements provide for emergency responders to lend assistance across jurisdictional boundaries. This may occur due to an emergency response that exceeds local resources, such as a disaster or a multiple-alarm fire or a lack of specific response capability such as hazardous materials.

The Fire Department is divided into three divisions: Administrative, Fire Prevention and Operations. The responsibilities of these divisions overlap due to the small size of the Department.

Administrative Division

Currently, the Administrative Division consists of the Fire Chief and the Assistant Chief of Training and Operations. These two positions work together closely and as a team to set goals, create policies, manage budgets, personnel, daily operations and emergency responses. These positions are considered to be 24-hour Command Staff responders for major incidents.

Fire Prevention

The prevention division is managed by the Fire Marshal, who works under the authority of the Fire Chief and operates independently to achieve the assigned responsibilities of plan review, inspections, and other tasks. The Fire Marshal requires administrative support, but no significant supervision.

Operations Division

The operations division is managed by the Assistant Chief and is comprised of a three (3) platoon shift structure. Each shift is supervised by a Fire Captain, or Acting Captain in their absence. Each shift consists of three firefighters and one Captain. All firefighters are required by the State of Washington to maintain a medical certification of at least an Emergency Medical Technician Basic (EMT-B) or Emergency Medical Technician-Paramedic (EMT-P). The Operations Chief works closely with the captains to ensure consistency across the shifts to support the departments' mission and priorities and principles. The City's 2023-2024 Biennial Budget provides for the following fire protection staff: one Fire Department staffing consists of the Chief (1 Full Time Equivalent, FTE), one Assistant Fire Chief (1 FTE), one Fire Marshall (0.5 PTE), three Captains (1 FTE each and 10 Firefighters (1 FTE each). The Fire

Department operates on three 24-hour shifts on a 48/96 pattern. For example, if a shift starts at 8:00 AM on Monday, the firefighters remain on duty and ready until Wednesday morning at 8:00 AM (48 hours), then they are off duty for 96 hours (4 days). Manning consists of 3 platoons composed of a captain and 3 fire fighters. 1 firefighter/paramedic is a “floating” member used to cover other shifts when they are short staffed.

The Fire Department apparatus and vehicles include: 2 fire engines, 1 wildland brush truck, 2 medic units, 3 administrative vehicles, 1 off-road utility vehicle, (City of DuPont 2024 Fire Dept Website). Since there is one engine/ambulance in service at any one time, they must determine the appropriate apparatus to man for any given response and must rely on their mutual aid agreement with other departments.

The department’s Emergency Medical Services (EMS) functions are funded by a six-year EMS property tax levy passed by voters in April 2023. These funds must be used for EMS purposes. Thirty percent of the cost of the operations division is financed by this levy. Property tax funds are projected to be \$878,946 in 2023 and \$1,106,771 in 2024. The city budgeted \$1,402,588 for EMS in 2023 and \$1,730,098 in 2024; the difference of us, the city has committed additional General Fund dollars to cover the additional costs of \$523,642 for 2023 and \$623,327 not covered by the EMS levy.

Calls for Service

Calls for service are received by South Sound 9-1-1 which serves all of Pierce County. Calls within DuPont for fire or EMT are dispatched to the DuPont Fire Department. Over the past six years (between 2018 and 2023), calls for service to the Department have increased by approximately 17.21%; Most of the calls responded to by the Department (67% in 2023) are for Emergency Medical Service (EMS). The department provides Basic Life Support and Advanced Life Support as Paramedics were introduced in 2022.

Table 3.9.4-1 City of DuPont Fire Department Calls for Service: 2019–2024

Year	Calls for Fire Service	Calls for Medical Service <i>* includes vehicle accidents</i>
2020	267	546
2021	288	676
2022	281	627
2023	310	691
*2024	164	354

Source: City of DuPont Fire Department’s 2023 Annual Update.

The City of DuPont adopted a time standard from dispatch to on-scene of 480 seconds. In 2023, the Department met this standard 82% of the time, that said the NFPA 1710 time standard from dispatch to on-scene is 340 seconds, the Department met this standard 37% of the time. In 2023, the Fire Department received 118 multiple calls and 224 calls for mutual aid, and they gave 67 calls for mutual aid calls (Fire Department’s 2023 Annual Update).

Table 3.9.4-2 City of DuPont Fire Department Calls for Service 2022-2023

Incident Type	2022	2023
(10) Fire, other	3	5
(11) Structure Fire	7	6
(13) Mobile property (vehicle) fire	5	7
(14) Natural vegetation fire	9	11
(15) Outside rubbish fire	2	0
(25) Excessive heat, scorch burns with no ignition	2	1
(30) Rescue, emergency medical call (EMS), other	3	2
(31) Medical assist	4	5
(32) Emergency medical service (EMS) incident including vehicle accidents	616	680
(33) Lock-In	1	0
(34) Search for Lost Person	0	1
(35) Extrication, rescue	5	0
(36) Water or ice-related rescue	1	3
(40) Flammable gas or liquid condition, other	1	0
(41) Combustible/flammable spills & leaks	9	6
(42) Chemical release, or toxic condition	0	3
(44) Electrical wiring/equipment problem	6	1
(50) Service call, other	32	56
(51) Person in distress	11	13
(52) Water problem	5	1
(53) Smoke, odor problem	2	2
(54) Animal problem or rescue	2	2
(55) Public service assistance	28	
(56) Unauthorized burning	1	41
(60) Good intent call, other	3	1
(61) Dispatched and canceled en route	41	12
(62) Wrong location, no emergency found	1	52
(65) Steam, other gas mistaken for smoke	12	2
(66) EMS call where party was transported prior to arrival	0	12
(70) False alarm and false call, other	21	1
(71) Malicious, mischievous false alarm	2	18
(73) System or detector malfunction	36	3
(74) Unintentional system/detector operation (no fire)	34	31
(91) Citizen complaint	1	21
UNK	2	2
Total	908	101

Source: City of DuPont Fire Department

Level of Service Standards

The Washington State Growth Management Act (GMA) seeks to have public facilities and services provided concurrent with development. Concurrency means that adequate public facilities will be in place to support new development or will be provided in a specified time thereafter. Concurrency requires that facilities have sufficient capacity to serve development without decreasing the level of service (LOS). The City of DuPont 2015 Comprehensive Plan identifies the LOS standards for police as – 0.98 fire apparatus per 1,000 population (proposed target), and 1.00 aerial apparatus per 409 acres of commercial/industrial-zoned land. With the existing city population of 10,080, 10 fire apparatus would be needed, far more than the current three shifts in the Operations Division could adequately handle. The existing aerial apparatus appears to meet the standard as there is currently about 500 acres of commercial/industrial land in the city.

Staffing levels of fire departments based on population vary greatly. The city manning levels with platoons of four are within the general range of surveys of fire departments serving populations of 5,000 to 9,999 with an average of 3.9 firefighters available to respond, but somewhat smaller than the average of 7.7 firefighters available for cities with populations of 10,000 to 24,000. (NFPA 2021)

Appropriate provision of equipment and staff is a complex problem that balances many factors including the different needs for different types and scales of incidents and the range of needs for apparatus and staffing between different types and sizes of buildings.

Capital Facilities

No new Fire Department capital facility projects are anticipated or included in the 6-year planning cycle (2016 – 2021) in the 2015 Comprehensive Plan. The Comprehensive Plan identifies the long-term (within 20 years) need to construct a combined police/fire outside training facility (see above under *Police Service* for details).

The Fire Department's 2022 Biennial Update identifies the need to increase minimum staffing levels to: increase efficiencies and optimize safety; satisfy the Washington Administrative Code (WAC) requirement of "2 in/2 out" for structural interior firefighting; improve the Department's rating with the Washington State Rating Bureau; and decrease reliance on Mutual Aid for low acuity emergencies. The Department's Biennial Update indicates that the timing of DuPont's addition of a fire-based paramedic service is critical. The Biennial Update also identifies the need to start planning for the location of a new fire station.

3.9.4.2 Impacts – No Action/Existing Subarea Plan and Zoning

Under the existing Subarea Plan and zoning, the Old Fort Lake area is emphasized as a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses. It is projected that 56 acres of the site would be devoted to 100 single-family units and 1,000 multifamily units resulting in a residential population of about 2,300 primarily in multifamily dwellings with about 1.6 million square feet of office and research and development use (or about 800,000 square feet of office and 800,000 square feet of light manufacturing if the vested Founders Ridge proposal was built), about 70,000 square feet each of retail and service use and a moderate size hotel and several restaurants.

Utilizing the city's LOS standards for fire of 0.98 Apparatus per population of 1,000, the addition of 2,300 people would result in a need for 2.25 new apparatus. The need for new apparatus should be evaluated in terms of the existing shortfall or surplus of equipment. The standard of 1.00 aerial apparatus per 409 acres of commercial/industrial-zoned land would result in about one half of a warrant. The remaining commercial industrial land in the city would complete the warrant for this type of equipment. The decision by a fire department regarding acquisition of aerial equipment generally considers the height of

buildings served and their occupancy, response time, fire flow availability, the time and staffing needed to place ground ladders, and other non-operational factors such as a community's fire rating. The department will need to determine whether existing demand, together with the demands of this proposal and other development projected for the future, warrants an additional apparatus at some point.

The standard cited above is only for capital equipment needs. The acquisition of new equipment would require additional personnel to operate. Based on the increase of population of 2,300 compared to the existing population of 10,080, an additional four firefighters per shift would be needed in addition to the current staff of 15 (12 in operations). The addition of staff to serve commercial, office park and light manufacturing uses likely would be far more than the addition warranted by residential growth because of the greater fire risk exposure and specialized fire-fighting strategies needed for larger and more complex building. This need for future equipment and staff also should be evaluated in conjunction with existing staffing deficiencies or surpluses. The additional development that warrants such additional equipment will take place overtime. The department will have many budget cycles available to determine equipment and staffing levels.

Use of either the LOS standard based on population, or the "per capita multiplier" methodology has limited applicability to this alternative, as only about a quarter of the subarea land area would be devoted to residential uses while the majority is devoted to non- residential uses. For the residential component, the following application of the per capita multiplier based on a 23 percent increase in population provides a perspective on demands related to the residential portion of future growth as shown in Table 3.9.4-3.

Table 3.9.4-3 DuPont Fire Department Projected Future Cost OLF Existing Zoning Residential Component

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Fire Administration	694,306	727,765	750,742	123%	923,412
Staffing			3		3.7
Fire Operations	840,257	690,172	751,331	123%	924137
Staffing			5		6
Emergency Medical	1,547,066	1,402,558	1,537,574	123%	1891216
Staffing			7		8
TOTAL	2,201,086	2,638,723	2,760,609	123%	3,738,766
Staffing	15	15	15		17.7

Source: City of DuPont 2024 Budget

Note: Staffing is shared between Fire Operations and Emergency Medical. Allocation is based on the approximate number of responses by each function.

The residential component of growth is likely to result in buildings and population with characteristics similar to the existing population of DuPont, but with somewhat different fire risk exposure related to the predominance of multifamily units under existing zoning. The type and frequency of fire and emergency medical response to the residential component of growth is likely to be similar and increase roughly proportionally to population. For the residential component of growth, the population multiplier methodology is likely to be roughly accurate.

The projected 1.7 million square feet of office and research and development use, light manufacturing, retail restaurant and service uses, a moderate size hotel, and several restaurants would have a different character of fire and emergency medical response compared to the primarily residential character of the existing DuPont community, with the exception of the warehouse area in the northeast corner of the city. Medical response calls would relate to job-oriented needs rather than heart attacks or other general health issues of the residential population. Proposed new buildings would be constructed in compliance with applicable Fire Code and Building Code requirements and would meet the City's standards for emergency access. Even with sprinkler and other fire suppression systems, fire response in large buildings often involves response from multiple units. Because of manning limitations of the DuPont Fire Department, this may involve response by neighboring departments under mutual aid agreements. Manufacturing uses often have materials that are processed and have special characteristics and require specialized response, such as hazardous materials control. Fires in manufacturing facilities may pose hazards to surrounding areas because of toxins carried by smoke.

The opportunities to address additional costs under existing city codes are largely limited to the established development review process for specific projects which could address capital needs imposed by a specific development. Operational cost may be addressed through the planning and budgeting process for the fire department. Development would take place over a buildout period of 20 years or more with multiple opportunities to adjust budget to need.

Capital facility costs related to additional staffing is likely to cumulatively lead to a need for additional office space and expansion of Police/Fire Building and associated parking, or other development of other facilities. The addition of a second fire station would accomplish the same result by freeing up space in the existing building for equipment to respond to Old Fort Lake Subarea development. Other capital facilities such as fire apparatus with the full range of ladders, clothing, hoses, communication and other facilities would be needed both to serve the general population growth and the specific needs of office, research, light manufacturing, commercial, and restaurant use. Administrative staff would require computers and other facilities as well as staff car-pool cars for additional transportation demand and a variety of other facilities likely would be needed.

Cumulative impacts in conjunction with impacts on other public services are discussed under each service discussed below.

3.9.4.3 Impacts - Proposed Subarea Plan Amendments and Zoning

Under the proposed Subarea Plan and zoning amendments, the Old Fort Lake Subarea would accommodate under a higher intensity scenario up to about 3,800 dwelling units with a population of 8,782 with about 409,800 square feet of retail, service, restaurant, and two hotels serving both local residents and as a destination for golf and other amenity-oriented tourism.

This analysis primarily uses the "per capita multiplier" methodology as generally applicable to a predominant residential use which will involve fire and medical response demands typical of existing residential use. The future DuPont total population would be 18,737 including the current estimated population of DuPont of 10,080 plus the estimated increase of 8,782 from the high growth scenario for

the Old Fort Lake Subarea Plan revisions. This would be an 87 percent increase. Table 3.9.4-4 illustrates the raw increase in projected costs which is a surrogate of the additional increased costs of personnel and other costs. It is important to remember that these costs are in constant dollars and provide a one-to-one comparison of existing costs.

Table 3.9.4-4 DuPont Fire Department Projected Future Cost OLF Subarea Plan Revision Residential Component

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Fire Administration	694,306	727,765	750,742	187%	1403,887
Staffing			3		5
Fire Operations	840,257	690,172	751,331	187%	1,404,988
Staffing			5		9
Emergency Medical	1,547,066	1,402,558	1,537,574	187%	2,875,263
Staffing			7		14
TOTAL	2,201,086	2,638,723	2,760,609	187%	5,684,140
Staffing	15	15	15		28

Source: City of DuPont 2024 Budget

Table 3.9.4-5 provides a comparison of similar budget categories for cities that currently have a population similar to the projected DuPont population of 18,737 at OFL Subarea buildout. The resources budgeted for police service by other jurisdictions should not be considered for direct comparison. This should not be considered a correlation but rather an order of magnitude analogy, at best. Police demands and costs are not necessarily proportional to population but reflect the unique characteristics of a community. All comparisons based on population must be substantially qualified by the many factors that differ between communities and the variety of resources and priorities different jurisdictions may have.

Table 3.9.4-5 DuPont Fire Department Projected Future Cost OLF Subarea Plan Revision Residential Component – Comparison Cities

DuPont		Comparison Cities		
Category	Buildout Cost based on Multiplier	Aberdeen 2024 Budget	Anacortes 2024 Budget	Port Angeles 2024 Budget
Population	18,737	18,564	18,326	20,118
Fire Administration	1403,887	NA	NA	707,800
Staffing	5	NA	NA	
Fire Operations	1,404,988	NA	NA	1,758,800
Staffing	9	NA	NA	
Emergency Medical	2,875,263	NA	NA	3,738,200
Staffing	14	NA	NA	
TOTAL	5,684,140	3,936,968	4,764,542	6,204,800

DuPont		Comparison Cities		
Category	Buildout Cost based on Multiplier	Aberdeen 2024 Budget	Anacortes 2024 Budget	Port Angeles 2024 Budget
Staffing	28	44	39	29

Source: City of DuPont 2024 Budget, Aberdeen 2024 Budget, Anacortes 2024 Budget, Port Angeles 2024 Budget

This analysis does not consider non-residential use as a separate generator of demand for police services because the amount of non-residential uses proposed as part of the Subarea Plan Revision is typical or smaller than that found in most small cities. The 35 acres of commercial and related uses is considerably less than the areas devoted to such uses in the comparison cities for the subarea population of 8,782. This is about 175 square feet of non-residential land area per resident. The city has about 325 acres of land designated for commercial and industrial uses outside this subarea with a current population of 10,080, which is about 1,400 square feet of non-residential land area per resident.

For the fire department, an 87 percent increase in population served would approximate the average additional demand for services, if the type of incident responded to continues to be typical of the current profile of responses to areas characterized by residential use. The mix of residential uses projected in the subarea are 15 percent single-family, 50 percent middle housing, and 35 percent multifamily, which departs from the current city distribution of about 70 percent single-family and 30 percent multifamily. The character of response, however, is not expected to differ substantially.

The distribution of costs between administration and operations is shown in the table above as increasing at the same proportion. It is likely, however, that the increase in administrative staff and costs would be somewhat different with a larger department as the need for administrative functions is likely to increase at a lower rate than the demand for operations which would be directly responding to increased patrol area and increased number of incidents.

Capital facility costs related to additional staffing is likely to cumulatively lead to a need for additional office space and expansion of Police/Fire Building and associated parking, or other development of other facilities. Other capital facilities such as fire apparatus with the full range of fire-fighting equipment communication and other facilities would be needed. Administrative staff would require computers and other facilities as well as staff cars for additional transportation demand and a variety of other tools of the trade likely would be needed. The minor items are included in the proportional increase in costs, the major items such as expansion of facilities, patrol cars and other major expenses are in addition.

Cumulative impacts in conjunction with impacts on other public services, are discussed under each service discussed below.

3.9.4.4 Mitigation

Mitigation of operating expenses is dependent on General Fund Revenue from property taxes, sales taxes, Business and Occupation taxes, Utility taxes and other revenue sources keeping pace with general governmental expenses. Washington State does not provide taxing authority for cities that would vary tax rates between the subarea and other parts of the city if operating expenses were related to specific growth within the subarea. The buildout of the subarea is projected to take 20 years or more and the additional expenses will occur gradually over that time period, giving the city many budget cycles to adjust staffing and other needs.

Capital expenses in the form of additional office space can be mitigated by impact fees because they are specifically included in the listing of public facilities in RCW 82.02.090(7) which includes fire protection. This could include apparatus and fire stations in which to house them. A Community Facilities District under RCW 36.145 could be formed to finance public facilities, including public safety facilities for police. Contribution of funds for capital costs could potentially be required as mitigation for environmental impacts under the State Environmental Policy Act supplementary authority in RCW 43.21C.060. Such mitigation could be included in the anticipated Planned Action Ordinance as a condition to be met in order to avoid additional environmental review. Developers could also enter into voluntary agreements with the city to provide funds for this and other city costs.

The city has a Public Safety Mitigation Fund which was established for the purpose of receiving payments that mitigate a direct impact that has been identified as a consequence of a proposed development. In cases where improvements to the City's emergency response services are reasonably necessary as a direct result of commercial and industrial development conditions may be imposed. The city can enter into mitigation agreements with developers as allowed by RCW 82.08.020. An additional option is that the city can impose impact fees on new residential, commercial and industrial development in the city pursuant to RCW 82.08.050 – 110 if warranted.

The Capital Projects Fund accounts for receipts and disbursements related to acquisition, design, construction and any other expenditures related to capital projects including public buildings, facilities and parks. The city's park projects, capital facility improvements, and general governmental projects make up the activity in this fund. The general tax-funded portion of the Civic Center debt payments was scheduled in this fund through the duration of the bonds until 2039.

The city also could allocate funds collected by the Real Estate Excise Tax (REET) which is currently placed in a Capital Projects Fund for acquisition, design, construction and any other expenditures related to capital projects including public buildings, facilities and parks. This tax, which is levied on all sales of real estate, is likely to be substantially augmented by sales related to new development in the Old Fort Lake Subarea. These taxes could continue to be pooled citywide, or the component related to the OFL could be tracked geographically and considered as a mitigation source for expenses arising from development of the subarea.

3.9.5 Community Development and Building

3.9.5.1 Affected Environment

In the City of DuPont, the Community Development and Building functions are among the divisions of the Department of Public Services (DPS) which combines Community Development (Planning, Zoning, Permitting, Building, and Code Enforcement) and Public Works, to provide a comprehensive and holistic approach for land use, development, and infrastructure within the City. For budgetary purposes, the expenditure program is maintained separately to maintain consistency and compliance with general accounting practices and the BARS chart of accounts. In this analysis, the functions of the divisions are different enough that they are treated separately.

The division of Community Development includes planning, environmental impacts, permitting, building, and code enforcement. It is responsible for all aspects of long range and current planning; development review and permitting related to land use and building permits; and enforcement. Current staffing continues to operate at a level below the pre-recessionary staff of seven, which significantly limits provision of full services. To address its limited in-house capacity to provide services, the division utilizes contracted outside consultant services for planning and environmental services.

The major current effort of the planning function of the division is the update of the Old Fort Lake Subarea Plan and zoning and the update of the city's Comprehensive Plan which the state Growth Management Act requires be updated by December 2024. As a means to save expense of relying solely on outside consultants to do this work, City Council approved a Term Position for a Planner for two years to assist the division with the Comprehensive Plan update.

Primary duties include:

- Preparation, administration, and enforcement of the City's growth management policies, regulations, and programs as required by the State.
- Maintenance and amendments to the City's Comprehensive Plan and Land Use Code and processes all land use applications from administrative applications to complex Design Reviews, Zone Changes, and amendments to the City's Land Use Plan and Land Use Code. The division also maintains the Shoreline Master Program and critical areas regulations and assists in the review of all development for compliance with these environmental regulations.
- Provide support to the current and future citizens and businesses of the community regarding our local zoning requirements in response to their questions; as well as efforts to promote economic development within the city.
- Planning staff support to other city departments, the city Hearing Examiner, Planning Commission, and City Council, and coordinates with county, regional, state and federal agencies.
- Assures compliance with building codes, plan review, issuance of building permits, inspections, final occupancy certificates for all new construction and modifications, alterations or additions to existing structures with the exception of electrical permits, which are issued and inspected by the Washington State Department of Labor & Industries.

Current Community Development Staffing includes 1 FTE Building Official, 1 FTE Permit, Coordinator, 1 FTE Planner (Term Employee ending Dec 2024).

A summary of types of permits issued over the past 5 years are included in Table 3.9.5-1 and 2 below.

Table 3.9.5-1 DuPont Community Development Discretionary Permits Reviewed

Year	Privately Initiated Comprehensive Plan and Zoning Amendments	City Initiated Comprehensive Plan and Zoning Amendments	Conditional Uses	Site Plan and Master Plan Approvals	Other Discretionary Permits
2023	0	0	0	3	0
2022	1	0	0	1	0
2021	0	1	0	0	0
2020	0	0	0	4	3
2019	0	2	0	1	2

Table 3.9.5-2 DuPont Building Permits Reviewed

Year	Single-Family Residential	Multifamily Residential	Commercial	Industrial	Public and Institutional
2023	243	5	15	0	0
2022	216	1	23	0	7
2021	236	3	27	0	9
2020	237	2	26	0	1
2019	230	5	69	0	1

Because the Planning and Building functions budgets are presented separately in the city budget, they are displayed separately below in Tables 3.9.5-3 and 4 and combined in Table 3.9.5-5.

The major components of the division budget are presented below, together with a “per capita multiplier” of 24 percent that represents the potential addition of 1,100 residential units under the existing plan and zoning for the Old Fort Lake Area. This would represent an “ordinary” level of demand for services such as public information, infill development under existing zoning within the subarea and including undeveloped land elsewhere in the city, and modifications, alterations or additions to existing structures. It does not include the review of major projects. This methodology, however, has limited applicability to this city service since the past and existing staffing levels related to relatively low development caused by the Covid-19 pandemic and limited post pandemic development. It is important to remember that these costs are in constant dollars with no provisions for future inflation. This provides no analogous representation of demand for resources related to non-residential uses which are the primary use within the existing Subarea Plan and zoning.

Table 3.9.5-3 DuPont Planning Division Existing and Past Budgets and Projected Future Cost Existing Zoning Residential Component

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Staffing *	164,032	223,991	232,173	123%	285,572
Professional Services	532,000	308,000	45,000	123%	55,350
Reimbursable Professional Services	150,000	150,000	150,000	123%	184,500
Other Costs	44,959	41,799	44,854	123%	55,170
TOTAL	964,093	723,790	472,027	123%	580,593

* Public Services Director (30%); Administrative Support Specialist (50%); Clerical Assistant (10%) and Senior Planner

This budget breakdown does not adequately reflect the reliance of the city on reimbursable professional services for discretionary permit review such as site plan review which is charged to applicants and is outside of the city’s revenue stream. Since this responds to actual applications filed within a given year and the use of professional services is an on-demand function, this can vary substantially.

Table 3.9.5-4 DuPont Building Division Existing and Past Budgets and Projected Future Cost Existing Zoning

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Staffing *	278,256	371,169	382,664	123%	474,503
Professional Services	9,150	9,150	9,150	123%	11,346
Reimbursable Professional Services	70,000	70,000	70,000	123%	86,800

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Other Costs	20,558	22,549	24,437	123%	30,302
TOTAL	517,076	472,868	472,027	123%	529,513

* City Engineer (5%); Facilities Analyst (5%); Public Services Director (30%); Building Official; Utility Billing Clerk (5%); Administrative Support Specialist (10%); Permit Coordinator; Clerical Assistant (10%); Finance Specialist (15%)

This budget breakdown does not reflect revenues. Generally, building permit fees adequately pay the cost of plan review and inspection. For more complex projects, the city fee schedule provides for reimbursement of complex plan review including costs and 10 percent overhead.

Table 3.9.5-5 DuPont Combined Planning and Building Division Existing and Past Budgets and Projected Future Cost Existing Zoning

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Staffing *	573,690	595,160	614,837	123%	760,075
Professional Services	541,150	317,150	54,150	123%	66,696
Reimbursable Professional Services	220,000	220,000	220,000	123%	271,300
Other Costs	65,517	64,348	69,291	123%	85,472
TOTAL	1,326,056	1,162,045	958,278	123%	1,183,543

This methodology based on population increase likely substantially underestimates staffing and other needs to administer permits for the projected development allowed under the existing plan and zoning which is projected to be 1.8 million square feet of office and research and development uses, light manufacturing, retail restaurant and service uses, a moderate sized hotel, and several restaurants. The proportional increase based on population does not take these uses into account. The non-residential uses are not included in the 24 percent increase based on population. In addition, the current level of staffing is substantially below past levels. An additional “case study” is provided below to provide a perspective from a rapidly developing city.

3.9.5.2 Impacts - Proposed Subarea Plan Amendments and Zoning

Under the proposed Subarea Plan and zoning amendments, the Old Fort Lake area would accommodate under a higher intensity scenario up to about 3,800 dwelling units with a population of 8,782 with about 409,800 square feet of retail, service, restaurant, and two hotels serving both local residents and as a destination for golf and other amenity-oriented tourism.

This analysis uses the “per capita multiplier” methodology as generally applicable to for an “ordinary” level of demand for services such as public information, and modifications, alterations or additions to existing structures and changes of occupancy. The cost of review of discretionary permits such as subdivisions and design review for multifamily residential development and commercial design review would be reimbursable, as permit fees are designed to fully recover costs of such review. The

proportional increase in population is from the current estimated population of DuPont of 10,080 with the estimated increase from the high growth scenario for the Old Fort Lake Subarea Plan revisions of 8,782 at buildout, this results in a city population of 18,737 or an 87 percent increase. Table 3.9.5- 6 illustrates the raw increase in projected costs. It is important to remember that these costs are in constant dollars and provide a one-to-one comparison of existing costs.

Table 3.9.5-6 DuPont Planning Existing and Projected Future Cost OLF Proposed Plan and Zoning Amendments, Residential Component

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Staffing	164,032	223,991	232,173	187%	434,164
Professional Services	532,000	308,000	45,000	187%	84,150
Reimbursable Professional Services	150,000	150,000	150,000	187%	280,500
Other Costs	44,959	41,799	44,854	187%	83,877
TOTAL	964,093	723,790	472,027	187%	882,690

This represents a substantial increase in staffing and other costs but is likely to substantially under-estimate future resource needs. One obvious result of a larger staff is the likely need for a full-time department manager rather than one shared by several functions. In addition, the very low levels of current staffing make a proportional increase less reliable than for a fully staffed department.

Table 3.9.5-7 DuPont Building Existing and Past Budgets and Projected Future Cost Proposed Subarea Plan and Zoning Amendments Residential Component

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Staffing	278,256	371,169	382,664	187%	715,582
Professional Services	9,150	9,150	9,150	187%	17,111
Reimbursable Professional Services	70,000	70,000	70,000	187%	130,900
Other Costs	20,558	22,549	24,437	187%	45,697
TOTAL	517,076	472,868	472,027	187%	798,540

As with planning, this represents a substantial increase in staffing and other costs but is likely to substantially under-estimate future resource needs because it is an increase from a small base. One obvious result of a larger staff is the likely need for additional management. It is common for building planning and related functions to be combined as one department. The organization currently in place in DuPont which includes Public Works and functions usually in a Parks Department is less common.

The combined planning and building costs are shown in Table 3.9.5-8.

Table 3.9.5-8 DuPont Combined Planning and Building Division Existing and Past Budgets and Projected Costs with Proposed Subarea Plan and Zoning Amendments Residential Component

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Staffing	573,690	595,160	614,837	187%	1,149,745
Professional Services	541,150	317,150	54,150	187%	101,261
Reimbursable Professional Services	220,000	220,000	220,000	187%	411,400
Other Costs	65,517	64,348	69,291	187%	129,574
TOTAL	1,326,056	1,162,045	958,278	187%	1,791,980

As discussed above, this methodology based on population increase likely substantially underestimates staffing and other needs to administer permits for the projected development. These costs are costs after development build-out in the Subarea and do not represent the substantial costs incurred during review and approval of the thousands of residential units and related commercial development. These costs, however, can generally be recovered. The city fee schedule for permits can be expected to recover most costs.

Table 3.9.5-9 provides a comparison of similar budget categories for cities that currently have a population similar to the projected DuPont population of 18,737 at OFL Subarea buildout. These are all for combined planning and building departments and are therefore roughly comparable to Table 3.9.5-8. This provides a somewhat more likely representation of the level of funding that is more likely to be required. The resources budgeted for community by other jurisdictions should not be considered for direct comparison because organizational structure and the responsibilities of different departments vary considerably. This should not be considered a correlation but rather an order of magnitude analogy, at best. Demands for community development services and related costs are not necessarily proportional to population but reflect the unique characteristics of a community. All comparisons based on population must be substantially qualified by the many factors that differ between communities and the variety of resources and priorities different jurisdictions may have.

Table 3.9.5-9 DuPont Planning and Building Projected Future Cost with Amended Subarea Buildout Comparison Cities

DuPont		Comparison Cities		
Category	Buildout Cost based on Multiplier	Aberdeen 2024 Budget	Centralia 2024 Budget	Monroe 2024 Budget
Population	18,737	18,564	18,269	18,574
Staffing	1,149,745	500,864	693,019	1,794,689
Professional Services	101,261	263,600	94,407	382,111
Reimbursable Professional Services	411,400			
Other Costs	129,574	11,000	32,599	10,650
TOTAL	1,791,980	724,407	820,025	2,187,450

As indicated above, this analysis does not include the considerable costs incurred by the city during construction of infrastructure and buildings during the approximately 20 years presumed for buildout. Table 3.9.5-10 and -11 below, use the City of Ridgeway as an example of potential costs of community development and building during construction. Ridgeway has experienced a rate of building generally comparable to what the City of DuPont may experience during construction within the subarea.

A perspective on the costs during buildout of the subarea can be provided by another rapidly growing city. The City of Ridgefield in Clark County is one of the fastest growing cities in the state with growth from a population of 9,356 in 2019 to a 2023 population of 15,180. As can be seen from Table 3.9.5-10 it has processed 2,005 single-family permits, 298 permits for townhouses, and 497 multifamily units in the past 5 years.

As with any comparison, the resources budgeted for community by other jurisdiction should not be considered for direct comparison because organizational structure and the responsibilities of different departments vary considerably. The type and pace of development also differs. This should not be considered a correlation but rather an order of magnitude analogy, at best.

Table 3.9.5-10 City of Ridgeway, WA Permits Processed

Community Development Activity					
Activity	2019	2020	2021	2022	2023 Est.
Inspections - Average per Day	74	117	155	111	57
New commercial and industrial space, SQFT	316,744	201,643	122,672	151,484	106,308
New single-family detached residential units	289	481	610	433	192
New single-family attached (townhouse) residential units	18	4	65	156	55
Single-family attached share of new units	0.05	0.01	0.08	0.24	0.22
New multifamily residential units	80	220	123	74	0
Multifamily share of new units	0.21	0.31	0.15	0.11	0

The staffing levels for this combined community development and building department have ranged from 12 to 16 over the past 5 years.

A multi-year budget summary for Ridgeway is provided in Table 3.9.5-11

Table 3.9.5-11 Ridgeway Community Development Budgets

Category	2021	2022	2023	2024
Staffing	1,269,367	1,573,690	1,803,300	2,104,600
Professional Services	64,162	\$201,554	\$160,000	\$200,000
Other Costs	534,711	540,501	1,425,055	1,515,516
TOTAL	1,868,240	2,315,745	3,388,355	3,820,116

As mentioned above, much of the cost of permitting can be recovered by fees.

The City of DuPont will face a substantial challenge in hiring and training personnel to serve the amount of development projected in the revised Old Fort Lake Subarea Plan. Initially the city is likely to retain professional services for permit review, plan review and inspection. It is likely that as the pace of buildout becomes better established staffing levels will be increased to a core level that serves most functions while being supplemented by consultants and professional service organizations.

Capital facility costs related to additional staffing is likely to cumulatively lead to a need for additional office space and expansion of the City Hall or development of other facilities. Staff would require computers, desks, chairs, and other facilities as well as staff car-pool cars for additional transportation demand and a variety of other tools of the trade.

Cumulative impacts in conjunction with impacts on other public services are discussed under each service discussed below.

3.9.5.3 Mitigation

Mitigation of operating expenses is dependent on General Fund Revenue from property taxes, sales taxes, Business and Occupation taxes, Utility taxes and other revenue sources keeping pace with general governmental expenses. Washington State does not provide taxing authority for cities that would vary tax rates between the subarea and other parts of the city if operating expenses were related to specific growth within the subarea. The buildout of the subarea is projected to take 20 years or more and the additional expenses will occur gradually over that time period, giving the city many budget cycles to adjust staffing and other needs.

Most cost related to permits including discretionary permits like subdivision, design review and conditional uses as well as building permits would be recovered by the city's fee system.

Capital expenses in the form of additional office space could not be mitigated by impact fees because they are not included in the listing of public facilities in RCW 82.02.090(7) which includes fire protection facilities but not police. A Community Facilities District under RCW 36.145 could be formed to finance public facilities, including offices for general services such as community development. Contribution of funds for capital costs could potentially be required as mitigation for environmental impacts under the State Environmental Policy Act supplementary authority in RCW 43.21C.060. Such mitigation could be included in the anticipated Planned Action Ordinance as a condition to be met in order to avoid additional environmental review. Developers could also enter into voluntary agreements with the city to provide funds for this and other city costs.

3.9.6 Parks, Museum, Greenways, Recreation, Community Events, and Tourism

3.9.6.1 Affected Environment

Parks and Recreation: The city owns and manages 17 developed parks encompassing over 60 acres of land. In addition, there are more than 24 acres of greenways throughout the City. Both are maintained primarily by Public Works staff and supplemented by contracted services. In addition, the city maintains

several undeveloped historic sites. The existing 60 acres of parks in the city constitutes about six acres of park land per 1,000 population based on the existing population of 10,080.

The city currently owns the 47-acre Old Fort Lake natural area in the approximate middle of the Subarea which includes about 20 acres of water. The surrounding land consists largely of steep slopes generally in excess of 40 percent that constitute Geologically Hazardous Areas and erosion hazard areas under the City's Critical Areas codes. The city also owns an area of about 15 acres at the northwest corner of the subarea which contains the historic Wilkes Observatory, a narrow trail corridor about 4 acres in size along the northerly boundary above the Burlington Northern Santa Fe Railroad right-of-way and a 45-acre open space area encompassing the south side of the Sequelitchew Creek Canyon.

Proposed trails identified in the 2014 Parks Master Plan include:

- The Puget Sound Bluff Trail is an unpaved trail that goes from south-to-north and connects residential neighborhoods to the southwest of the Subarea to Wilkes Observatory and Sequelitchew Trail to the northwest.
- The Sequelitchew Creek Trail is a paved and unpaved 1.4-mile trail that accesses the creek from the City Hall complex and leads to Puget Sound. The 2014 Parks Master Plan states that Sequelitchew Creek holds "environmental and historical significance as a connection to Puget Sound." Plans for improvements to Sequelitchew Creek Trail include securing public access to Puget Sound, developing additional trail corridor, and enhancing natural habitat.

The City of DuPont division of Parks & Recreation includes responsibility for the planning and execution of community events and recreation opportunities throughout the year. The Division is also tasked with coordinating special events and tourism as well as to maintaining and updating the City's Parks, Recreation, and Open Space Plan.

Museum

The city owns a 2,512 square foot Historic Museum located on Barksdale Avenue in the Historic Village. It is jointly managed by the city and the DuPont Historical Society. The Comprehensive Plan has a level of service (LOS) of 272 square feet per 1,000 population. The plan envisions the expansion of the museum to 9,500 square feet. Future projects include: 1) Expansion of display area for historic fire truck and police car; 2) Expansion/Remodel of display area for historical artifacts, currently in storage; 3) a planning effort to evaluate the potential of restoration of the historic narrow gauge train and track for a tourism and historic preservation idea.

Tourism

Tourism is addressed in the City's Comprehensive Plan by policies that encourage a variety of marketing and tourism efforts that build on the City's assets, including:

- Recognize, support, and enhance DuPont's unique historic landmarks by encouraging historic preservation planning.
- Promote DuPont's championship golf course, building on recent successes hosting the United States Men's Amateur Championship, United States Women's Amateur Championship, and the local qualifying round for the U.S. Open.
- Support tourist attractions and amenities by pursuing funding sources.
- Recognize, support and enhance DuPont's unique and precious natural features by encouraging restoration, protection, and preservation.

The DuPont Historical Society, DuPont History Museum, and the DuPont Tourism Board sponsor the Annual Hudson Bay Heritage Days weekend every August in DuPont to celebrate the community's significant history. The weekend involves a golf tournament, a 5K Run, Live Music, a barbecue, and guided tours of the historic 1843 site of the Hudson Bay Company's Fort. Nisqually built near the

Sequalitchew Creek as a trading post and agricultural center. This is partially supported by lodging tax dollars. Since 2017, the city has had five hotels contributing to lodging tax revenues.

Golf Course

The Home Course is the City's 18-hole golf course cooperatively owned and operated by the Pacific Northwest Golf Association and Washington Golf (WA Golf). It is open to the public and includes a clubhouse, restaurant, practice facilities, and administrative offices. The golf course serves as an engineered cap over contaminated soils, and therefore has restrictions on use, plantings, and other activities that would breach the cap. The course opened in 2007 and has been the site of numerous championships, including the US Men's Amateur Championship, US Women's Amateur Championship, and the qualifier for local players in the 2015 U.S. Open at Chambers Bay.

The current Comprehensive Plan references a community goal to protect the Home Course as a beautiful and highly desirable public amenity. The golf course and vicinity are envisioned to comprise an open space Focus Area, with the golf course and related properties designated as the recreational centerpiece for the Subarea. New development is mandated to protect the edges, views, and overall character of the golf course. The area west of the course is mandated to develop with a community character and building design style that are sensitive to views around the golf course and the bluff.

3.9.6.2 Impacts – No Action/Existing Subarea Plan and Zoning

Parks and Recreation

Under the existing Subarea Plan and zoning which emphasizes the Old Fort Lake area as a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses, it is projected that 56 acres of the site would be devoted to 100 single-family units and 1,000 multifamily units resulting in a residential population of about 2,300 primarily in multifamily dwellings with about 1.6 million square feet of office and research and development use (or about 800,000 square feet of office and 800,000 square feet of light manufacturing if the vested Founders Ridge proposal was built), about 70,000 square feet each of retail and service use, a moderate sized hotel, and several restaurants.

Utilizing the city's Comprehensive Plan Level of Service (LOS) standards for provision of 4.5 acres of Community Parks per 1,000 population and 33.8 acres of Natural Areas per 1,000 population, the projected population of 2,300 within the subarea would warrant 10 acres of community park and 78 acres of open space.

The city has 60 acres of park at present, which is slightly more than the level of service standard. To meet the overall standard for the projected future population of 12,480 with buildout of the subarea, a total of 67 acres of community park would be required, or an additional 7 acres within the subarea. The accessibility of community parks is also a factor. Community parks generally are recommended to be within walking distance of the population they serve, or about one-half mile. The DuPont Powderworks Park is a 24-acre park which is within a half-mile walking distance of portions of the site generally east of Old Fort Lake, however this area is not designated for residential use. In order to meet reasonable walking access standards, an additional 10 acres of Community Park would need to be provided within the westerly portion of the site.

The city has 829 acres of open space which is about 407 acres more than the 422 required to meet the citywide standard for a population of 12,240 with buildout of the subarea under existing zoning. Adjacent to the Subarea, the open space areas along Puget Sound and Sequalitchew Creek total about 60 acres and the Edmonds Marsh area east of Center Drive totals about 200 acres. All of these areas are accessible by public trails which allow public access to and enjoyment of the natural environment and open space character. The city-owned tract containing Old Fort lake totals about 47 acres, including

water area. There are currently no public trails or other formal access within the area, but the existing Subarea Plan provides for a trail to extend from Garry Oaks Park to the south and loop around Old Fort Lake, eventually connecting with the Sequalitchew Creek trail. This trail presumably would be at the top of the steep slopes but would allow visual access to the open space and habitat values. There is no need for additional public open space to meet the City's LOS standard for this type of park.

The personnel and equipment costs of maintaining park lands are difficult to isolate in the City's budget since they are embedded within the Public Works division which also maintains streets, greenways and utilities. The National Recreation and Park Association surveys of over 1,000 agencies indicates that on average 8.9 FTEs are employed in park operations per 1,000 population and the average per capita cost of parks operations is about \$100 per capita (NRPA 2022). Based on these standard multipliers and the addition of 2,400 residents, the projected additional cost would be about 240,000. This, however, is somewhat larger than statistics on the average cost per acre for maintenance of Community Parks which is \$6,000 to \$16,000 per acre (NRPA 2023) which would indicate a cost of 60,000 to 160,000 for the additional 10 acres of park land needed to meet city LOS standards. The cost of maintenance is influenced by a range of factors including the provision of facilities such as sports courts, sports fields and play areas which are much more expensive to maintain than lawn areas.

The increase in programs such as the planning and execution of community events and recreation opportunities by the City of DuPont division of Parks & Recreation is difficult to estimate based on population increase. Such programs are largely related to the community perception of what programs are desirable. An index of possible increase in resources needed is provided in Table 3.9.6-1 which includes population-based increases for the division as a whole.

Museum

The City's Comprehensive Plan has very specific policies for expansion of the existing historic museum facilities including a LOS standard of 264 square feet per 1,000 population and the specification that adequate historic museum facilities must be available at the time of occupancy and use of new development. The additional projected population of 2,400 would warrant expansion of the museum by 633 square feet, which would be a modest expansion of the existing 2,512 square foot building. This would be a minor contribution to the adopted goal of a 9,500 square foot building. If other sources of funding were available, such resources could be combined to provide more area and enhance existing exhibits. The costs of maintaining and operating the facility is difficult to isolate, particularly since it is currently operated primarily by volunteers from the DuPont Historical Society. As indicated above for Parks and Recreation, an index of possible increase in resources needed is provided in Table 3.15-1 which includes population-based increases for the division as a whole.

Tourism

The tourism promotion function for the city which includes promoting history, trails and golf is entirely funded by the Hotel/Motel tax which currently is supported by five hotels. Current revenues are \$275,000 per year through a tax of five percent of the charge made for the lodging. With the addition of a hotel which is projected under existing zoning, the tax receipts can be expected to increase about 20 percent or about \$55,000 per year.

Table 3.9.6-1 DuPont Parks, Museum, Facilities, Greenways, Recreation & Community Events, Tourism Budgets and Projected Future Cost Under Existing Zoning

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Staffing	555,432	544,469	556,079	123%	683,977
Professional Services	266,830	214,000	215,000	123%	264,450
Utilities	226,410	204,197	207,593	123%	255,339
Other Costs	814,829	262,470	262,966	123%	323,448
TOTAL	1,863,501	1,122,5136	1,241,638	123%	1,527,215

3.9.6.3 Impacts - Proposed Subarea Plan and Zoning Amendments

Parks and Recreation

Utilizing the city's Comprehensive Plan Level of Service (LOS) standards for provision of 4.5 acres of Community Parks per population of 1,000 and 33.8 acres of Natural Areas per population of 1,000, the projected population of 8,782 for the Subarea would warrant 40 acres of community park land and 297 acres of open space. The city currently has 60 acres of park land, which is slightly more than the level of service standard. To meet the overall standard for the projected future population of 18,737, a total of 85.3 acres of community park land would be required citywide, or an additional 25.3 acres within the subarea.

The accessibility of community parks is also an important factor in meeting the overall standard. Community parks generally are recommended to be within walking distance of the population they serve, or about one-half mile. The DuPont Powderworks Park is a 24 acre park which is within a half-mile walking distance of portions of the site generally east of Old Fort Lake within areas F-1 through F-5 with a projected 460 middle housing units with a projected population of 1,058, and a projected 1,360 multifamily units with a projected population of 2,992. If this population was considered adequately served by this park, the net additional parks required in the OFL Subarea would be 15 acres. Approximately half of the existing Powderworks Park, however, is open space forest and an Oregon White Oak Prairie and has a limited range of facilities centered largely around sports fields and picnicking. If half the area of the park is credited with providing community park facilities, the net park need within areas F-1 through F-5 would be about 9 acres. The balance of the subarea would require about 30 acres of park land to meet the LOS standard.

The city has 829 acres of open space which is about 190 acres more than the 641 acres which would be required to meet the level of service standard, assuming the open space is primarily natural areas. As described above, adjacent to the Subarea are open space areas along Puget Sound and Sequelitchew Creek that total about 60 acres with the 200-acre Edmonds Marsh, east of Center Drive. All of these areas are accessible by public trails which allow public access to and enjoyment of the natural environment and open space character. The city-owned Old Fort lake tract totals about 47 acres, including water area. There are currently no public trails or other formal access within the area, but the existing Subarea Plan and the proposed plan provide for a trail loop around the lake, eventually connecting with the Sequelitchew Creek trail. There is no need for additional public open space to meet the city's LOS standard for this type of park.

The personnel and equipment costs of maintaining park lands are difficult to isolate in the city's budget since they are embedded within the Public Works division which also maintains streets, greenways and utilities. The National Recreation and Park Association surveys of over 1,000 agencies indicates that on average 8.9 FTEs are employed in park operations per 1,000 population and the average per capita cost of parks operations is about \$100 per capita. (NRPA 2022) Based on these standard multipliers and the addition of 8,782 residents, the projected additional cost would be about \$878,200. This, however, is somewhat larger than statistics on the average cost per acre for maintenance of Community Parks which is \$6,000 to \$16,000 per acre (NRPA 2023) which would indicate a cost of \$234,000 to \$624,000 for the additional 39 acres of park land needed to meet city LOS standards. The cost of maintenance is influenced by a range of factors including the provision of facilities such as sports courts, sports fields, and play areas which are much more expensive to maintain than lawn areas. It also does not include facilities such as community centers.

The increase in programs such as the planning and execution of community events and recreation opportunities by the City of DuPont division of Parks & Recreation is difficult to estimate based on projected population increase. Such programs are largely related to the community perception of what programs are desirable. An index of possible increase in resources needed is provided in Table 3.15-2 which includes population-based increases for the division as a whole.

Museum

The City's Comprehensive Plan has very specific policies for expansion of the existing historic museum facilities including a LOS standard of 264 square feet per 1,000 population and the specification that adequate historic museum facilities must be available at the time of occupancy and use of new development. The additional projected population of 8,782 would warrant expansion of the museum by 2,342 square feet, which would be a substantial expansion of the existing 2,512 square foot building to a total area of 4,854. This would be a substantial contribution to the adopted goal of a 9,500 square foot building. The costs of maintaining and operating the facility is difficult to isolate, particularly since it is currently operated primarily by volunteers from the DuPont Historical Society. An index of possible increase in resources needed is provided in Table 3.15-2 which includes population-based increases for the division as a whole.

Tourism

The tourism promotion function for the city which includes promoting history, trails and golf is entirely funded by the Hotel/Motel tax which currently is supported by five hotels. Current revenues are \$275,000 per year through a five percent lodging tax. With the addition of two hotels projected under the proposed plan and zoning, the tax revenues can be expected to increase about 50 percent or about \$110,000 per year and would contribute substantially to programs.

**Table 3.9.6-2 DuPont Parks, Museum, Facilities, Greenways, Recreation & Community Events, Tourism
Existing and Past Budgets and Projected Future Cost with Existing OLF Zoning**

Category	2022 Actual	2023 Adopted	2024 Adopted	Buildout Population Multiplier	Buildout Cost based on Multiplier
Staffing	555,432	544,469	556,079	187%	1,039,868
Professional Services	266,830	214,000	215,000	187%	402,050
Utilities	226,410	204,197	207,593	187%	388,199
Other Costs	814,829	262,470	262,966	187%	491,746
TOTAL	1,863,501	1,122,516	1,241,638	187%	2,321,863

Due to the mix of functions provided in the city's department and division structure, no attempt has been made for these functions to provide a comparison with other jurisdictions.

Home Course

The golf course which occupies much of the central portion of the subarea would be subject to residential development along most of its perimeter. Because of the lower height and bulk of the proposed single-family and middle-housing, the visual compatibility of projected development is likely to be much greater than the light manufacturing, office and research and development uses which have an allowed height of 65 feet, when set back 50 feet from the course. The proposed multifamily area with a proposed maximum height of 50 feet is adjacent to the Old Fort Lake open space for about 2,500 linear feet and is adjacent to the golf course fairways 11 and 12 for about 1,400 linear feet. The higher bulk and relatively small setbacks from the golf course provide for the potential of these buildings to dominate views from the green of Fairway 11 and the tee of Fairway 12. This is somewhat mitigated by the distance of 120 feet and 150 feet to potential development from the playable portion of the green and tee, respectively.

The golf course also has relatively small setbacks from the maintained portions of the fairways to the property lines and therefore residential development adjacent to the course is likely to be subject to errant golf balls hit beyond the course limits. This can be a substantial hazard to persons occupying the area between buildings and the course, particularly the yards of single-family residences.

3.9.6.4 Mitigation

Parks and Museum

Mitigation of operating expenses is dependent on General Fund Revenue from property taxes, sales taxes, Business and Occupation taxes, Utility taxes and other revenue sources keeping pace with general governmental expenses. Washington State does not provide taxing authority for cities that would vary tax rates between the Subarea and other parts of the city if operating expenses were related to specific growth within the Subarea. The buildout of the Subarea is projected to take 20 years or more and the additional expenses will occur gradually over that time period, giving the city multiple budget cycles to adjust staffing and address other needs.

Capital expenses in the form of additional parks and development of parks facilities can be mitigated by impact fees because they are specifically included in the listing of public facilities in RCW 82.02.090(7) which includes "publicly owned parks, open space, and recreation facilities." Such facilities must be within a service area in which a defined set of public facilities provide service to development within the area. Any dedications of land must be credited against fees. The definition of parks and recreation

facilities is expansive and could, for example, include community centers with a recreation component such as indoor sports. Contribution of facilities or funds for capital costs could potentially be required as mitigation for environmental impacts identified under the State Environmental Policy Act supplementary authority in RCW 43.21C.060. Such mitigation could be included in the anticipated Planned Action Ordinance as a condition to be met in order to avoid additional environmental review. Developers could also enter into voluntary agreements with the city to provide funds for this and other city costs.

The city also could allocate funds collected by the Real Estate Excise Tax (REET) which is currently placed in a Capital Projects Fund for acquisition, design, construction and any other expenditures related to capital projects including public buildings, facilities and parks. This tax which is levied on all sales of real estate, is likely to be substantially augmented by sales related to new development in the Old Fort Lake Subarea. These taxes could continue to be pooled citywide, or the component related to the OFL Subarea could be tracked geographically and considered as a mitigation source for expenses arising from development of the subarea.

Tourism

This function is generally not included in the scope of a park or recreation facility, although promotional activities may take place within a park. As outlined above, this is supported by the Hotel/Motel tax which would be augmented if projected hotels are developed on the site.

Home Course

Potential proximity impacts to the golf course adjacent to much of the projected residential development could be addressed by specific standards for bulk, height, and landscaping to ensure visual compatibility. Visual compatibility can also be achieved through setbacks or avoidance of uses adjacent to the golf course that may be subject to hazards from stray golf balls or the design of areas between the course and buildings to discourage persons from occupying those areas.

3.9.7 Streets

3.9.7.1 Affected Environment

The City of DuPont Budget maintains the Street Fund as a Special Revenues Fund because gas tax revenues must be used for the maintenance of our arterial streets, sidewalks, and trails. The city has budgeted \$184,360 for 2024 revenues from the Motor Vehicle Fuel Tax. In addition, the city maintains a Street Depreciation Fund, with primary revenue from developers which are passed through the Northwest Landing Residential Owners Association (ROA) and Commercial Owners Association (COA) for depreciation. For 2024, \$50,000 is budgeted from this source which has a balance of \$189,926.

The Real Estate Excise Tax (REET), which is levied on all sales of real estate, includes a city authorized local tax of 0.50 percent. The first half (0.25 percent) tax must be used primarily for local capital improvements identified under the capital facilities plan element of the City's Comprehensive Plan, which can include street improvements. The second half (0.25 percent) which is optional, must also be used for the planning, acquisition, construction, reconstruction, repair, replacement, rehabilitation, or improvement of streets, roads, highways, sidewalks, street and road lighting systems, traffic signals, bridges, domestic water systems, storm and sanitary sewer systems, and parks.

The city has maintained a Transportation Benefit District Fund since 2013 which collects a \$20 vehicle license fee, providing a projected 2024 revenue of \$102,260. These funds are transferred to the City's Street Fund for transportation-related projects.

The city has budgeted \$522,946 in 2024 for grants from the state Transportation Improvement Board for construction projects. In 2023, grants totaled \$689,628 and in 2022 they totaled \$1,257.

In 2024 the Street Fund is budgeted to receive an operating transfer in the amount of \$140,000 from the General Fund; \$250,000 from the Capital Projects Fund; and \$75,000 from the Street Depreciation Fund. Total revenues for the Street Fund are shown in Table 3.9.7-1.

Table 3.9.7-1 DuPont Street Fund Revenue

Revenues	2021 Actual	2022 Actual	2023 Adopted	2024 Adopted
Street Permits	1,150	1,750	1,100	1,100
Federal Grants			539,000	
Transp. Improvement Board	1,257	2,968,787	689,628	522,946
Motor Vehicle Fuel (Gas) Tax	184,147	191,110	185,276	184,360
Multimodal Transportation-City	12,959	13,408	13,234	13,030
Vehicle License Fees	67,827	147,000	95,000	95,000
Investment Interest	1	16	10	10
Miscellaneous Revenue	278,662	-	-	-
Transfer from REET	250,000	650,000	500,000	250,000
Transfer from General Fund	140,000	417,000	140,000	140,000
Transfer from Street Depreciation Fund	75,000	75,000	50,000	50,000
TOTAL	1,011,003	4,464,072	2,213,248	1,256,446

The city maintains over 74 lane miles of road surface, several hundred traffic signs, nine traffic signals, 50 miles of sidewalk, more than 25 miles of pedestrian trails, and hundreds of street trees. The Road and Street Maintenance Fund is responsible for the administration and maintenance of the City's transportation network, including public roadways together with roadway improvements, sidewalks, bicycle facilities, and signalization and illumination systems and includes street sweeping, roadside vegetation management, pavement markings, snow and ice control, and support for special events.

Utilizing a per-capita cost of maintenance, which excludes budgeted items for major construction projects, yields an average per-capita cost of about \$57 for street maintenance and operations, as shown in Table 3-26-2. The combined operations and capital expenditure cost per capita for 2024 is about \$125, however for previous years with higher capital expenses it has varied from \$233 to \$485. This compares to a statewide average of \$638, which includes both operations and capital expenses and includes the state highway system, and therefore is likely to be substantially higher than the cost for local jurisdictions (Urban Inst 2023). These per-capita maintenance costs are likely to be fairly accurate for the existing city since the majority of the street system serves residential units. An alternative would be to calculate the cost per mile of the street. With the 74 existing miles of street, this would be an annual operations cost of about \$7,900 per mile.

The city major arterial, Center Drive, is a divided four lane arterial with a planted median and extensive landscape areas on each side. It also has sidewalks on one side and a 12-foot-wide multi-purpose trail. Maintenance costs for this roadway are likely substantially higher than the average, particularly for vegetation management.

The city has implemented phased pavement rehabilitation projects on major arterials such as Center Drive, and Wilmington Drive as part of a program to extend pavement life. In most cases this includes

grinding up to two inches of existing pavement and overlaying existing asphalt travel lanes and bike lanes/shoulders. Sidewalk curb ramps not in compliance with current ADA standards are upgraded. The variance in capital expenses from year-to-year largely reflects the costs of those major improvements. The cost of overlays (excluding costs such as sidewalks and ramps) is between \$450,000 and \$650,000 per lane mile (based on city 6-year TIP estimates).

Table 3.9.7-2 DuPont Streets Current and Past Budgets

Category	2022 Actual	2023 Adopted	2024 Adopted	Cost per Capita	Cost per Mile of Road
Staffing	255,726	235,726	240,816	23.66	3,254
Professional Services	120,674	163,150	163,150	16.03	2,205
Utilities Streetlights	30,556	10,000	10,000	0.98	135
Other Costs	82,281	167,549	169,438	16.64	2,290
TOTAL OPERATIONS	489,237	576,425	583,404	57.31	7,884
Capital Expenses	4,445,214	1,794,767	685,164	67.30	9,259
TOTAL STREET BUDGET	4,934,451	2,371,192	1,268,568	124.61	17,143

3.9.7.2 Impacts – No Action/Existing Subarea Plan and Zoning

Under the existing Subarea Plan and zoning which emphasizes the Old Fort Lake area as a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses, it is projected that 56 acres of the site would be devoted to 100 single-family units and 1,000 multifamily units resulting in a residential population of about 2,300 primarily in multifamily dwellings with about 1.6 million square feet of office and research and development use (or about 800,000 square feet of office and 800,000 square feet of light manufacturing if the vested Founders Ridge proposal was built), about 70,000 square feet each of retail and service uses, a moderate size hotel, and several restaurants.

The major component of the street system in the existing plan is an arterial that loops through the Subarea and is about three miles in length. An additional local access road is designated to provide access to the Wilkes Observatory site and local development. Landscaping and multi-use paths are proposed along Road A, which skirts the south and west of the Subarea and along Road B which is an east-west linkage through the Subarea. The north-south road in the westerly portion of the Subarea has no particular landscaping or trail requirements.

In this case, the per-capita calculation of road maintenance costs is not likely to be accurate since the zoning allows only 100 single-family units and 1,00 multifamily units. Single-family homes on individual lots would generally have 30 to 50 feet of roadway per lot, assuming single-family lots would result in 3,000 to 5,000 feet of new roadway. If private roads or flag lots were utilized, the total would be less. Multifamily development most likely would be served by private internal driveways and parking areas and would not add to public road maintenance. The majority of the Subarea would be expected to develop as office, research, light manufacturing, and commercial uses that also would be served by private driveways and parking areas. All roadways within the Subarea would be expected to be constructed as part of development with no cost to the city.

Maintenance of Roadways A and B designated for extensive landscaping and a trail system likely would cost more than the average cost per mile of about \$7,800. The proposed 1.7 miles of these roads likely would cost between \$13,500 and \$20,000 per year. The local roadways to serve single-family homes and

the Wilkes Observatory site would likely cost less than the average and would range between \$3,500 and \$5,000. These are average costs and would vary year-to-year. Generally, maintenance activities are needed only every several years. Operational costs such as maintaining street trees also would be averaged over several years. Operational costs such as snow removal can vary greatly from one year to another. The total projected additional maintenance costs of \$17,000 to \$25,000 per year would increase the streets operational budget from three to five percent.

The greatest cost associated with roadways is the cost of major rehabilitation or replacement at the end of the road surface lifespan. Hot mix asphalt (HMA) pavement performance in Washington State varies across the state's climatic zones. In Western Washington, the climate is classified as mild marine with warm, humid summers and cool, wet winters. The average surface life of highway pavements in Western Washington is 16.7 years. Highways, however, typically have substantially higher traffic. The predominant failure mechanism is cracking and the time to reach a cracking rehabilitation threshold is relatively independent of traffic and loading meaning that environment is the major contributor over time (WSDOT 2016). Major streets such as the loop roads likely would not need major rehabilitation for 15 to 20 years.

3.9.7.3 Impacts - Proposed Subarea Plan and Zoning Amendments

Under the proposed Subarea Plan and zoning amendments the Old Fort Lake area would accommodate under a higher intensity scenario up to about 3,800 dwelling units with a population of 8,782 with about 409,800 square feet of retail, service, restaurant, and two hotels serving both local residents and as a destination for golf and other amenity-oriented tourism.

This analysis uses the "per capita multiplier" methodology as generally applicable to an "ordinary" level of road maintenance and operations such as street sweeping, roadside vegetation management, minor repairs of roadway surfaces, pavement markings, snow and ice control, and support for special events.

The new roadways within the Subarea can be expected to be provided by developers at their cost. The cost to the city of review of plans, permits, and inspections would be reimbursable as permit fees are designed to fully recover costs of such review.

As discussed above under impacts of the existing plan, the different types of uses are likely to be associated with different levels of dedication of public roads. For the Subarea, a loop road similar to the existing plan is proposed, which will result in about two miles of major roads that includes trails and substantial landscaped buffers. The westerly north-south portion of the loop system would be built to lesser standards. The single-family component of future development projected at 560 units would generally be constructed on individual lots. Lot size and frontage would vary according to the developer's perception of the market they are aiming for. In general, they can be expected to have 50 to 80 foot wide lots and 25 to 50 feet of roadway per lot (assuming double-loaded streets). This would result in 14,000 to 28,000 linear feet of roadway or 2.7 to 5.3 miles. The middle housing component of future development projected at 1,860 units of townhomes are presumed to front public streets with lot width of 20 to 40 feet and 10 to 20 feet of roadway per lot (assuming double-loaded streets). This would result in 18,600 to 37,200 linear feet or 3.5 to 7 miles of new roadway. If private roads or flag lots were utilized, this total would be less.

Multifamily development most likely would be served by private internal driveways and parking areas, and this use would make up about 35% of the total residential units and population within the Subarea and likely would not be directly served by public roads providing local access. The commercial and entertainment areas all front on components of the loop roadway and would be served by private

driveways and parking areas. This area would not increase the amount of new public roads requiring city maintenance.

Two scenarios of increased cost of operation and maintenance of the street system are provided in Table 3.9.7-3. The first is based on the per-capita increase in population using the 2024 budget as a base. The second is based on the per mile maintenance costs. The proportional increase in population is from the current estimated population of DuPont of 10,080 with the estimated increase from the high growth scenario for the Old Fort Lake Subarea Plan revisions of 8,782 at buildout. This results in a city population of 18,737 or an 87 percent increase. It is important to remember that these costs are in constant dollars and provide a one-to-one comparison of existing costs. The results of the two methods are two substantially different projections. It is likely that the actual future costs is somewhere in the range between the two. Maintenance of portions of the loop roadway designated for extensive landscaping and a trail system likely would cost more than the average cost per mile of about \$7,800., with a more likely cost between \$13,500 and \$20,000 per year. The local roadways to serve single-family and middle family would likely average between \$3,500 and \$5,000. Because the loop roadway is about 20 percent of the new roads to be maintained by the City, a higher than average per mile cost can be presumed.

Table 3.9.7-3 DuPont Streets Current and Past Budgets and Projected Future Cost OLF Proposed Plan and Zoning Amendments

Category	2024 Adopted	Buildout Population Multiplier	Buildout Based on Multiplier
Staffing	240,816	187%	450,326
Professional Services	163,150	187%	305,091
Utilities Streetlights	10,000	187%	18,700
Other Costs	169,438	187%	316,849
TOTAL OPERATIONS	583,404		1,090,965

The cumulative effect of additional roadway maintenance may also result in the need for additional costs of management and oversight. No projection is made for the cost of future major road rehabilitation. It is likely that resurfacing of the fist components of the major loop roadway would be needed shortly after buildout (if this buildout period encompasses 20 years). The cost of such programs currently generally includes a combination of local resources and state and federal grants and therefore projection of the cost to the city is not reliable.

In the case of streets, comparison of budget implications with other cities of similar size has not been provided because the unique characteristics of the public local street system serving residences within the Subarea can't be readily compared with other cities

If the Founders Ridge vested application were implemented in areas E and F-1 through F-4, about 18 fewer acres of single-family units and 16 acres of middle housing would be developed, with about 145 and 330 units, respectively. This would result in about 3 fewer miles of public roads to be maintained. The areas designated in the proposed plan for multifamily and non-residential use would not be likely to be developed with public roads under the vested light manufacturing use as driveways and parking areas would be private, as would the multifamily and non-residential areas under the proposed Subarea Plan.

Capital facility costs related to additional staffing is likely to cumulatively lead to a need for additional office space, additional equipment and additional equipment storage and maintenance areas.

Administrative staff would require computers and other facilities as well as staff car-pool cars for additional transportation.

3.9.7.4 Mitigation

Mitigation of operating expenses for street maintenance and operation could continue to be financed by the variety of local sources currently relied on, including Motor Vehicle Fuel (Gas) Tax (42% of local resources contributed to street operations), Vehicle License Fees (21%), Transfer from Real Estate Excise Taxes (57%), Transfer from the General Fund (31%), Transfer from Street Depreciation Fund (11%). The extent to which Federal and State grants (which have made up 31% to 67% of the budget) will continue to be available is unknown but can be presumed to continue.

Capital facilities consisting of new roads, trails and associated landscaping within the Subarea areas designated for development are presumed to be provided by developers. The city has the option of assisting in financing such improvements through a Local Improvement District (LID) which is a means of financing capital improvements that will primarily benefit property owners within a specific area and would be paid overtime by present and future land owners. A LID must be approved both by a local government and the benefited property owners (RCW 35.43 through 35.56 RCW). Formation at the early stages of a development when there are few owners makes the process simpler. An LID would shift the financing of improvements from an up-front cost to the developer to a cost financed by municipal bonds and paid by future owners of property.

The city could finance improvements, likely off-site, that the City Council finds is in the public interest through a Transportation Benefit District (TBD) (RCW 36.73.050). The city currently has a citywide TBD that collects licensing fees. Additional sources of revenue the city could utilize include sales taxes of up to 0.3% which would be in addition to other sales taxes the city collects (RCW 82.14.0455). Because the funding source would be city-wide, the expenditures from the TBD would have to benefit all residents.

Transportation impact fees could be collected from within the boundaries of the Subarea and used for “public streets, roads, and bicycle and pedestrian facilities that are addressed by a capital facilities plan element of a comprehensive plan (RCW 82.02.050(4)). Transportation fees may be assessed at different amounts on different areas within the city, depending on their contribution to the needed facilities. Fees collected from development within the Subarea would be used for improvements outside of the Subarea boundaries in cases where the need for improvements to facilities, or new facilities result from traffic generated by the development. Fees must give credit for improvements made through other mechanisms, such as voluntary agreements. The time period over which the Comprehensive Plan designates needed facilities is not limited to a specific period, but fees collected must be expended within 10 years of the date collected. This can mean that the city can base the fees on an extensive list of improvements and expend the fees in a phased manner such that fees collected earlier are expended at earlier phases RCW 82.02.090(7).

Capital expenses in the form of additional office space, road maintenance equipment or storage and maintenance facilities could not be mitigated by impact fees because they are not included in the listing of public facilities in RCW 82.02.090(7) which limits improvements to public streets and roads.

A Community Facilities District (RCW 36.145) could be formed to finance public facilities, including public buildings. The district must be initiated by property owners and functions with a board separate from the City Council, but including members appointed by the council. The district has the authority to establish special assessments for a period of 35 years to retire municipal bonds.

The State Environmental Policy Act is the supplementary authority in RCW 43.21C.060. Such mitigation could include any public facility adversely affected by development and could be included in the

anticipated Planned Action Ordinance as a condition that runs with the land and subsequent owners. Mitigation facilities or fees could be required to be paid up-front by a developer or passed on to future purchasers to be collected at building permit or other phases of development. Developers could also enter into voluntary agreements with the city to provide funds for this and other city costs.

The city also could continue to allocate funds collected by the Real Estate Excise Tax (REET) to the street fund. In 2024 60% of the anticipated REET revenues were transferred to the streets fund. This tax which is levied on all sales of real estate, is likely to be substantially augmented by sales related to new development in the Old Fort Lake Subarea. These taxes could continue to be pooled citywide, or the component related to the OFL Subarea could be tracked geographically and considered as a mitigation source for expenses arising from development of the Subarea.

3.9.8 Schools

3.9.8.1 Affected Environment

The Steilacoom Historical School District No. 1 (SHSD) is the public school district that serves the City of DuPont and also the City of Steilacoom, Anderson Island, and portions of the City of Lakewood and unincorporated Pierce County.

The SHSD is the oldest school district in Pierce County, being founded in 1854 in the Washington Territory. In 1975, the Steilacoom School District Board approved consolidation with the Anderson Island School District and the DuPont-Fort Lewis School District and was renamed Steilacoom Historical School District No. 1. The District did not have a high school until the establishment of Steilacoom High School in 1984. Previously, high school students attended schools in the Tacoma School District and Clover Park School District.

The District's 2023 total enrollment was 2,835, with elementary school enrollment of 1,305 students in grades K-5, middle school enrollment of 745 in grades 6-8, and high School enrollment of 785 full time equivalents (headcount of 913 students) in grades 9-12. Overall enrollment grew from 2,600 in 2003 to 2,835 students in 2023, an increase of about ten percent. These enrollment numbers include only students who physically attend SHSD schools. They exclude students who are enrolled in full time running start programs or skills center programs off campus. There has been fluctuation over the past 5 years but there is no clear trend of increase. The Covid 19 pandemic disrupted patterns of school enrollment throughout the state and a new equilibrium has not been re-established in many cases. School enrollment since 2008 is shown in Table 3-16-1 below.

The District's schools have varying grade configurations model to address variations in school student populations within their attendance areas and make the best use of facilities.

Currently all kindergarten through 3rd graders in DuPont attend Chloe Clark Elementary school and all 4th and 5th graders are bussed to Saltar's Point Elementary School in Steilacoom. All students attend middle school in DuPont and high school in Steilacoom. This grade configuration model provides flexibility in housing elementary students as enrollment changes due to growth and demographic factors.

The district acquired a 10-acre site in the City of DuPont located on McNeil Street adjacent to Marshall Circle and intends to construct the next elementary school on this site. The construction of this school would allow all DuPont elementary students in grades Pre-K through 5 to attend school in DuPont.

The District proposed a \$116 million bond issue to refinance land and construct a new elementary school, a high school stadium, a performing arts center, career technical education space, additional

classrooms; make safety, security and accessibility improvements districtwide; and make capital improvements to the District's existing elementary schools.

Table 3.9.8-1 Steilacoom Historical School District, Student Enrollment 2008-2023

Grade	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Kindergarten (K)	204	224	206	217	244	255	212	237	233	247	238	248	199	233	216	175
1st Grade	235	232	224	223	231	234	256	223	263	242	245	269	238	226	248	219
2nd Grade	199	238	240	255	234	214	229	271	215	256	237	261	253	244	226	225
3rd Grade	231	211	241	242	249	227	207	243	267	220	258	248	236	258	230	223
4th Grade	216	226	214	257	263	238	196	206	219	264	226	248	228	232	252	218
5th Grade	236	219	234	244	246	264	252	208	216	228	262	223	221	232	233	240
6th Grade	244	240	221	253	241	265	268	269	247	239	239	299	230	239	225	256
7th Grade	194	242	227	238	261	236	247	277	280	242	249	247	273	236	255	243
8th Grade	218	203	227	248	230	266	228	253	280	277	231	261	242	272	240	245
9th Grade	199	232	205	242	226	224	247	231	255	278	291	232	240	240	263	237
10th Grade	188	210	223	201	225	221	217	258	231	262	268	298	222	245	236	268
11th Grade	197	187	219	223	204	226	212	215	238	173	231	251	245	194	231	208
12th Grade	119	160	159	179	189	190	208	200	196	190	162	193	218	219	178	199
Total	2,680	2,824	2,840	3,022	3,043	3,060	2,979	3,091	3,140	3,118	3,137	3,278	3,045	3,068	3,033	2,956

Voters narrowly defeated the bond measure in February 2023 and again in April 2023. Voters approved a capital and technology levy in November 2023 to address some of the more emergent capital needs that could be funded without a significant increase in the overall tax rate within the district.

The district's adopted Standard of Service is indicated in Table 3.9.8-2.

Table 3.9.8-2 Steilacoom Historical School District, Standard of Service

Standard of Service	
High School	25 students/classroom
Middle School	25 students/classroom
Elementary	20 students/classroom

Source: SHSD Capital Facilities Plan 2024-2029

The capacity for each facility is established by multiplying the regular classrooms available by the District's standard for average class load (the "Standard of Service"). Spaces used for special program needs are excluded from the definition of regular classrooms. Core facilities and special use facilities are compared to classroom capacity to confirm that facility capacity is not limited by limitations in core facilities.

Based on the Standard of Service and methodology outline above, projected enrollment through 2029 as indicated in the current Capital Facilities Plan 2025-2030 is shown in Table 3.9.8-3.

Table 3.9.8-3 Steilacoom Historical School District, Projected Enrollment through Year 2028/2029

Facility	Area (SF)	Teaching Stations**	Existing Capacity (Based on Service Standards)	Actual October 2023 Enrollment	Projected Oct 2029 Enrollment
Steilacoom High School	133,374	41	1,025	912	960
Pioneer Middle School	103,128	31	775	746	736
Mainland Elementary Schools*	156,651	60	1200	1,282	1,411
Anderson Island Elementary	11,366	2	40	16	16
Total Elementary			1,220	1298	1,427
Total Secondary			1,800	1658	1,696

*Does not include modular classroom capacity

The district's current Capital Facilities Plan defines facility capacity, current enrollment, and projected facility need as follows:

- Currently, Saltar's Point Elementary, Chloe Clark Elementary and Cherrydale Primary are all over capacity based on Service Standards.
- The District's current plans are to construct a new elementary school in DuPont, add capacity at Pioneer Middle School, and add capacity at Steilacoom High School, within the planning period of the district's current Six-Year Capital Facilities Plan. The District may also add portable facilities as needed to provide interim capacity at all grade levels.
- The District has current capacity in the middle school and high school to meet the current projection of demand through 2028/2029.
- The District collects impact fees for capital facilities for elementary school expansion cost. The district does not currently collect impact fees for middle school and high school because their current projections do not document a need for expansion.

To collect impact fees, a District must demonstrate an "un-housed student need" as determined by applying the district's level of service to projected growth from new residential development. The amounts to be charged are calculated based on the costs for providing the space for the projected number of students in each residential unit.

To collect impact fees, the district must first adopt a Capital Facilities Plan that demonstrates the need with recommended fees and then, the jurisdictions located within the District boundaries must then adopt a school impact fee ordinance and adopt or update the District's recommended fee. Within the Steilacoom Historical School District, those general government jurisdictions include the Town of Steilacoom, the City of DuPont and Pierce County. Developers may contribute properties which will have value to a District, which entitles them to a credit for the value of the provided property and can reduce or eliminate the mitigation or impact fee that would be otherwise chargeable.

The district collects school impact fees from new residential development in unincorporated Pierce County, the Town of Steilacoom and the City of DuPont. The DuPont fee program is in Sections 26.05.150 -190 of the city Code. The city fee schedule does not have the limits in the Pierce County school impact fee ordinance that requires that the calculated fee be discounted by 50% with a cap on fees. The DuPont fee program has the potential to more closely meet the Districts cost in providing new facilities. There are two basic limits to collection of school impact fees: RCW 82.02.050 (1)(c) provides that impact fees may

not be arbitrary or duplicate fees for the same impact; and RCW 82.02.060 (1)(b) provides that the formula or other method of calculating impact fees shall incorporate, among other things: “The availability of other means of funding public facility improvements.”

The District uses a student generation rate as one of the factors in projecting future enrollment. This is based on District records of average actual student generated rates for new developments constructed in the District. Using only development within the district presumes that existing demographic characteristics within a District will continue in the future and that the demographic character of past development (particularly household size and age of children) will continue. This is not necessarily a reliable presumption as future residents are likely to be drawn from the region as a whole rather than from within the District and may have different household size and other characteristics. The character of development may also change within a type of development, especially for multifamily units, the number of bedrooms has a substantial correlation with household size, the number of children and the number of students.

The current Student Generation Factors developed for the district are as shown in Table 3.9.8- 4

Table 3.9.8-4 Steilacoom School District, 2024 Survey of Student Generation Factors

Type of Development and Year Range	Number of Units	Grade Level	Number of Students	Student Generation Rate for Type of School	Student Generation Rate per Grade
Single-Family Development					
2016-2021	176	Elementary K-5	19	0.108	0.018
		Middle School 6-8	13	0.739	0.025
		High School 9-12	14	0.080	0.020
MultiFamily Development					
Duplex 2012-2021	6	Elementary K-5	0	0	0
		Middle School 6-8	0	0	0
		High School 9-12	0	0	0
Townhouse 2012-2021	54	Elementary K-5	20	0.370	0.061
		Middle School 6-8	5	0.093	0.031
		High School 9-12	6	0.111	0.028
Apartment 2012-2021	359	Elementary K-5	22	0.061	.010
		Middle School 6-8	11	0.031	.010
		High School 9-12	9	0.025	.006
Combined MultiFamily 2012-2021	419	Elementary K-5	42	0.100	0.017
		Middle School 6-8	16	0.038	0.013
		High School 9-12	15	0.036	0.009

Source: SHSD Capital Facilities Plan 2024-2029

These results which break out townhomes provides a perspective on this type of unit in terms of household size and number of children and hence student generation. It is probable that these units have more bedrooms than multifamily apartments and are more affordable than single-family units. They may tend to attract households in the “family formation” phase of between ages of 25 and 35 with younger children. (McCue 2023) Unfortunately there is little census information on townhomes as the US Census classifies them as single-family housing units if they are separated by a ground-to roof wall, have a separate heating system, have individual meters for public utilities, and have no units located above or below. (Census 2023) Other surveys to date do not break out townhomes separately, so there is limited basis for corroboration from other studies.

3.9.8.2 Impacts

Assessment of impacts on schools includes two components:

- Enrollment impacts including the demand or need for additional school facilities or alterations in existing facilities.
- Proximity impacts from new development on existing or planned school facilities.

Enrollment

Assessment of impacts on school enrollment and facility needs involves the following general steps:

- Population and dwelling unit projections.
- Student generation by dwelling unit type.
- Assignment of new students to grade levels (including cohort progression of new and existing students through grade levels).
- Assessment of the need for new or altered facilities produced by additional enrollment.

Population and Dwelling Unit Projections, Methodology

Population projections based on land use planning categories and zoning are generally reliable for maximum allowed development levels in an area since the regulations generally provide for a maximum density. Regulations, however, are less reliable in projecting actual development intensities since developers can choose to develop at lower intensities if they are aiming for a specific market segment. For example, in high amenity areas or particularly desirable residential communities, lower intensity single-family development may be preferred because the price per unit is higher and makes up for a lower number of total units. “Middle housing” townhomes also might be developed at lower intensities if a developer believes that higher levels of amenities at a lower intensity may bring higher prices that compensate for fewer units. In addition, lower than maximum intensity may be preferred if market conditions indicate that higher intensity units may not be absorbed by the market at the same rate and therefore will be less likely to be sold or rented. Financial institutions’ perceptions also affect decisions about development intensity as they tend to fund housing types with which they are familiar and often are less likely to fund types for which they do not have clear financial performance information.

Multifamily dwellings are generally presumed to provide a higher return at higher intensities, however if reaching higher intensity involves construction types that are more expensive, or features such as underbuilding parking to gain higher building coverage, the reduced cost of developing lower intensity units may provide a greater return. In addition, building envelope zoning based on the size of the building based on Floor Area Ratios (FAR) rather than maximum number of units may favor a greater number of smaller units in a building. With no limit on the number of units, a higher return may be provided by more studio and one-bedroom units in the same building envelope. With zoning based on a maximum number of units, larger units with more bedrooms may be favored because a higher rent per unit can be charged for a limited number of units. Larger units with more bedrooms tend to accommodate larger families with children, therefore the type of zoning can have an impact on student generation.

Household size tends to vary among housing types and between communities. Outer suburbs, as compared to core urban areas, tend to have a greater proportion of children and tend to have a higher proportion of households headed by 25 to 34-year-olds. This is generally interpreted as a tendency for those communities to attract a greater proportion of families with children or who desire children, as opposed to a higher proportion of single persons or couples without children in urban core communities (Fry 2020).

The City of DuPont previously used a single-family occupancy rate of 2.94 persons per unit and a multifamily occupancy rate of 2.76 for planning purposes (DuPont 2015). Examination of these rates revealed that they were based on the 2009-2013 American Community Survey data, for average

household size. The problem with using census "household" size is that households are 2 or more related persons living together. This excludes persons who live alone or share residences with unrelated people. For example, in 2020 DuPont had 4,150 housing units and 4,006 households; 96 percent of housing units were occupied by households. Similarly, Pierce County had 371,205 housing units and 341,783 households; 92 percent of housing units were occupied by households.

The use of a household size for DuPont that is higher than Pierce or King Counties is based on several factors.

- Young, modest-income households with children are more likely to live in new single-family units or "middle housing" townhomes. In the 2020 census, 46 percent of households in single-family homes were married couples with children (26 percent) or without children (20 percent), twice the rate of married couples in newer multifamily (23 percent). In total, 39 percent of households in new single-family units had children, compared with just 14 percent in multifamily.
- "Middle housing", consisting of townhouse type units of up to 6 units in a structure is generally thought to likely have occupancy between single-family and multifamily dwellings (Nesbit 2023). There is, however, little specific information on the housing type in census and other data as the US Census classifies them as single-family housing units if they are separated by a ground-to roof wall, have a separate heating system, have individual meters for public utilities, and have no units located above or below (Census 2023). It has been presumed that this type of housing has more bedrooms and additional amenities that are more likely to attract larger households than multifamily units. The student generation rates developed from the recent survey conducted for the Steilacoom School District in Table 3.9.8-4, however, indicates a higher student generation rate for townhomes than single-family dwellings. Single-family units in that survey generated an average of 26 students for every 100 units. Townhome developments produced an average of 57 students for every 100 units, and apartments produced an average 12 students for every 100 units. As this survey was conducted entirely within the School District and had a relatively low townhouse sample size of 54 units, the statistical validity for the larger regional population cannot be established. This may not indicate a larger household size than single-family units but may reflect a younger age of young children as reflected by elementary school student generation rates about twice the per-grade level as middle school and high school.
- Multifamily dwellings with larger numbers of rooms are more likely to be occupied by larger households. The number of rooms developers plan in new multifamily development is driven both by perceptions of the market and by the rate of return. In DuPont several market conditions are more likely to favor somewhat larger units. There is a smaller population of young single persons, particularly students, which provides a market for very small units such as studios. The average income in DuPont is somewhat higher than the Pierce County average leading to a likely higher demand for larger units with additional amenities provided by one and two room units. Unfortunately, there is little census data available for DuPont on housing tenure as the more detailed information tends to be generated later in the cycle, but the above factors appear to justify a slightly higher multifamily occupancy.

Student Generation by Dwelling Unit Type

Student generation is a result of the demographics of a community and depends largely on the extent to which residents are in households with children. That tends to vary by dwelling unit type, but has a weak correlation with dwelling unit type. It has a greater correlation with the life cycle characteristics of the population.

Based on national US Census data, the following general conclusions can be reached about the tendency of households to have students in the age range to be enrolled in public schools:

- Single persons not defined as a census household between the ages of 18 and 25 tend to have the lowest proportion of children.
- Single persons *in households* between the ages of 18 and 45 are generally single parents and have a high proportion of children.
- Married persons (which are defined as a census household) between 18 and 25 tend to have children, but at a lower rate than older married persons of greater age or single person households.
- Married persons (which are defined as a census household) between 26 and 35 tend to have more children than the married persons between 18 and 25.
- Married persons (which are defined as a census household) between 36 and 45 tend to have children at a similar rate as married persons between 26 and 35 but have older children (which is logical as a result of cohort aging).
- Married persons (which are defined as a census household) between 46 and 55 tend to have children at a lower rate than married persons between 26 and 34 and have older children (which is logical as a result of cohort aging).
- Both single persons (whether or not in households) and married persons over 55 tend to have lower rates of children present, which trend continues as populations age (Harvard 2023).

These characteristics, however, have only a moderate correlation with housing type. There is a weak to moderate correlation between families with children and occupancy of single-family housing units, however this correlation is not as great as the correlation between higher family income and occupancy of single-family dwellings. There is also a high incidence of older adults without children (both single and married) occupying single-family residences, which is likely a result both of income and of persons “aging in place” in their homes after their children have grown and left (Fry 2020).

Despite these limitations, the correlation between housing types and student populations is generally the most readily accessible data available to attempt to derive meaningful correlations between housing growth and the increase in student population.

The current demographic character of a school district, however, may not be a reliable indicator or predictor of the future demographic character of occupants of new development. Both of the communities of DuPont and Steilacoom, which comprise the majority of the district, have experienced low rates of growth in the past 5 years. DuPont grew from a 2019 population of 9,425 to a 2023 population of 10,080, or about 8 percent less than 2 percent per year. Steilacoom grew from a 2019 population of 6,450 to a 2023 population of 6,825, or about 5 percent, slightly more than one percent per year. This low rate of growth makes it difficult to gather meaningful data concerning the trip generation from recent development. The survey recently performed for the District had to go back to 2012 to get an acceptable sample size, which makes it difficult to get accurate data that is meaningful for present conditions.

The most recent surveys of student generation from recent growth in the Steilacoom District are also not entirely consistent with information gathered by other districts in the region, which show substantial variation as indicated in comparing Table 3.9.8-4 with Table 3.9.8-5 which presents information from

other districts. Unfortunately, none of the surveys from other districts included townhomes as a separate category, therefore direct comparisons are not possible. For example, the generation rate from new single-family units is about half the average rate of other districts for elementary schools, about three quarters of the rate for middle schools, and about one quarter the rate for high schools. The generation rate for new multifamily units ranges between one third and two thirds of the average rate of other districts for elementary schools, middle schools, and high schools. If the 2024 Steilacoom District survey data is combined for townhouses and multifamily for comparison purposes, the 2024 Steilacoom District survey results are about 70 percent of the average rate of other districts for elementary schools, middle schools, and high schools. The apartment rate, with townhomes excluded, is about half the average rate for other districts for elementary schools and high school and 62 percent of the rate for middle school. The student generation rates for townhomes alone (which are 54 of the 419 multifamily, or 13 percent) are about three times the rate of the average of other districts for elementary schools and about twice the rate for middle school and high school. They are about 50 percent higher than the highest rate from any of the other districts.

There is little means to determine whether the survey data of townhouses in the 2024 Steilacoom District survey represents a statistical anomaly, a special case that relates to the specific character of a specific development that may be oriented to a specific market sector or may provide more detailed information on an important sub-unit otherwise buried in the multifamily component of other district's surveys. The sample is limited to 54 units as compared to 359 multifamily units, which raises issues of the confidence level. The 20 elementary students out of 54 townhome units surveyed could be the result of a few large families, rather than a general indication of a greater proportion of families with children in townhomes. If townhomes do indeed have a higher household size, those results are buried in the multifamily category for other districts, allowing no opportunity for confirmation. In the future, with the statewide mandate to accommodate "middle housing" (which is essentially townhomes) more districts may survey this housing type separately and provide a more reliable regional data set. The Steilacoom district will also have the opportunity to monitor new townhome development as it is occupied and generates students to provide more accurate future projections.

New development in the Old Fort Lake area are not likely to be characterized by the same demographic trends that have prevailed in the past. Most of the district currently is single-family whereas the proposed Old Fort Lake mix of land uses is primarily "middle housing" and multifamily. These new developments will draw from a county-wide or region-wide base of persons looking for opportunity and therefore are more likely to be characterized by the demographic character of Pierce County of the South Sound region including Pierce and Thurston Counties.

This analysis for assessment of impacts utilizes three variations on Student Generation Rates as shown in Tables 3.9.8-7, 8 and 9 and discussed in more detail below. The "Low Scenario" is based on the lower quartile of the rates from the sample other school districts shown in Table 3.9.8-5 with an interpolated rate for townhouses, which is the average between the rates for the single-family and multifamily rates. The "Average Scenario" is based on the average for the surveyed grade level of the same sample of other districts with the same method of deriving an interpolated rate for townhouses which is the average between the average single-family and multifamily rates. The "Steilacoom Historic School District scenario" uses the 2024 surveyed rates for the district.

Background Growth

In addition to growth produced by development within the Old Fort Lake Subarea, additional growth will create enrollment for the District. Past population growth in the District has not been well correlated with growth in enrollment. Over the past 10 years the Washington State Office of Financial Management has estimated an increase of household population in the District of around 12%, or about 2,700 from a

household population of 20,915 in 2014 to 22,791 in 2024. During that period, enrollment in the district has fluctuated but has not consistently grown.

Table 3.9.8-5 Other School District Student Generation Rates

School Grade Level	Orting		Riverview		Puyallup		Bethel		Sumner Bonney Lake		Average	First Quartile
	School Level	Per Grade	School Level	Per Grade	School Level	Per Grade	School Level	Per Grade	School Level	Per Grade		
Single-Family Generator												
Elementary K - 5	0.221	0.037	0.239	0.040	0.379	0.063	0.355	0.059	0.403	0.067	0.035	0.021
Middle School 6 - 8	0.058	0.019	0.104	0.035	0.158	0.053	0.17	0.057	0.14	0.047	0.035	0.027
High School 9 - 12	0.076	0.019	0.137	0.034	0.132	0.033	0.9	0.225	0.099	0.248	0.093	0.020
Townhouse Generator												
Elementary K - 5	Not Surveyed, Average Interpolated Average										0.029	0.019
Middle School 6 - 8	Not Surveyed, Average Interpolated Average										0.026	0.019
High School 9 - 12	Not Surveyed, Average Interpolated Average										0.017	0.014
Multi-Family Generator												
Elementary K - 5	0.11	0.018	0.149	0.025	0.205	0.034	0.256	0.043	0.095	0.016	0.023	0.017
Middle School 6 - 8	0.058	0.019	0.025	0.008	0.07	0.023	0.102	0.034	0.043	0.014	0.017	0.011
High School 9 - 12	0.076	0.019	0.033	0.008	0.055	0.014	0.106	0.027	0.033	0.008	0.013	0.008

Housing growth within the district, outside of Old Fort Lake is estimated to be low over the next 20 years. The Pierce County Buildable Lands allocation for the Town of Steilacoom is 190 units, or 9.5 per year. That does not, however, include the major undeveloped site in the city, a brownfields site in the northeast quadrant of the city with a potential Master Planned Development of up to 390 residential units, with a mix of types (Fuller 2024). DuPont is allocated a target growth of 1,960 residential which includes the 1,300 units allowed by the current Old Fort Lake Subarea and zoning. The city has conducted a study that estimates a capacity for 381 additional housing units outside of the OFL Subarea. The area to the southeast of DuPont in unincorporated Pierce County appears to have little development potential as it is mostly owned by the Nisqually Tribe; with about 40 acres of land under open space taxation and a few residences on 5 acre lots.

For the purposes of this analysis, background growth has been presumed to include 1,000 additional housing units with an even split between single-family and multifamily and a student generation rate

equivalent to the low rate described above. This produces an additional 282 students over a 20-year buildout period.

Cohort Progression

Cohort progression moves enrollment statistics from one grade to the next grade based on historical records of how many students from one grade typically move to the next grade. It has a slight effect on overall enrollment as some grades, primarily residential, consistently experience a small increase in enrollment from year to year. This is useful for a district that experiences an anomaly of a particularly large group of students in a particular grade that will need to be accommodated in greater numbers as they age and move through higher grades. It is useful in this projection of the need for facilities because it moves younger children in elementary school up into middle school and high school over time. If the initial student generation is higher for younger students, the initial higher demand for facilities in lower grades will eventually be transposed to higher enrollment in higher grades.

The Steilacoom district has several anomalies that is likely to make cohort projections less accurate including the following. Students from military stationed at Joint Base Lewis McCord (JBLM) tend to enter or leave the system based on their parents' stationing orders rather than on normal grade progression. Students from the base in some cases attend elementary schools on the base but enroll in the Steilacoom District for middle school. High school enrollment is affected by programs such as "Running Start" which diverts students from the District to local colleges. The proximity to Pierce College and the programs they offer causes a large number of high school juniors and seniors to attend the college rather than high school (Lewis 2024).

For this analysis, it is presumed that the existing population will continue to produce students at approximately the same rate as they do now. The kindergarten recruitment is presumed to be the same as the previous year. To adjust for fluctuation in recent years due to the Covid-19 pandemic and other causes, a ten-year average of enrollment by grade has been used as the starting point. The cohort progression generally accounts for about a five to ten percent increase in school population over the 20-year presumed buildout period of the Old Fort Lake Subarea.

3.9.8.3 Impacts – No Action/Existing Subarea Plan and Zoning

Enrollment Projections Methodology

Under the existing Subarea Plan and zoning, the Old Fort Lake area is designated as a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses. It is projected that 56 acres of the site would be devoted to 100 single-family units and 1,000 multifamily units resulting in a residential population of about 2,300 primarily in multifamily dwellings with about 1.6 million square feet of office and research and development use (or about 800,000 square feet of office and 800,000 square feet of light manufacturing if the vested Founders Ridge proposal was built), about 70,000 square feet each of retail and service uses, a moderate size hotel, and several restaurants.

The existing zoning does not designate a particular location for residential use but allows the use in two of the nine districts with a limit of 100 single-family units and 1,000 multifamily units. Utilizing the two scenarios discussed above for student generation, the existing plan is likely to produce between about 3,401 and 3,736 students over the buildout period as indicated in Table 3.9.8-7. As the existing zoning does not provide separately for "middle housing" or townhomes, this type of housing is incorporated into multifamily.

The 20-year buildout period for the existing plan is used primarily to provide comparison with the proposed action. It is possible that the lower number of residential units could be constructed in a shorter time period. However, since the likely location of residential units allowed by current zoning is in the westerly portion of the site and substantial infrastructure such as roads and utilities would have to be constructed first to allow such development, it is likely that residential development would not occur until substantial non-residential development was completed. Because of limits to market demand, it is likely that non-residential development would take place over an extended period. (BST 2023)

Table 3.9.8-6 No Action/Existing Zoning - Future Residential Land Use

Land Use	Units	Population
Single-Family	100	270
Multi Family	1,000	2,200
Total	1,100	2,470

The residential component of growth provided for in the existing Subarea Plan and zoning is likely to result in substantially higher enrollments. Tables 3-16.7 – 9 depict future enrollment projections under student generation rate based on the three scenarios outlined above.

Low Student Generation Rates

The resulting increase in enrollment in the Steilacoom District of both background growth and growth from new in housing units in the Old Fort Lake Subarea under existing zoning is shown in Table 3.9.8-7 for the low student generation rate scenario based on the first or lowest quadrant of student generation rate of several Puget Sound school districts shown in Table 3-16-6. Under this scenario, future enrollment projections at buildout of the Old Fort Lake Subarea projected in 2044 results in an increase in enrollment from the existing 3,085 (10-year average of past enrollment) to 3,736, or about a 21 percent increase. About 55 percent of this increase results from background growth, about 41 percent results from Old Fort Lake Subarea growth and the remainder results from cohort progression. The greater contribution to growth by the 1,000 units of background growth results from the greater percentage of single-family units which is presumed to be half the growth, or 500 units and has a substantially higher student generation rate than multifamily. The Old Fort Lake existing zoning limits single-family units to 100 units, which results in 90 percent of the units generating students at the lower multifamily rate.

Table 3.9.8-7 Existing Subarea Plan and Zoning - Low Student Generation Rate Projections of Enrollment

Grade	2023	2034			2044		
	10 Year Avg	Back-ground Growth	Total OFL Growth	Total	Back-ground Growth	Total OFL Growth	Total
K	224	14	6	247	20.5	15.2	271
1	243	14	7	268	22.2	16.4	294
2	242	14	7	266	22.1	16.4	293
3	239	14	6	264	21.9	16.2	289

Grade	2023	2034			2044		
	10 Year Avg	Back-ground Growth	Total OFL Growth	Total	Back-ground Growth	Total OFL Growth	Total
4	229	14	6	252	20.9	15.5	277
5	232	14	6	255	21.2	15.7	280
6	251	10	7	277	23.0	17.0	304
7	255	10	7	281	23.3	17.3	309
8	253	10	7	279	23.1	17.1	306
9	251	7	7	277	23.0	17.0	304
10	251	7	7	276	22.9	17.0	303
11	220	7	6	242	20.1	14.9	266
12	196	7	5	216	17.9	13.3	238
Total	3,085	140.9	83.6	3,401	282.0	208.9	3,736

Average Student Generation Rates

The resulting increase in enrollment in the Steilacoom District of both background growth and growth in housing units in the Old Fort Lake Subarea under existing zoning and the average student generation scenario is shown in Table 3.9.8-8. This scenario is based on the average of the student generation rate of several Puget Sound school districts shown in Table 3-16-6. Under this scenario, future enrollment projections at buildout of the Old Fort Lake Subarea projected for 2044 results in an increase in enrollment from 3,085 (10-year average of past enrollment) to 3,815, about a 24 percent increase. About half of this increase results from background growth, and about half results from Old Fort Lake Subarea growth, with an additional contribution from cohort progression. The greater contribution to growth by the growth of units in the Subarea results from a higher student generation rate in this scenario for both single-family and multifamily development.

Table 3.9.8-8 Existing Subarea Plan and Zoning - Average Student Generation Rate Projections of Enrollment

Grade	2023	2034			2044		
	10 Year Avg	Back-ground Growth	Total OFL Growth	Total	Back-ground Growth	Total OFL Growth	Total
K	224	14	5	245	20	20	277
1	243	14	6	266	22	21	300
2	242	14	6	264	22	21	299
3	239	14	6	261	22	21	296
4	229	14	5	250	21	20	283
5	232	14	5	253	21	20	286
6	251	10	6	274	23	22	311
7	255	10	6	277	23	22	315
8	253	10	6	274	23	22	313
9	251	7	6	272	23	22	311
10	251	7	6	270	23	22	310
11	220	7	5	236	20	19	272
12	196	7	5	210	18	17	243
Total	3,085	141	72	3,352	282	270	3,815

Steilacoom District Student Generation Rates

The District contracted for a survey of student generation rates in 2024 which included a separate rate for townhomes which was substantially greater than the multifamily rate and similar to the highest single-family rates recorded for other districts. The multifamily rate alone was much lower than that recorded for other districts. Under this scenario, shown in Table 3.9.8-9, future enrollment projections at buildout of the Old Fort Lake Subarea projected in 2044 results in an increase in enrollment from the existing 3,085 (10-year average of past enrollment) to 3,625 about a 17 percent increase. About two thirds of this increase results from background growth, and about one third results from Old Fort Lake Subarea growth, with an additional contribution from cohort progression. The results are almost the same as the “Average scenario” above because the greater student generation rate for townhomes is not included, because no townhomes are presumed under the existing zoning.

Table 3.9.8-9 Existing Subarea Plan and Zoning - Steilacoom District Student Generation Rate Projections of Enrollment

Grade	2023	2034			2044		
	10 Year Avg	Back-ground Growth	Total OFL Growth	Total	Back-ground Growth	Total OFL Growth	Total
K	224	14	10	247	20	10	265
1	243	14	11	267	22	11	287
2	242	14	11	266	22	11	286
3	239	14	10	263	22	11	282
4	229	14	10	253	21	11	270
5	232	14	10	255	21	11	273
6	251	10	11	272	20	12	296
7	255	10	11	276	22	12	300
8	253	10	11	274	22	12	297
9	251	7	11	270	22	12	294
10	251	7	11	269	21	12	292
11	220	7	10	237	21	10	255
12	196	7	9	212	23	9	227
Total	3,085	141	135	3360	23	144	3,625

Capital Facilities

Capital facility needs include the full range of facilities and equipment needed to accomplish the educational goals of the district. In the simplest measure it includes the space needed to accommodate students in classrooms together with a range of facilities to serve related functions.

The district has established “level of service” standards based on the desired average class load for various grade levels. These standards include grade configuration, class size, school facility size, educational program offerings at various grade levels and practical considerations of classroom utilization and scheduling. In addition to classrooms, schools must accommodate the gymnasium, food service, the library, restrooms, the main office, and may include a variety of spaces for special functions.

An overview of the facility needs reference to existing facilities capacity according to the adopted “level of service” standard is shown in Tables 3.9.8-10 through 12 for the student generation projected for existing zoning accommodating 100 new single-family units and 1,000 new multifamily units within the Subarea, as well as background growth, for a ten-year intermediate period and a 20-year buildout period.

This assessment provides an order-of magnitude projection based on the classroom component of school capital needs. It does not consider the specific needs for additional facilities schools must accommodate such as the gymnasium, food service, library, restrooms, the main office, and a variety of spaces for special functions, special education, preschool, computer labs, career, technical education, music education, highly capable programs, and a variety of other programs. It is presumed that the need for such facilities will be proportional to the need for new classrooms. Such details will be addressed in the district’s specific facility plans.

In general, the magnitude of needed facilities under existing zoning at buildout of the Old Fort Lake area, projected for 2044, generally consists of:

- Additional Elementary School capacity equivalent to 17 to 28 classrooms compared with its existing 60 teaching stations among all schools. This alone (without other facilities and programs) would increase the overall size of the existing three Elementary Schools by 30 to 40 percent, or more realistically require an additional school, or some combination with expansion of existing schools.
- Additional middle school capacity equivalent to five to seven classrooms compared to 31 existing teaching stations. This alone (without other facilities and programs) would increase the capacity needed to serve middle school students by 16 percent to 23 percent.
- Additional high school capacity equivalent to two to four classrooms compared to 41 existing teaching stations. This alone (without other facilities and programs) would increase the capacity needed to serve high school students by 5 percent to 10 percent.

The difference between the scenarios is largely the result of the higher student generation for the average of other districts. The Steilacoom District survey has lower generation rates for all levels, with the exception of townhomes which are not in the mix of housing types for existing zoning.

Depending on the configuration of schools and the location of new or expanded schools, the District's transportation budget will be affected. The District currently busses 4th and 5th graders from DuPont to the Salter's Point Elementary School in Steilacoom. With additional elementary schools in DuPont, a greater proportion of children are likely to be within walking distance and not require bussing. The district currently busses middle school students from Steilacoom and other northerly portions of the district to DuPont and busses all DuPont high school students to Steilacoom. If that structure is continued, the total number of students at these levels that are bussed will increase substantially.

The Steilacoom District does not consider portables as being ideal instructional space for students and/or staff members. They separate their occupants from the rest of a school's student body and/or staff members and the increased enrollments accommodated may exceed the optimal size of the "core" facilities of the permanent building(s); such spaces as the gymnasium, the library, the restrooms, the main office, and the food service facilities. In the course of accommodating enrollment growth while planning financing and building new facilities, they may be employed as an interim measure.

The district is likely to closely monitor new development as it occurs and keep records of student generation to accurately assess the resulting impacts on facility needs. The district updates its facilities plans on a regular basis and will use the best available information to assess and plan for future needs. Additional discussion of strategies to accommodate additional enrollment demand is provided in the mitigation measures section below.

Cumulative impacts in conjunction with impacts on other public services are discussed under each service discussed in this overall section.

Proximity Impacts

Under existing zoning regulations and the existing Subarea Plan, which outlines the road system configuration, the main access roadway to the Old Fort Lake area which aligns with Palisade Boulevard is adjacent to Pioneer Middle School athletic fields near the intersection with Center Drive. Due to the configuration of the site and the roadway, it is about 350 to 400 feet from the existing buildings which is set back about 50 feet from the northerly property line. In addition, there is an 80-foot-wide trail and electric transmission line easement between the school property and the Old Fort Lake Subarea. Most of the area adjacent to the athletic field within the Subarea would be open space to meet tree retention requirements. Mature trees in the developable portion of the site adjacent to the building would be required to be retained within setback areas and would tend to soften building scale, in addition to newly planted landscaping.

Table 3.9.8-10 Existing Subarea Plan and Zoning - Steilacoom School District Existing Facility Capacity and Enrollment Projections - Low Student Generation Scenario

Facility	Area (SF)	Teaching Stations	Existing Capacity (Based on LOS)	Enrollment October 2023	Future Capacity Deficit					
					2034			2044		
					Projected Enrollment 2034	Deficit (Based on LOS)	Additional Classrooms Needed	Projected Enrollment 2044	Deficit (Based on LOS)	Additional Classrooms Needed
Steilacoom High School	133,374	41	1,025	912	997	0	0	1,096	71	3
Pioneer Middle School	103,128	31	775	923	873	62	2.5	923	148	6
Mainland Elementary	156,651	60	1,200	1,282	1,570	367	18	1,721	520	26
Anderson Island Elementary	11,366	2	40	16	16			16		
TOTAL Secondary				1,800	1,834	34	1.5	2,019	291	9
TOTAL Elementary				1,220	1,570	367	18	1,721	520	26

Table 3.9.8-11 Existing Subarea Plan and Zoning - Steilacoom School District Existing Facility Capacity and Enrollment Projections - Average Student Generation Scenario

Facility	Area (SF)	Teaching Stations	Existing Capacity (Based on LOS)	Enrollment October 2023	Future Capacity Surplus/(Deficit)					
					2034			2044		
					Projected Enrollment 2034	Deficit (Based on LOS)	Additional Classrooms Needed	Projected Enrollment 2044	Deficit (Based on LOS)	Additional Classrooms Needed
Steilacoom High School	133,374	41	1,025	912	1,005	0	0	1,123	98	4
Pioneer Middle School	103,128	31	775	746	846	71	3	943	168	7
Mainland Elementary	156,651	60	1,200	1,282	1,586	386	19	1,759	559	28
Anderson Island Elementary	11,366	2	40	16	16			16		
TOTAL Secondary				1,800	1,852	52	2	2,066	265	10
TOTAL Elementary				1,220	1,586	386	19	1,759	559	28

Table 3.9.8-12 Existing Subarea Plan and Zoning - Steilacoom School District Existing Facility Capacity and Enrollment Projections - Survey of Student Generation Scenario

Facility	Area (SF)	Teaching Stations	Existing Capacity (Based on LOS)	Enrollment October 2023	Future Capacity Deficit					
					2034			2044		
					Projected Enrollment 2034	Deficit (Based on LOS)	Additional Classrooms Needed	Projected Enrollment 2044	Deficit (Based on LOS)	Additional Classrooms Needed
Steilacoom High School	133,374	41	1,025	912	987	0	0	1,071	47	2
Pioneer Middle School	103,128	31	775	746	825	50		894	119	5
Mainland Elementary	156,651	60	1,200	1,282	1,593	339	17	1,665	465	23
Anderson Island Elementary	11,366	2	40	16	16			16		
TOTAL Secondary				1,800	1,812	12	0	1,966	166	7
TOTAL Elementary				1,220	1,593	339	17	1,665	465	23

Overall, the middle school would experience some visual impacts in the change from undeveloped land to a site accommodating large scale buildings designed to accommodate office park, research park, or light industrial use. There is not likely to be an effect on the character of the school within the school campus on school activities. Noise from the main access roadway in the Subarea is likely to be at low levels because traffic approaching the intersection will be travelling at slower speeds. Given the existing traffic on Center Drive, additional noise from roadways within the Subarea is not likely to be discernable from the school.

The safety of students travelling to the school will be impacted by an additional arterial intersection. Crosswalks will be provided with demand activated signals which would provide for safe crossing. Most students served by the school are either on the east side of Center Drive and would cross Center Drive at signal-controlled crosswalks or are west of the school and would access by Bobs Hollow Lane or local streets. Safety of students likely would be enhanced by crosswalks and signals at intersections.

Students accessing the site from the Subarea would be located in housing in the westerly portion of the site. Housing is not permitted by zoning in the easterly portion of the site. Walking access would be provided by sidewalks or trails along roadways in the Subarea. Students would likely access the middle school via Wren Road on the west side of the school campus.

No adverse impacts are projected for continuing operation of the Pioneer Middle School.

Other schools in the DuPont area are at a distance from the Subarea including Chloe Clark Elementary School at Palisade Boulevard and Montgomery Street, about a half mile from the Subarea. The site for a new elementary school is located at McNeil Street and Bobs Hollow Lane, about a quarter mile from the Subarea. Neither of these schools are likely to be affected by the proximity of future development of the Subarea under existing zoning.

3.9.8.4 Impacts - Proposed Subarea Plan and Zoning Amendments

Under the proposed Subarea Plan and zoning amendments, the Old Fort Lake area would accommodate up to about 3,800 dwelling units with a population of 8,782 with about 409,800 square feet of retail, service, restaurant, and two hotels serving both local residents and as a destination for golf and other amenity-oriented tourism.

The proposed zoning includes designation of specific areas for “middle housing” which generally accommodates townhouse units. For this reason, separate density and student generation rates are incorporated for this use. The area of each use, and two scenarios for the estimated density of development and number of units and population are illustrated in Table 3.9.8-13 with slightly different number of units per acre.

Table 3.9.8-13 Proposed Subarea Plan and Zoning Amendments - Dwelling Unit and Population Projections

Land Use	Land Area Acres	Population Multiplier	Moderate Growth			High Growth		
			Units/Acre	Units	Population	Units/Acre	Units	Population
Single-Family	70	2.7	6	420	1,134	8	560	1,512
Middle Housing	95	2.3	16	1,695	3,899	20	1,860	4,278
Multi Family	30	2.2	30	1,020	2,244	40	1,360	2,992
Total Housing Units/Population				3,185	7,277		3,780	8,782

Buildout is projected over a 20-year period starting in 2025. The actual buildout may occur sooner or later than this. The extensive infrastructure of roads and utilities required to develop the area favors the earlier development of the easterly portion of the site designated for multifamily and middle housing (townhouse) development. It is possible that the economies of scale could result in development of the multifamily component over a shorter period as one integrated development phase. The multifamily and portions of the middle housing may be developed earlier than the single-family component because the latter is located primarily on the westerly portion of the site and infrastructure improvements may be implemented later for that portion of the site. The resulting impacts on school enrollment would be similar, except for a smaller or greater contribution from cohort progression.

The residential component of growth provided for in the proposed amendments to the Subarea Plan and zoning is likely to result in substantially higher enrollments than at present or under existing zoning.

Tables 3-16-14 through 16 depict future enrollment projections under student generation rate based on the three scenarios outlined above and described in more detail above under subsection 3.9.8.2.2.A.

Low Student Generation Rate

The resulting increase in enrollment in the Steilacoom District from both background growth and growth from new in housing units in the Old Fort Lake Subarea under the proposed plan revisions and zoning is shown in Table 3.9.8-14 for the low student generation rate scenario. This scenario is based on the first or lowest quadrant of student generation rate of several Puget Sound school districts shown in Table 3-16-6. Under this scenario, the increase in residential units under the proposed revised Subarea Plan results in an increase in enrollment from 3,085 (10-year average of past enrollment) to 4,716, about a 50 percent increase from existing and about a 25 percent increase from the same student generation scenario under the existing Subarea Plan and zoning. About 20 percent of this increase results from background growth, about 65 percent results from Old Fort Lake Subarea growth and the remainder results from cohort progression.

**Table 3.9.8-14 Proposed Subarea Plan and Zoning Amendments - Steilacoom School District
Projections of Enrollment - Low Student Generation Rate**

Grade	2023	2034			2044		
	10 Year Avg	Back-ground Growth	Total OFL Growth	Total	Back-ground Growth	Total OFL Growth	Total
K	224	14	28	280	21	71	349.1
1	243	14	31	304	22	77	378.4
2	242	14	31	303	22	76	376.0
3	239	14	30	299	22	76	371.4
4	229	14	29	287	21	72	355.6
5	232	14	29	290	21	73	359.4
6	251	10	32	314	23	79	387.1
7	255	10	32	319	23	81	390.2
8	253	10	32	317	23	80	384.4
9	251	7	32	315	23	79	378.4
10	251	7	32	314	23	79	373.3
11	220	7	28	275	20	69	324.7
12	196	7	25	246	18	62	287.8
Total	3,085	140	390	3,863	284	975	4,716

Average Student Generation Rates

The resulting increase in enrollment in the Steilacoom District from both background growth and growth in housing units under the Old Fort Lake Subarea Plan revisions and revised zoning under the average student generation rate scenario, is shown in Table 3.9.8-15. This scenario is based on the average of the student generation rate of several Puget Sound school districts shown in Table 3-16-6. Under this scenario, future enrollment projections at buildout of the Old Fort Lake Subarea projected at in 2044 results in an increase in enrollment from 3,085 (10-year average of past enrollment) to 5,002, about a 61 percent increase. It is a 31 percent increase over the projected conditions for 2044 under the existing plan and zoning. About 15 percent of this increase results from background growth, and about 65 percent results from Old Fort Lake Subarea growth, with an additional contribution from cohort progression.

Table 3.9.8-15 Proposed Subarea Plan and Zoning Amendments - Steilacoom School District
Projections of Enrollment - Average Student Generation Scenario

Grade	2023	2034			2044		
	10 Year Avg	Back-ground Growth	Total OFL Growth	Total	Back-ground Growth	Total OFL Growth	Total
K	224	14	44	298	20	88	363
1	243	14	48	323	22	95	394
2	242	14	47	321	22	95	392
3	239	14	47	317	22	94	388
4	229	14	45	303	21	90	371
5	232	14	45	306	21	91	375
6	251	10	49	329	23	98	407
7	255	10	50	331	23	100	413
8	253	10	50	325	23	99	410
9	251	7	49	319	23	99	408
10	251	7	49	314	23	98	406
11	220	7	43	272	20	86	356
12	196	7	38	241	18	77	318
Total	3,085	141	605	3,999	282	1,209	5,002

Steilacoom District Student Generation Rates

The student generation rates for the district based on a 2024 survey included a separate rate for townhomes, which was substantially greater than the multifamily rate recorded for other districts. Because the townhome rate is higher and townhomes (or “middle housing”) is the predominant proposed land under the proposed plan and zoning amendments, the increase under this student generation scenario, future enrollment projections at buildout of the Old Fort Lake Subarea projected in 2044 results

in an increase in enrollment from 3,085 (10 year average of past enrollment) to 5,284, about a 71 percent increase, as shown in Table 3.9.8-16. The increase as compared to the existing zoning scenario is about 45 percent greater. About 12 percent of this increase results from background growth, and about 70 percent is from Old Fort Lake Subarea growth, with an additional contribution from cohort progression.

Table 3.9.8-16 Proposed Subarea Plan and Zoning Amendments - Steilacoom School District
Projections of Enrollment - Survey of Student Generation Scenario

Grade	2023	2034			2044		
	10 Year Avg	Back-ground Growth	Total OFL Growth	Total	Back-ground Growth	Total OFL Growth	Total
K	224	28	50	307.9	20	100	383
1	243	28	54	333.5	22	108	416
2	242	28	54	331.2	22	108	414
3	239	28	53	326.9	22	106	409
4	229	28	51	312.9	21	102	392
5	232	28	52	316.2	21	103	397
6	251	19	56	338.9	23	112	430
7	255	19	57	339.8	23	113	437
8	253	19	56	332.9	23	113	433
9	251	15	56	325.9	23	112	431
10	251	15	56	319.7	23	112	429
11	220	15	49	277.3	20	98	377
12	196	15	44	245.2	18	87	336
Total	3,085	127	687	4,108	282	1,373	5,284

Capital Facilities

As outlined in more detail above under subsection 3.9.2.2.A. No Action/Existing Subarea Plan/Existing Zoning, capital facility needs include the full range of facilities and equipment needed to accomplish the educational goals of the district: the space needed to accommodate students in classrooms together with a range of facilities to serve related functions.

The District has established “level of service” standards based on the desired average class load for various grade levels. These standards do not include other facilities that schools must accommodate such as the gymnasium, food service, the library, restrooms, the main office, and a variety of spaces for special functions.

The assessment of impacts on facilities is an overview of the scale of facilities needed. During the 20-year buildout of the Subarea, the School District will develop specific capital facilities plans for shorter-term phased implementation of needed facilities.

An overview of the facility needs is provided in Tables 3.9.8-17 through 19 for the student generation projected for the revised Subarea Plan under the student generation scenarios outlined above. This provides an order-of magnitude projection of the classroom component of capital facility needs. It does not consider the specific needs for other facilities such as the gymnasium, food service, library, restrooms, the main office, and a variety of spaces for special functions, special education, preschool, etc.

In general, the magnitude of needed facilities under existing zoning at buildout of the Old Fort Lake area, projected for 2044, generally consists of:

- Additional Elementary School capacity equivalent to 50 to 63 classrooms compared with its existing 60 teaching stations among all elementary schools. This alone (without other programs) would increase the overall size of the existing three Elementary Schools by 80 percent to slightly more than 100 percent, or more realistically require one or two additional schools, or some combination of new schools and expansion of existing schools.
- Additional middle school capacity equivalent to 15 to 21 classrooms compared with its existing 41 teaching stations. This alone (without other programs) would increase the capacity the existing Middle School must meet by 50 percent to 67 percent.
- Additional high school capacity equivalent to 14 to 19 classrooms compared to its existing 41 teaching stations. This alone (without other programs) would increase the capacity the existing high school must meet by 33 to 47 percent.

The difference between the scenarios is largely the result of the higher student generation for the scenario which averages the generation rate of other districts compared to the low scenario and the unique character of the 2024 Steilacoom District survey. That survey resulted in lower generation rates for single-family and multifamily units, but with an additional separate rate for townhomes larger than the other categories and larger than the comparable rates for other districts. Since “middle housing” consisting largely of townhomes is the largest component of residential use in the proposed revisions to the Subarea Plan and zoning, this increased student generation rate more than compensates for lower generation rate for single-family and multifamily.

Depending on the configuration of schools and the location of new or expanded schools, the district’s transportation budget will be affected. The district currently busses 4th and 5th graders from DuPont to the Salter’s Point Elementary School in Steilacoom. With additional elementary schools in DuPont, a greater proportion of children are likely to be within walking distance and not require bussing. The district currently busses middle school students from Steilacoom and other northerly portions of the district to DuPont and busses all DuPont high school students to Steilacoom. If that structure is continued, the total number of students at these levels that are bussed will increase substantially.

The Steilacoom District does not consider portables as being ideal instructional space for students and/or staff members. They separate their occupants from the rest of a school’s student body and/or staff members and the increased enrollments accommodated may exceed the optimal size of the “core” facilities of the permanent building(s); such spaces as the gymnasium, the library, the restrooms, the main office, and the food service facilities. In the course of accommodating enrollment growth while planning financing and building new facilities, they may be employed as an interim measure.

The District is likely to closely monitor new development as it occurs and keep records of student generation to accurately assess the resulting impacts on facility needs. The District updates its facilities

plans on a regular basis and will use the best available information to assess and plan for future needs. Additional discussion of strategies to accommodate additional enrollment demand is provided in the mitigation measures section below.

Cumulative impacts in conjunction with impacts on other public services, are discussed under each service discussed in this EIS.

Table 3.9.8-17 Proposed Subarea Plan and Zoning Amendments - Steilacoom School District Capacity and Enrollment Projections - Low Student Generation Scenario

Facility	Area (SF)	Teaching Stations	Existing Capacity (Based on LOS)	Enrollment October 2023	Future Capacity Deficit					
					2034			2044		
					Projected Enrollment 2034	Deficit (Based on LOS)	Additional Classrooms Needed	Projected Enrollment 2044	Deficit (Based on LOS)	Additional Classrooms Needed
Steilacoom High School	133,374	41	1,025	912	1,111	86	3	1,364	339	14
Pioneer Middle School	103,128	31	775	923	952	177	7	1,161	387	15
Mainland Elementary	156,651	60	1,200	1,282	1,800	600	30	2,190	990	50
Anderson Island Elementary	11,366	2	40	16	16					
TOTAL Secondary				1,800	2,062	262	10	2,526	726	29
TOTAL Elementary				1,220	1,800	600	30	2,190	990	50

Table 3.9.8-18 Proposed Subarea Plan and Zoning Amendments - Steilacoom School District, Capacity and Enrollment Projections - Average Student Generation Scenario

Facility	Area (SF)	Teaching Stations	Existing Capacity (Based on LOS)	Enrollment October 2023	Future Capacity Deficit					
					2034			2044		
					Projected Enrollment 2034	Deficit (Based on LOS)	Additional Classrooms Needed	Projected Enrollment 2044	Deficit (Based on LOS)	Additional Classrooms
Steilacoom High School	133,374	41	1,025	912	1,146	121	5	1,444	418	17
Pioneer Middle School	103,128	31	775	746	986	211	8	1,233	458	18
Mainland Elementary	156,651	60	1,200	1,282	1,867	1,200	33	2,325	1,125	56
Anderson Island Elementary	11,366	2	40	16	16			16		
TOTAL Secondary				1,800	2,132	332	13	2,676	876	35
TOTAL Elementary				1,867	1,200	33	1,867	2,325	1,125	56

Table 3.9.8-19 Proposed Subarea Plan and Zoning Amendments - Steilacoom School District Capacity and Enrollment Projections - Survey of Student Generation Scenario

Facility	Area (SF)	Teaching Stations	Existing Capacity (Based on LOS)	Enrolment October 2023	Future Capacity Deficit					
					2034			2044		
					Projected Enrollment 2034	Deficit (Based on LOS)	Additional Classrooms Needed	Projected Enrollment 2044	Deficit (Based on LOS)	Additional Classrooms Needed
Steilacoom High School	133,374	41	1,025	912	1,168	143	6	1,505	482	19
Pioneer Middle School	103,128	31	775	746	1,012	237	9	1,294	519	21
Mainland Elementary	156,651	60	1,200	1,282	1,928	729	36	2,452	1,251	63
Anderson Island Elementary	11,366	2	40	16	16			16		
TOTAL Secondary				1,800	2,179	380	15	2,801	1,001	40
TOTAL Elementary				1,220	1,928	729	36	2,452	1,251	63

Proximity Impacts

Under the proposed Subarea Plan and zoning amendments, the future arterial road system configuration is designated. The main access roadway to the Old Fort Lake area aligns with Palisade Boulevard and is adjacent to Pioneer Middle School athletic fields near the intersection with Center Drive. Due to the configuration of the site and the roadway, it is about 350 to 400 feet from the existing buildings which are set back about 50 feet from the northerly property line. In addition, there is an 80-foot-wide trail and electric transmission line easement between the school property and the Old Fort Lake Subarea. Most of the area adjacent to the athletic field within the Subarea would be open space to meet tree retention requirements. Mature trees in the developable portion of the site adjacent to the building would be required to be retained within setback areas and would tend to soften building scale, in addition to newly planted landscaping.

Overall, the middle school would experience some visual impacts in the change from undeveloped land to a site accommodating “middle housing” consisting largely of townhomes. The scale of the proposed residential buildings would be much smaller in scale than the development allowed under the existing plan and zoning which consists of large-scale buildings designed to accommodate office park, research park, or light manufacturing uses. The proposed residential plan designation and zoning is not likely to have an effect on the character of the school within the school campus or on school activities. Noise from the main access roadway in the Subarea is likely to be at low levels because traffic approaching the intersection will be travelling at slower speeds. Given the existing traffic on Center Drive, additional noise from roadways within the Subarea is not likely to be discernable to users of the school during normal school hours.

The safety of students travelling to the existing middle school will be impacted by an additional arterial intersection leg for the new roadway at Palisade Boulevard. Crosswalks will be provided with demand activated signals which would provide for safe crossing. Most existing students served by the school are either on the east side of Center Drive and would cross Center Drive at signal-controlled crosswalks or are west of the school and would access by Bobs Hollow Lane or local streets. Safety of students likely would be enhanced by crosswalks and signals at intersections.

Students accessing the existing middle school site from the residential units within the Subarea would walk along sidewalks or trails along roadways in the Subarea. Students would likely access the middle school via Wren Road on the west side of the school campus. No adverse impacts are projected for continuing operation of the Pioneer Middle School.

The Subarea Plan includes a proposed 10-acre site for a new elementary school in the western portion of the Subarea. The proposed school site is abutted on the west by the main north-south arterial in the westerly portion of the Subarea. It is abutted on the east by “middle housing” townhomes. Access to the site will likely be from the adjacent arterial. Pedestrian access likely will include signal-controlled crosswalks. Students accessing the existing school site from the residential units within the Subarea would walk along sidewalks or trails along roadways in the Subarea. It is not likely that traffic on the adjacent arterial or noise from the arterial will adversely impact the future school. The townhouse development to the east between the golf course and the school is not likely to have adverse impacts on the future school. The golf course at a distance of about 300 feet from the new school site is not likely to adversely affect the future school.

Other schools in the DuPont area are at a distance from the Subarea including Chloe Clark Elementary School at Palisade Boulevard and Montgomery Street, about a half mile from the Subarea and the site for a new elementary school at McNeil Street and Bobs Hollow Lane, about a quarter mile from the Subarea. Neither of these schools are likely to be affected by their proximity to future development of the Subarea under the proposed Subarea Plan and zoning amendments.

3.9.8.5 Mitigation

The State Environmental Policy Act in RCW 43.21C.060 provides substantive authority in addition to code-based regulatory authority to condition or deny a proposal to ensure identified environmental impacts can be sufficiently offset. This authority can be used to mitigate impacts identified in environmental documents. Conditions required under SEPA substantive authority may be included as conditions on a permit, license, or approval. The specific content of conditions need not be included in environmental documents but the impact which they address must be identified.

Capital expenses in the form of additional school facilities can be mitigated by impact fees because they are specifically included in the listing of public facilities in RCW 82.02.090(7)(c) which includes school facilities. School impact fees must be used for “school facilities” that are addressed by a capital facilities plan element of a comprehensive plan adopted under the GMA (RCW 82.02.050(4) and RCW 82.02.090(7). In the case of the City of DuPont, the District’ capital facilities plan is adopted by reference. Typically, school impact fees apply only to residential construction, or the residential portion of a mixed-use building or development since normally only residential uses generate students.

School districts are responsible for expending the impact fees but are not authorized to collect them. As a result, school impact fees require cooperation between school districts and the jurisdiction administering the program. DuPont provides that a school impact fee be reasonably related to the impact caused by the development and shall not exceed a proportionate share of the costs of system improvements that are reasonably related to the new development. The impact fee formula must account in the fee calculation for past and future revenues the district will receive from the development which are related to the same system improvements. Facilities donated by development, including school sites, must be credited against impact fees owed.

Districts have a variety of other sources of funding including bond issues for school capital facilities that are paid by a tax imposed on all properties in the District. To the extent the same facilities are included in an impact fee and bond issue, the fee must give credit for the revenues from that source.

The State of Washington has a Common School Construction Fund to pay a portion of school costs. The Office of the Superintendent of Public Instruction (OSPI) had determined that the school district funding assistance rate is 52.15 percent for eligible expenses. Many school facility improvements may not, however, qualify for state funding. If such funding is available in the future, credit must be given against impact fees.

The Steilacoom Historical School District has extensive experience in school facilities planning and development of impact fees that meet statutory requirements. During the process of development, they can be expected to monitor and update student generation rates and other factors and develop fees that will provide resources for school facilities in accordance with statutory requirements.

3.9.8.6 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, the implementation of either alternative will introduce a variety of land uses that will add population which will include children, which the state constitution mandates be provided the opportunity to attend public schools. This will require the School District to change the capacity and perhaps the character of school services provided.

3.10 UTILITIES

3.10.1 Water

Technical studies that form the basis of the analysis presented in this section may be found at <https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>

3.10.1.1 Affected Environment

A detailed inventory of city water system facilities is included in the City of DuPont Water System Plan 2018 Update.

The city water system, which operates two pressure zones, currently provides service to the Historic Village, Palisade Village, DuPont Station, Edmond Village, Manufacturing Research Park, Industry, Civic Center, Old Fort Lake Subarea, Sequalitchew Village, Yehle Park Village, and Hoffman Hill Village. Water from the Bell Hill Pump Station and Hoffman Hill Reservoir serves most of the city at a nominal 400-foot Hydraulic Grade Line (HGL). The Historic Village is served from the upper 400-foot pressure zone through two pressure reducing valves (PRV).

Water Supply

The city uses only groundwater sources for its water supply. The Hoffman Hill Wells Nos. 1 and 2 are situated in the southwest corner of the city's service area. Both wells utilize a single water right and have been added to the system to increase capacity. Under normal operating conditions the Hoffman Hill well(s) act as the primary source for the water system.

Water Storage

The City of DuPont currently owns and operates two storage facilities: the 1.0 million gallon (MG) reservoir located at Bell Hill and the 3.5 MG Hoffman Hill Reservoir. The reservoirs both serve the main 400-foot HGL pressure zone.

The 1.0 million-gallon pre-cast, post-tensioned concrete reservoir at Bell Hill was constructed in 1991 to provide storage for the northeasterly part of the city under LID #88-1. This reservoir's interior diameter is 85 feet with a height of 23.75 ft. The base elevation of the reservoir is approximately 250 feet above mean sea level (MSL), providing an overflow elevation of 273.75 feet. The reservoir is served by the three adjacent Bell Hill wells. The reservoir supplies the city water system via the Bell Hill Pump Station, which boosts the pressure to the approximate 400-foot HGL.

The 3.5 MG steel reservoir at Hoffman Hill was constructed in 1999 to provide storage capacity for the planned expansion of the Northwest Landing to the southeast. The Hoffman Hill reservoir's interior diameter is 160 feet with a height of 24 feet. The base elevation of the reservoir is approximately 378 feet MSL, providing an overflow elevation of 401.5 feet. The reservoir is served by two adjacent Hoffman Hill wells. The reservoir supplies the city water system at a service elevation of 400 feet via the distribution system along McNeil Street.

The City of DuPont owns and operates two booster pump stations. The Bell Hill Booster Pump Station pumps from the Bell Hill Reservoir into the 400-foot pressure zone, and the Hoffman Hill Booster Pump Station pumps from the Hoffman Hill Reservoir into the 530-foot pressure zone which serves the hill generally southeast of the Hoffman Hill greenbelt.

Distribution

The existing distribution system in the Northwest Landing portion of the city water system includes primarily 8, 12, and 16-inch diameter ductile iron (DI) mains, which have primarily been installed subsequent to construction of the various Bell Hill (1992) and Hoffman Hill (1999) facilities. Significant

upgrades to the Historic Village system were made in 2016 and 2017, which have replaced essentially all of the distribution facilities in that area.

Water Rights

According to the 2018 Water System Plan the City of DuPont has adequate water rights to meet projected 6-year growth demands of the system. However, in planning for buildout, the City of DuPont will pursue transferring existing water rights from the Historic Village and the Weyerhaeuser golf course wells from one point of withdrawal to another.

3.10.1.2 Impacts – No Action/Existing Subarea Plan and Zoning

In compliance with Growth Management Act and city policy, adequate water supply and distribution facilities must be available at the time of occupancy and use of new development.

The existing plan which calls for a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses in the Old Fort Lake Subarea provides several challenges in projecting water demand.

The allowed development of about 56 acres of the Subarea with 100 single-family units and 1,000 multifamily units resulting in a residential population of about 2,300 is fairly straightforward in projecting Equivalent Residential Units (ERU) a factor of 1 for single-family and 0.70 for multifamily results in 800 ERU. For DuPont, the current ERU is 231 gallons per day.

The projected square feet of office and research and development use at 0.07 ERU per 1,000 square feet would equal to about 107 ERU. If a substantial component of that was light manufacturing and used processed water, the water consumption would have to be calculated on a case-by-case basis. Industrial water use includes water used for such purposes as fabricating, processing, washing, diluting, cooling, or transporting a product; incorporating water into a product; or for sanitation needs within the manufacturing facility.

Light manufacturing uses allowed in DuPont, excluding food processing, are estimated, based on national surveys, to use between 0.030 to 0.168 to 0.305 ERU or about 134 to 244 ERU. (Morales 2009) The high cost of water provides an effective incentive to minimize use or recycle water such that light manufacturing use may have if the vested interest is minimizing use. If the Founders Ridge proposal was built, about 70,000 square feet each of retail and service use could include a variety of uses including general retail with an ERU of around 0.185/1,000 square feet would produce around 13 ERU. An average size restaurant at about 1.788 ERU/1,000 square feet would produce about 14 ERU. Overall, the non-residential component of use would likely range from around 270 to 380 ERU, or with the residential component about 1,070 to 1,280 ERU.

The City's existing Water System Plan provides for a growth from the current 7,238 ERU to 10,770 ERU. That increase of 3,532 ERU is well within projections of additional water demand under the existing Subarea Plan and Zoning.

3.10.1.3 Impacts - Proposed Subarea Plan and Zoning Amendments

Under the proposed Subarea Plan and zoning amendments, the Old Fort Lake area would accommodate under a higher intensity scenario up to about 3,800 dwelling units with a population of 8,782 with about 409,800 square feet of retail, service, restaurant, and two hotels serving both local residents and as a destination for golf and other amenity-oriented tourism.

The projected 560 single-family and 1,860 middle housing/townhomes at an ERU of 1 would be projected to result in 2,420 ERU. The 1,360 projected multifamily at a protected ERU of 0.70 would be

projected to result in 952 ERU. The 175,000 square feet of retail use and 40,000 square feet of service uses at an ERU of around 0.185/1,000 square feet would be expected to produce around 40 ERU. The 61,500 square feet of restaurant use at 1.788 ERU/1,000 square feet would produce about 109 ERU. The 20,000 square feet of projected light industrial use at about 0.168 ERU/1,000 square feet would produce about 4 ERU. Hotels with a total of 200 rooms at 0.473 ERU/1,000 square feet would produce about 45 ERU. The 500-student school at about 0.042 ERU per student would produce about 22 ERU. Other non-residential uses totaling about 73,000 square feet are projected to have an ERU of around 0.185/1,000 square feet and would be expected to produce around 14 ERU.

The total water demand of the development of the proposed Subarea Plan and Zoning amendments with the projected resulting uses as above would result in a range of 3,406-3,964 ERU. The city's adopted Water System Plan projects growth from the current 7,238 ERU to 10,770 ERU, which represents an increase of 3,532 ERU. In comparing the Available water vs. Water Needs, the total need for ERUs under the Moderate and High Alternatives results in a water availability deficit of 169 ERUs for the Moderate Alternative and 727 ERUs for the High Alternative.

A more detailed analysis generally confirms that conclusion as indicated in the tables and analysis below:

Table 3.10.1-1 DuPont Summary of Water System Capacity Limits

Limiting Factor	System Capacity Limit, ERUs	Additional Available ERUs
Storage Capacity with 5-Ft Operating Interval	8,812	2,640
Treatment Capacity	11,187	5,015
Storage Capacity with 1-Ft Operating Interval	11,378	5,206
Source Capacity	12,139	5,967
Instantaneous Water Rights	12,829	6,657
Annual Water Rights	12,985	6,813

The City's well production records and equivalent water usage in ERUs for the years 2018 to 2023 are included in Table 3.9.1-2.

Table 3. 10.1-2 DuPont Water Usage and Availability

Year	Water Usage (MG)	Water Usage (mgd)	Equivalent Usage (ERUs)[1]	Available (ERUs)
2018	536.1	1.469	6,358	2,454
2019	516.6	1.415	6,127	2,685
2020	442.8	1.213	5,252	3,560
2021	492.4	1.349	5,840	2,972
2022	445.3	1.220	5,281	3,531
2023	470.0	1.288	5,575	3,237

(1) Equivalent Residential Unit (ERU) is 231 gallons per day (gpd)

As shown in Table 1, the 2023 water usage is equivalent to 5,575 ERUs. Using the limiting factor analyses from Table 3-24 of the Water System Plan gives the following availability of water shown in Table 3.9.1-3.

Table 3.10.1-3 DuPont Current Water Availability

Water Needs	System Capacity Limit (ERUs)	2023 Water Usage (ERUs)	Available Water (ERUs)
Storage Capacity w/ 5-Ft Operating Interval	8,812	5,575	3,237
Treatment Capacity	11,187	5,575	5,612
Storage Capacity w/ 1-Ft Operating Interval	11,378	5,575	5,803
Source Capacity	12,139	5,575	6,564
Instantaneous Water Rights	12,829	5,575	7,254
Annual Water Rights	12,985	5,575	7,410

As shown in Table 3.9.1-3, the limiting factor in the City's available water is Storage Capacity with a 5-foot operating interval.

The development proposal for the Old Fort Lake Subarea Plan currently includes the following three development scenarios:

Scenario 1: Development under the Existing Subarea Plan and zoning with primarily non-residential uses.

Scenario 2: Development under proposed Subarea Plan and zoning amendments for primarily residential uses with a moderate intensity projection of development below the maximum allowed by zoning, which might be implemented because of market conditions.

Scenario 3: Development under proposed Subarea Plan and zoning amendments for primarily residential uses with a high intensity projection of development near the maximum allowed by zoning, which might be implemented because of market conditions.

The projected water needs of each of the three development scenarios are included in Table 3.10.1-4.

Table 3.10.1-4 DuPont Projected Water Needs

Water Needs	Scenario 1: Existing Subarea Plan and Zoning	Amendments to Subarea Plan and Zoning	
		Scenario 2: Moderate Development Alternative	Scenario 3: High Development Alternative
Residential (ERUs)	850	2,695	3,253
Residential Daily (MGD)	0.196	0.623	0.751
Residential Annual (MG)	71.7	227.2	274.2
Non-Residential (ERUs)	1,020	711	711
Non-Residential Daily (MGD)	0.236	0.164	0.164
Non-Residential Annual (MG)	86.0	60.0	60.0
Total (ERUs)	1,870	3,406	3,964

Total (MGD)	0.432	0.787	0.916
Total (MG)	157.6	287.2	334.2

A comparison of the available water and the development scenario water needs for the City's limiting storage capacity is shown in Table 3.10.1-5:

Table 3.10.1-5 DuPont Current Water Availability versus Water Needs

Water Item	Scenario 1: Existing Subarea Plan and Zoning	Amendments to Subarea Plan and Zoning	
		Scenario 2: Moderate Alternative	Scenario 3: High Alternative
Available Water ^[1]	3,237	3,237	3,237
Total Water Need ^[2]	1,870	3,406	3,964
Surplus / (Deficit)	1,367	(169)	(727)

- (1) Minimum number from Table 3.9.1-1 (Storage Capacity with 5-foot Operating Interval).
(2) Total Water Need from Table 3.9.1-3.

Table 3.10.1-6 indicates a deficit of water for the Moderate Alternative and High Alternative development scenarios. In order to provide adequate storage capacity for the Moderate and High alternatives, the city could address this by reducing the maximum operation interval of its water storage reservoirs to 3 vertical feet as discussed below under Mitigation. Table 3.9.1-5 includes that same comparison of available water and water needs with this operational change.

Table 3.10.1-5a Additional Storage Requirement

Water Item	Scenario 1: No Action	Scenario 2: Moderate Alternative	Scenario 3: High Alternative
ERUs Surplus/(Deficit) ^[1]	1,205	(169)	(727)
Additional Storage Required (Gallons) ^[2]	0	33,800	145,400

- (1) From Table 4.
(2) Standby Storage Requirement of 200 gallons per ERU.

Table 3.10.1-6 DuPont Current Water Availability versus Water Needs Revised for 3-foot Operating Interval

Water Item	Scenario 1: No Action	Scenario 2: Moderate Alternative	Scenario 3: High Alternative
Available Water ^[1]	4,520	4,520	4,520
Total Water Need ^[2]	1,870	3,406	3,964
Surplus / (Deficit)	2,650	1,114	556

- (3) Storage Capacity with 3-foot Operating Interval.
(4) Total Water Need from Table 3.

Based on the analysis above, The city water system appears to have the capacity to support the demand of the proposed Subarea Plan and zoning amendments with mitigation to provide adequate storage capacity for water availability. In order to provide adequate storage capacity for the Moderate and High alternatives, the city could address this by requiring additional storage with a new reservoir and booster pump station. Another option is to reduce the maximum operation interval of its water storage reservoirs to from a five foot operating interval to three vertical feet. Both options are discussed below under Mitigation and in Tables 3.9.1-5 and 3.9.1-5a.

3.10.1.4 Mitigation

As discussed under Impacts above, under existing operating conditions the city has a deficit of water for the proposed amendments to the Subarea Plan and zoning. The city can provide more effective (or available) storage capacity by providing additional storage of 33,800 gallons for the Moderate Alternative and 145,400 gallons for the High Alternative with a new reservoir and booster pump station or reducing the maximum operation interval of its water storage reservoirs from a five (5) foot operating interval to three (3) vertical feet.

Water storage tanks are crucial components of water distribution networks and are primarily designed and operated to meet demand variations and pressure needs. Operational storage is the volume of the reservoir(s) devoted to supplying the water system while, under normal operating conditions, when the source(s) of supply are in “off” status. This volume will vary according to the configuration of the tank designed and the water elevation when the tank is full and when the water level drops to a pre-determined level to pump additional water into the tank(s). This is a design choice that involves many factors, one of which is to provide the volume required to prevent excessive cycling (starting and stopping) of the pump motor(s). Operational storage is an additive quantity to the other components of storage. It also provides an additional factor of safety in those cases when the reservoir is full. A design, however, that increases operational storage to reduce pump cycling is conservative and may lead to inefficient use of the storage capacity.

The city can provide more effective (or available) storage capacity by reducing the maximum operation interval of its water storage reservoirs to three vertical feet as illustrated in Table 3.10.1-7 which includes that same comparison of available water and water needs with this operational change.

Table 3.10.1-7 DuPont Current Water Availability versus Water Needs Revised for 3-foot Operating Interval

Water Item	Scenario 1: No Action	Scenario 2: Moderate Alternative	Scenario 3: High Alternative
Available Water ^[1]	4,520	4,520	4,520
Total Water Need ^[2]	1,870	3,406	3,964
Surplus / (Deficit)	2,650	1,114	556

The Old Fort Lake Subarea is projected to build-out over a 15 to 20 year period. The city will have the opportunity during that timeframe to review facilities and operations to determine the best mix of facility and operational strategies to address additional demand. There are a wide range of options in addition to that outlined above, for example the city might decide to add additional storage to serve the

higher Hoffman Hill pressure zone, to reduce the reliance on booster pumps to serve that area, which also would make additional storage capacity available for future development.

3.10.2 Stormwater

3.10.2.1 Affected Environment

The City of DuPont maintains a stormwater system consisting of a combination of ditches and hard piped conveyance systems, biofiltration swales, and infiltration ponds and trenches. Stormwater is infiltrated or discharged directly to natural water bodies. A large part of the city is underlain by Spanaway soils, which are excessively drained and allow infiltration to be used as a primary means of stormwater management. The area within the Historic Village relies on surface infiltration for stormwater management. Surface flow, which does not infiltrate, flows overland to Bell Marsh. Stormwater from the portions of the city developed as Northwest Landing has a piped system that discharges to various stormwater ponds which may serve as storage and infiltration. Most of the piped system provides for discharge to surface waters, if pond capacity is exceeded. The detention pond immediately south of the Subarea has a pipeline for overflow that discharges to Old Fort Lake, from which it must discharge to groundwater.

The city has adopted a Stormwater Management Program (SWMP) in 2024 which is designed to satisfy the Western Washington Phase II Municipal Stormwater Permit (Permit) requirements. The purpose of the SWMP is to reduce the discharge of pollutants from the municipal stormwater system to the maximum extent practicable and to protect water quality. The program includes procedures for reporting and correcting or removing illicit connections, spills and other illicit discharges, and public information and regulations. The city has adopted the Washington Department of Ecology 2019 Stormwater Management Manual as its regulatory mechanism.

3.10.2.2 Impacts

All new development and redevelopment within the City of DuPont must provide stormwater quality and/or quantity control as required by the Department of Ecology 2019 Stormwater Management Manual. Each applicant must prepare a Stormwater Site Plan. The plan must address construction stormwater pollution prevention through appropriate Best Management Practices (BMP). It must address control prevention which depends on the use. For most residential uses it involves pollutants generated by parking areas as well as fertilizers and pesticides used on the landscaping areas. Preservation of natural drainage systems and outfalls is a requirement that does not apply to the Subarea because there are not surface water drainage systems, due to the permeability of soils and underlying gravels. On-site stormwater management can follow a number of options.

Projects in the subarea can achieve the Low Impact Development Performance Standards by use of full infiltration of runoff from all impervious areas on-site which is a preferred method of stormwater management. Runoff treatment standards require each project site to comply to Basic Treatment standards requiring runoff from pollutant generating surfaces such as parking lots to be routed to a basic water quality facility. Water quality facilities include a variety of options such as biofiltration swales, filter strips, wetponds, wet vaults, treatment wetlands, sand filters and other facilities. Each project will be required to provide a detailed plan prepared by a qualified engineer which will be reviewed and approved by city staff.

Maintenance of facilities may be provided by the city and financed through stormwater fees, which is the case for most single-family areas on public streets. Commercial and multifamily developments are

often responsible for maintenance of their facilities, subject to city oversight and inspection. This is determined by the city at the time of approval of stormwater plans.

3.10.3 Sewer

3.10.3.1 Affected Environment

The City of DuPont does not own or maintain any sanitary sewer system components. Sanitary sewer services are provided by the Pierce County Sewer Utility (Utility). The city has interlocal agreements for the provision of sewer service with the Utility. The main sewer system in DuPont is the gravity line which follows McNeil Street from the westerly boundary of the city, then Bobs Hollow Lane, Center Drive, Powerline Road and ends at a pump station on Wharf Road that discharges to the ULID 90-4 Interceptor, which consists of 25,687 lineal feet of twin 22-inch pressure sewer pipelines to the Lakewood West Sub-basin to the north. Sewage is treated at the Chambers Creek Sewage Treatment Plant. The 2010 Pierce County Unified Sewer Plan includes the DuPont-Lakewood Bypass Interceptor scheduled for completion by 2035. It would be a 42-inch gravity pipeline extending 4,800 feet providing a more direct route to the sewage treatment plant. (Pierce 2010)

3.10.3.2 Impacts

Sewer service to the Subarea would be provided by new facilities provided by the developer(s). The Pierce County 2010 Unified Sewer Plan envisions a gravity system discharging to a pump station near the center of the Subarea, then discharging to the gravity sewer in Center Drive. (Pierce 2010). The existing ULID 90-4 Interceptor has adequate capacity for near-term to middle-term demand. The utility will monitor trends and ensure that new capacity comes on line prior to the existing system exceeding capacity. The future DuPont-Lakewood Bypass will be funded by utility charges and connection charges (Bedi 2024).

3.10.4 Energy

3.10.4.1 Affected Environment

Electrical utilities in DuPont are provided by Puget Sound Energy (PSE), a private utility providing electric and natural gas service to customers in the Puget Sound region. PSE provides electrical power to more than 1.2 million electric customers throughout 8 counties. Electricity provided by PSE to the City of DuPont is produced elsewhere and is interconnected to the Northwest's regional transmission grid through an extensive network of transmission facilities. Electric service to customers in DuPont is provided by the DuPont Substation on Wharf Road. The substation is served by a 115kv transmission line from the St. Clair Substation near Lacey and a 115kv transmission line from the Gravelly Lake Substation in Lakewood to the north. Together the transmission lines provide a n-1 level of reliability, which means if one transmission line source is not available the other source is sufficient to serve current demand. The DuPont Substation has transformers that steps the voltage down from the 115kv transmission lines to 28kv for distribution line service to customers in DuPont. There are two transmission lines that occupy a corridor that passes through DuPont from Jensen and McArthur to Wharf Road and DuPont Steilacoom Road. One line is owned by PSE and serves DuPont and other PSE customers. The other is owned by Tacoma Public Utilities and does not serve customers in DuPont.

3.10.4.2 Impacts

The PSE electric transmission facilities and substation serving the City of DuPont have capacity to serve additional demand from development of primarily residential use in the Subarea for the next 15 to 20

years. The utility will monitor system demand and capacity and plan for future system improvements to serve additional demand in DuPont and throughout the system. PSE updates and files an Integrated Resource Plan (IRP) with the Washington Utilities and Transportation Commission (WUTC) every two years. The IRP presents a long-term forecast of the lowest reasonable cost combination of resources necessary to meet the needs of PSE's customers to provide dependable and cost effective service. As the plan is updated every 2-years, there will be numerous opportunities to update the plan for new facilities prior to the existing system exceeding capacity.

If any components of the existing system need to be upgraded in the future to provide additional capacity, the most likely strategies include updating transmission line capacity through higher capacity conductors which may be accommodated on existing poles, or might need higher poles to serve the larger capacity conductors. Electrical capacity strategies are based on the entire system needs which includes service areas outside of DuPont and may lead to improvements to meet needs beyond the needs of customers in DuPont. It is likely that any increase in distribution capacity in DuPont can be met by expanding the existing substation, which has unused area within the existing property that can be used for additional facilities. Additional distribution lines may be needed, which would involve trenching and conduits for new underground lines to access the Subarea.

3.10.4.3 Mitigation

No mitigation measures have been identified. It is anticipated that normal systems planning and systems upgrades will provide adequate energy resources as the project builds-out. No specific measures besides expansion of the substation within the existing property or additional distribution lines have been identified.

3.10.5 Significant Unavoidable Adverse Impacts for All Utilities

Compared to pre-development conditions, the implementation of either alternative will introduce a variety of land uses that will add population, employees, and a variety of economic activities which will require a change in the scale and character of utilities provided by the city or other entities.

3.11 ECONOMY, SOCIAL FACTORS, AND SOCIAL POLICY

The DuPont Municipal Code provides in subsection 23.01.110 Additional elements to be covered in an EIS (Pursuant to WAC 173-806-125). The following additional elements are part of the environment for the purpose of EIS content, but do not add to the criteria for threshold determinations or perform any other function or purpose under this chapter: (a) Economy, (b) Cultural factors, (c) Social policy analysis.

Economy

For the purposes of this analysis: Economy will be assessed in terms of the economic base of the city, as the effects on public services is assessed separately in this EIS.

Cultural factors

These include social behavior, institutions, and norms found in human societies, as well as the knowledge, beliefs, arts, laws, customs, capabilities, and habits of the individuals in these groups. This analysis does not include Historic and cultural preservation as provided for in WAC 197-11-144(2)(b)(iv), which is assessed separately.

The Subarea Plan includes the following policies for Future Historic and Cultural Resources Goals and Policies

Goal CR-1: Protect cultural resources by implementing regulations that ensure cultural resources will not be destroyed, damaged, or disregarded during the development process.

- CR 1.1: Work with federal and state agencies and the tribe to utilize historic preservation planning.
- CR 1.2: Work with the Home Course to provide access to the Old Fort site.
- CR 1.3: Develop an active preservation program that emphasizes community outreach and involvement including other local governments and agencies.
- CR 1.4: Seek ways to capitalize on DuPont’s unique cultural and historic resources to enhance tourism and local education opportunities.
- C.R 1.5: Partner with the Nisqually Tribe to identify cultural sites that have tribal heritage and possess native artifacts.
- C.R 1.6: Apply the City’s cultural resources policies and regulations to all future development within the Subarea.

For the purposes of this analysis, cultural factors address the following Comprehensive Plan “guiding concepts for Cultural Resources”:

- Neighborhoods are not isolated and have a distinct focal point and short walking connections to other neighborhoods, services, public features, and jobs.
- There is a broad range of housing opportunities mixed into neighborhoods.
- Residential and commercial buildings are designed to a variety of styles from the 1900- 1940's.
- There is a single, diverse, lively, commercial area, which includes a major public space, retail, office, and residential use.
- There is a civic center containing government, recreational and cultural services.
- Environmentally sensitive areas are preserved.
- Heritage of the early settlements (American Indian, Hudson Bay, and DuPont Company) is featured with development, not obscured.

Social Policy Analysis

In the broadest terms is the study of courses of action with goals of preventing and addressing social problems. DuPont’s Comprehensive Plan vision statement includes “protection of the natural, social, and economic environments”. The plan also provides for encouraging a mix of generations within the social fabric of the City. Generally, social issues distinguish the personal lives of individuals and affect the well-being of identifiable groups (Kulic 2024). For the purpose of this analysis, this will be considered equivalent to “Environmental Justice” analysis as provided for in RCW 70A.02.010(8) and (9) as addressing disproportionate impacts on vulnerable populations and overburdened communities, the equitable distribution of resources and benefits, and eliminating harm.

3.11.1 Affected Environment

Economy

The economy in the City of DuPont reflects its current predominantly residential character. Most residents of DuPont must work outside of the city given limitations in employment within the city. The largest employers in DuPont are warehouse uses, including Amazon, that are estimated to employ between 1,00 and 2,500 with higher seasonal employment in peak periods. The average annual salary of warehouse workers is \$26,000 to \$45,000 (Talent 2024) which is well below the average household income in DuPont of \$107,000. (Census 2024) and indicates that most of those employees come from the greater regional workforce rather than DuPont. The DuPont workforce is about 18% warehousing and related uses, compared to 7.2% in Pierce County. Retail trade is 4.2% of the workforce compared to

about 12% countywide. Healthcare employment is about 6% in DuPont and 18.6% countywide. The largest components of employment in DuPont are Finance and Insurance at 17.6% compared to 2.5% countywide and Real Estate at almost 16% compared to 2% countywide. Employment in DuPont, except for warehousing, is largely oriented to providing services to the local residents rather than being a regional destination employer. (WFC 2024)

DuPont is close to the largest employer in Pierce County: Joint Base Lewis-McChord with 54,000 full-time employees. A substantial number of DuPont residents are believed to be both active-duty personnel and civilian employees. The 2020 census category of “Mean travel time to work” of 25.3 minutes indicates that DuPont Residents work location is fairly evenly distributed throughout Pierce County and the region. Tacoma, Puyallup, Olympia and Yelm are all within this average travel time, which indicates that close to half of the residents commute further than this. Other large employers in the county at which DuPont residents may be employed include MultiCare Health System (8,264) largely in Tacoma, the state of Washington (7,859) at various sites, CHI Franciscan Health (5,682) in Tacoma and vicinity, the city of Tacoma and Tacoma Public Utilities (3,623), Pierce County government (3,304) in Tacoma and multiple other locations, Puyallup Safeway and Albertson’s (2,153) in multiple locations, Emerald Queen Casino (2,146) in Tacoma and Fife, Fred Meyer retail and distribution center (1,802) in Puyallup, Amazon distribution centers (1,800), Costco (1,318), State Farm (1,219), Boeing (1,550), Puyallup Tribe (1,274) in Tacoma and vicinity, and the United States Postal Service (1,336) at multiple locations. (WSESD 2024)

The current Comprehensive Plan provides for a major employment center in the Old Fort Lake Subarea. The Comprehensive Plan notes that the city faces intense competition from other communities investing in education, job training, infrastructure, planning, and policies to attract economic growth and development. In the approximately 17 years since it has been available for development there has been limited interest and the value of the land has declined by 85%, according to county sales information. An economic assessment of a recent development proposal concluded that there was little or no demand for additional light manufacturing uses in Pierce County and a very limited demand for new office and research park space (BST 2023).

Since the city was expanded substantially, as a result of the Weyerhaeuser Northern Landing development, several large employers initially established a presence there and later moved. Intel established a facility originally planned to employ up to 3,000 workers, which eventually employed about 700. It was closed as part of a general consolidation of facilities. The owner of the site could not find tenants for the office and research-oriented building and replaced it with warehouses (Coursey 2013).

State Farm Insurance established a 350,000 square foot regional headquarters in DuPont in 1995. In 2020 the company announced the closing of the facility. In 1922 a proposal was advanced to change the zoning from Office to Mixed Use to provide a wider range of uses (DuPont 2022).

Cultural Factors

The Comprehensive Plan includes the following guiding concepts for cultural factors:

- Neighborhoods are not isolated and have a distinct focal point and short walking connections to other neighborhoods, services, public features, and jobs.
- There is a broad range of housing opportunities mixed into neighborhoods.
- Residential and commercial buildings are designed to a variety of styles from the 1900- 1940's.
- There is a single, diverse, lively, commercial area, which includes a major public space, retail, office, and residential use.
- There is a civic center containing government, recreational and cultural services.

- Environmentally sensitive areas are preserved.
- Heritage of the early settlements (American Indian, Hudson Bay, and DuPont Company) is featured with development, not obscured.

Overall, the current designation of the Subarea as an employment center affects Comprehensive Plan guiding concepts depends more on the layout and design of future development than the range of allowed uses.

Social Policy

Social policy from the perspective of protecting vulnerable populations and overburdened communities as well as the equitable distribution of resources and benefits, and eliminating harm requires, generally known as an “environmental justice” review an understanding of the social groups within the City.

3.11.2 Impacts - Existing Subarea Plan and Zoning

Under the existing Subarea Plan and zoning the Old Fort Lake area is designated as a mixed-use village with a range of office, research, light manufacturing, commercial, and housing uses. It is projected that under existing zoning about 56 acres of the site would be devoted to 100 single-family units and 1,000 multifamily units resulting in a residential population of about 2,300 primarily in multifamily dwellings with about 1.6 million square feet of office and research and development use (or about 800,000 square feet of office and 800,000 square feet of light manufacturing if the vested Founders Ridge proposal was built), about 70,000 square feet each of retail and service uses, a moderate size hotel, and several restaurants.

Economy

The existing Old Fort Lake Subarea Plan is intended to “Leverage the opportunity created by the City’s largest area of undeveloped commercial/light manufacturing land to create well-paying employment opportunities.”

The easterly portions of the Subarea are designated as the Business/Industry Focus Area, recognizing its transportation access and buffering potential from surrounding neighborhoods. This area is planned to support a variety of employment uses in a business park setting. Commercial uses in this area are generally planned to provide district-oriented services and to create district node and to act as a transition to the adjacent neighborhood.

This portion of the Subarea currently has a vested application for four large light manufacturing buildings and associated parking totaling 723,000 square feet. It does not provide a business park setting, but rather isolated buildings. No commercial use is proposed, but commercial uses could be located in the buildings. No node of commercial uses is proposed. This proposal has not received formal review.

The portion of the Subarea west of the existing golf course is envisioned as a Mixed-Use Focus Area to provide uses complementary to the golf course, the bluff, and adjacent neighborhoods. It is planned to support a variety of commercial, business, residential, and community uses and develop with a community character and building design style that are sensitive to views around the golf course and the bluff. The desire is for a portion of the Mixed-Use Focus Area to develop as a walkable neighborhood center with a cluster of retail stores, dining, employment, service, and multifamily uses. Other portions of the area may develop as independent employment campuses and modestly sized residential neighborhoods. With 1,100 residential uses allowed, it is improbable that a neighborhood commercial center could be supported without attracting substantial customers from the balance of the city. The

residential/commercial areas might encompass 60 to 70 acres of the 135 acres of this portion of the Subarea leaving approximately the same area for employment centers.

The residential component of the existing plan likely would have strong market support given amenities such as views of Puget Sound and proximity to the golf course. However, since it is in the extreme westerly portion of the Subarea financing infrastructure such as the loop road system and utilities likely would require prior or simultaneous development of the employment center, which has less market support.

Overall, the city has had limited success in attracting employment except for warehouse units as discussed in Affected Environment, above. It would appear that the City of DuPont and the Subarea has a number of characteristics that appear to favor the city as an employment center. However, over the last several decades office and research and development uses have not become established as envisioned. It appears doubtful after several decades of unsuccessful establishment of those uses that the city can effectively compete with existing employment centers for those uses. The existing plan and zoning provide the theoretical opportunity for a more balanced employment and residential structure for the city; however market forces do not appear to favor the employment component, and therefore the existing plans and codes, to not accomplish that goal.

Cultural Factors

The Old Fort Lake Subarea is intended to “Protect and integrate existing open space, critical areas, cultural resources, and views. Plan for future amenities that enhance the neighborhood and stay true to DuPont’s community character and quality of life. Focus on creating dynamic streetscapes, landscaping, trails, gathering places, and living/commercial environments.”

The city has a historic museum. Policy LU 2.8 seeks to “Promote the development of a convention center, cultural/community center, or other public facilities that are desired additions to the commercial and business uses in Old Fort Lake.” The existing Old Fort Lake Subarea Plan envisions the area as a major employment center emphasizing office and research and development uses with a small component of 100 single-family and 1,000 multifamily units and a component of allowed retail uses related to a number of the Comprehensive Plan guiding concepts, including:

- Neighborhoods are not isolated and have a distinct focal point and short walking connections to other neighborhoods, services, public features, and jobs.

The OFL Subarea is connected to the balance of the city through one major new road connection to Center Drive and two smaller connections to neighborhood streets to the south. The plan includes an extensive trail network that connects areas within the Subarea and connects to neighborhoods to the south. The existing plan does not include a specific requirement for a focal point. The golf course in the center of the Subarea effectively splits the Subarea into two parts. It is doubtful that a focal point would be developed in the easterly portion of the site devoted primarily to employment. It is possible that the wider range of uses in the westerly portion of the Subarea and the wider range of retail uses allowed could result in a commercial area as a focal point.

- There is a broad range of housing opportunities mixed into neighborhoods.

Except for a small residential component in the westerly portion, the Subarea, cannot be considered a residential mixed-use neighborhood, and therefore this guiding concept does not apply. The allowed 100 single-family and 1,000 multifamily residences does provide a range of housing opportunities given the wide range of densities and styles of housing allowed in the multifamily zoning

- Residential and commercial buildings are designed to a variety of styles from the 1900- 1940's.

The zoning in the Subarea provides for the city-wide design standards for commercial and multifamily development. There are no design standards for light industrial uses beyond bulk standards such as height and setbacks.

- There is a single, diverse, lively, commercial area, which includes a major public space, retail, office, and residential use.

The City Comprehensive Plan describes DuPont Station at the intersection of Center Drive and Wilmington Drive as the center of the city with a large mixed-use area intended for a variety of commercial/retail uses with high density/multifamily residential land uses integrated with public spaces. The Old Fort Lake Subarea retail and office use would be clearly secondary to this center.

- There is a civic center containing government, recreational and cultural services.

The city has established such an area on Civic Drive which presently includes government services and is anticipated to serve recreation and cultural services in the future.

- Environmentally sensitive areas are preserved.

The city has Critical Area code provisions that regulate development of sensitive areas.

- Heritage of the early settlements (American Indian, Hudson Bay, and DuPont Company) are featured within development, not obscured.

The Subarea includes known cultural sites which include the 1833 Hudson Bay Company Fort Nisqually and the Wilkes Observatory Historical Site. These sites do not have their original structures and only archeologic artifacts remain. Most of the manufacturing facilities of the DuPont Company have been demolished, except for a few foundations that provide a point of visual interest within the golf course. The crystallizer site in the northerly portion of the Subarea is relic with left behind building foundation and part of the wall structure. The Subarea Plan envisions opportunities for these sites to become signature cultural destinations through permanent structures and informational signage to educate visitors and celebrate the historical significance. This could be integrated with any development within the Subarea.

Overall, how the current designation of the Subarea as an employment center affects Comprehensive Plan guiding concepts depends more on the layout and design of future development that provides connections to these sites. Such policies are little affected by the range of allowed uses.

Social Policy

Social policy from the perspective of protecting vulnerable populations and overburdened communities as well as the equitable distribution of resources and benefits, and eliminating harm requires, generally known as an “environmental justice” review and understanding of the social groups within the city.

Table 3.23-1 depicts the US Census record of that the self-identified ethnicity of residents of DuPont and how it compares with the Seattle, Tacoma Metropolitan Area and Washington State. The differences are not substantial. The Black Population shows the largest difference being 30 percent higher than the metropolitan area and twice the proportion statewide.

Table 3.11.2-1 Race and Ethnicity Comparison

Race & Ethnicity	DuPont		Seattle, Tacoma Metro Percent	Washington State Percent
	Percent	Population		

White	60.7%	6,038	59.7%	65.5%
Black	7.6% [†]	752	5.9%	3.8%
Native	0.6% [†]	64	0.6%	0.9%
Asian	11.2% [†]	1,116	14.9%	9.1%
Islander	0.7% [†]	70	0.9%	0.7%
Other	0.7% [†]	65	0.5%	0.5%
Two+	6.5% [†]	643	6.9%	6.1%
Hispanic	12.1% [†]	1,207	10.8%	13.5%

This table indicates that about 40 percent of the population of DuPont are part of minority groups, but does not establish whether these groups are economically disadvantaged. The average household income of some of these groups are available from the census and are presented in Table 3.23-2. The differences in income between the average citywide income is less pronounced in DuPont for all groups except Asian. There is no data available that provides an explanation for that pattern.

Table 3.11.2-2 Household Median Income by Race and Ethnicity Comparison

Population Characteristic	City of DuPont		Pierce County		Washington State	
	Median Household Income	Percent of All	Median Household Income	Percent of All	Median Household Income	Percent of All
All	\$106,695		\$91,486		\$84,247	
White	\$108,778	102.0%	\$98,076	107.2%	\$91,916	109.1%
Black or African American	\$97,224	91.1%	\$67,088	73.3%	\$68,202	81.0%
American Indian and Alaska Native			\$99,699	109.0%	\$71,255	84.6%
Asian	\$88,881	83.3%	\$89,031	97.3%	\$125,692	149.2%
Native Hawaiian and Other Pacific Islander			\$87,435	95.6%	\$81,623	96.9%
Some Other Race			\$65,861	72.0%	\$69,545	82.5%
Two or More Races	\$121,800	114.2%	\$94,942	103.8%	\$84,303	100.1%

The percentage of residents in DuPont living in poverty in 2022 were 4.2% overall (3.1% for White Non-Hispanic residents, 2.1% for Black residents, 2.0% for Hispanic or Latino residents, 10.5% for other race residents, and 4.7% for two or more races residents). In Pierce County, the poverty rate was 8.0% and it was 10% for the state of Washington as a whole. The National Poverty Rate was 11.6%.

The lands in the City of DuPont are part of the traditional homeland of the people of the Nisqually Tribe. At the time of the establishment of the Hudson Bay Company, Native Americans used the Puget Sound shoreline for fishing and gathering of aquatic resources. Sequalitchew Creek was used for fishing and portions of the upland were used for hunting and gathering, particularly maintained camas fields, and other resources. Native Americans were subject to government sponsored cultural destructions through residential schools and other measures that intended to obliterate tribal language and practices. The Nisqually people have a strong relationship with traditional lands and the spiritual and recognize deep spiritual connections to the interconnections between the people and nature and respect and honor all living things. The development of the City of DuPont has disturbed many cultural features, including burial sites. The Nisqually Tribe currently owns the midden site in the southwest corner of the Subarea, the cemetery between the golf course Fairway 1 and the designated loop road, and a 46-acre parcel between Sequalitchew Creek and Fairways 4 through 7 of the golf course. Addressing the tribes social and cultural concerns is not directly affected by the mix of uses allowed by the existing plan which allows Cultural/community centers, which are one of the uses the tribe has expressed interest in, as well as a variety of other uses. The City's land use code in DMC 25.80.040 provides for review of development for cultural, historic and archaeological resources and provides for coordination with the State Historical Preservation Office and the Nisqually Indian Tribe to assure that such resources are protected, preserved or collected.

3.11.3 Impacts - Proposed Subarea Plan and Zoning Amendments

Under the proposed Subarea Plan and zoning amendments, the Old Fort Lake Subarea is designated a primarily residential area with supporting retail and service uses, and regional oriented entertainment uses. Under the proposed Subarea Plan and zoning amendments the Old Fort Lake Subarea is projected to accommodate, under a higher intensity scenario, up to about 3,800 dwelling units with a population of 8,782 with about 409,800 square feet of retail, service, restaurant, and two hotels serving both local residents and as a destination for golf and other amenity-oriented tourism.

Economy

The proposed land use map designates specific areas for different intensities of residential uses and designates three retail areas and two areas for entertainment and related uses. The three retail areas are near the center of the easterly portion of the site, in the southerly portion of the site near the golf course, and in the westerly portion of the site. The easterly retail area includes both general commercial and neighborhood commercial designations and an area for entertainment uses that may include a hotel, restaurants and other uses oriented to both a local and regional customer base. The southerly retail area is oriented to recreational use of the golf course and anticipates a focus on health-related uses, as well as restaurants and similar uses. There is a small retail area in the westerly portion of the site that allows a variety of uses oriented to local and regional customers and is projected to be oriented to views and other amenities of the site which overlooks Puget Sound. Across the loop road from this area is a larger entertainment area that may include a hotel, restaurants and other uses oriented to both a local and regional customer base and is projected to also be oriented to users of the golf course.

The Subarea Plan and zoning amendments that would make the area primarily a residential area would provide limited opportunities for employment and relatively few opportunities for “well-paying employment opportunities,” which is an objective of the existing Subarea Plan.

The existing Subarea Plan and zoning provide the theoretical opportunity for a more balanced employment and residential structure for the city; however, market forces do not appear to favor the employment component. It appears doubtful after several decades of unsuccessful establishment of those uses that the city can effectively compete with existing employment centers for those uses. The majority of employment centers developed in the city have been relatively low-paying warehousing and distribution uses as discussed in Affected Environment, above.

The proposed Subarea Plan represents a recognition that the city can most effectively play the role of the residential center within the regional economy rather than an employment center. The plan also recognizes the Home Course golf course as an amenity that can provide opportunities for service-related economic activities. The course, which opened in 2007, has been the site of numerous championships, including the US Men’s Amateur Championship, US Women’s Amateur Championship, and the qualifier for local players in the 2015 U.S. Open at Chambers Bay. The Home Course attracts a significant number of golfers on a daily basis and also attracts observers to major events. The customer base provided by the course provides visibility to the community and the opportunity for economic development related both to the course and to persons who become familiar with the area through the course and may return to enjoy other amenities.

Cultural Factors

The Old Fort Lake Subarea is intended to “Protect and integrate existing open space, critical areas, cultural resources, and views. Plan for future amenities that enhance the neighborhood and stay true to DuPont’s community character and quality of life.” Additionally, Policy LU 2.8 seeks to “Promote the development of a convention center, cultural/community center, or other public facilities that are desired additions to the commercial and business uses in Old Fort Lake.”

The proposed Subarea Plan and zoning amendments relate to a number of the Comprehensive Plan guiding concepts, including:

- Neighborhoods are not isolated and have a distinct focal point and short walking connections to other neighborhoods, services, public features, and jobs.

The residential areas designated within the Subarea under the Subarea Plan and zoning amendments are connected to the balance of the city through one major new road connection to Center Drive and two smaller connections to neighborhood streets to the south. The plan includes an extensive trail network that connects areas within the Subarea and connects to neighborhoods to the south. The plan revision also provides retail and entertainment centers that will attract customers from the neighborhoods immediately to the south, and the city as a whole. The open space amenities of the Subarea can be expected to attract residents from other neighborhoods. The proposed plan amendments provide separate retail/service focal points for the easterly and westerly portions of the Subarea which are separated by the golf course in the center of the Subarea, which effectively splits the residential portions of the Subarea into two parts. The residential customer base provides a greater probability of adequate customer support for the proposed retail, service and entertainment uses, in addition to customers attracted from the region.

- There is a broad range of housing opportunities mixed into neighborhoods.

The residential areas designated within the Subarea under the plan and zoning amendments provide for single-family, middle housing (townhome development up to simplexes) and multifamily development which are likely to provide a wide range of densities and housing types oriented to different lifecycles, economic status and lifestyle preferences of residences. A large component is likely to be oriented to amenities such as Puget Sound views and the golf course, however much of the site does not have such amenities and are likely to attract residents of a variety of economic and other characteristics.

- Residential and commercial buildings are designed to a variety of styles from the 1900 to 1940's.

The zoning in the Subarea provides for shared design standards for single-family and middle housing and separate standards for multifamily and non-residential uses. The design standards are more contemporary in style.

- There is a single, diverse, lively, commercial area, which includes a major public space, retail, office, and residential use.

The city's Comprehensive Plan describes DuPont Station at the intersection of Center Drive and Wilmington Drive as the center of the city with a large mixed-use area intended for a variety of commercial/retail uses with high density/multifamily residential land uses integrated with public spaces. The Old Fort Lake Subarea retail and office use would be secondary to this center and would provide for a local market area for residents as well as for a regional customer base attracted to the specific amenities of the Subarea.

- There is a civic center containing government, recreational and cultural services.

The city has established such an area on Civic Drive which presently includes government services and is anticipated to serve recreation and cultural services in the future. This is not directly affected by the Subarea and zoning changes proposed for the Old Fort Lake Subarea.

- Environmentally sensitive areas are preserved.

The city has Critical Area code provisions that regulate development of sensitive areas and will protect steep slopes along Puget Sound, Sequim Creek and Old Fort Lake as well as related habitat and other resources.

- Heritage of the early settlements (American Indian, Hudson Bay, and DuPont Company) is featured with development, not obscured.

The Subarea includes known cultural sites which include the 1833 Hudson Bay Company Fort Nisqually and the Wilkes Observatory Historical Site. These sites do not have their original structures and only archeologic artifacts remain. Most of the manufacturing facilities of the DuPont Company have been demolished, except for a few foundations that provide a point of visual interest within the golf course. The crystallizer site in the northerly portion of the Subarea is a relic with left behind building foundation and part of the wall structure. The Subarea Plan envisions opportunities for these sites to become signature cultural destinations through permanent structures and informational signage to educate visitors and celebrate the historical significance. This could be integrated with any development within the Subarea.

Overall, the proposed designation of the Subarea as a primarily residential area affects Comprehensive Plan guiding concepts for cultural factors more based on the layout and design of future development. Such policies are little affected by the range of allowed uses.

Social Policy

Social policy from the perspective of protecting vulnerable populations and overburdened communities as well as the equitable distribution of resources and benefits, and eliminating harm requires, generally known as an “environmental justice” review an understanding of the social groups within the City.

Table 3.23-1 above depicts the US Census record of that the self-identified ethnicity of residents of DuPont and how it compares with the Seattle, Tacoma Metropolitan Area and Washington State. The differences are not substantial. The Black Population shows the largest difference being 30 percent higher than the metropolitan area and twice the proportion statewide.

About 40 percent of the population of DuPont are part of minority groups but it has not been established whether these groups are economically disadvantaged. The average household income of some of these groups are available from the census and are presented in Table 3.23-2, above. The differences in income between the average citywide income is less pronounced in DuPont for all groups except Asian. There is no data available that provides an explanation for that pattern.

As summarized above, the percentage of residents in DuPont living in poverty in 2022 were 4.2% overall (3.1% for White Non-Hispanic residents, 2.1% for Black residents, 2.0% for Hispanic or Latino residents, 10.5% for other race residents, and 4.7% for two or more races residents). In Pierce County, the poverty rate was 8.0% and it was 10% for the state of Washington as a whole. The National Poverty Rate was 11.6%.

The proposed amendments to the Subarea Plan and zoning are likely to lead to a more economically diverse residential population because of the wider range of housing densities and types provided. It will provide a five-fold increase of non-single-family dwellings from the estimated existing 612 units in the city to a projected 3,200 units of these higher intensity land uses. Compared to the 1,000 multifamily units provided for in the existing Subarea Plan and zoning, the proposed amendments provide a projected three-fold increase. The proposed Subarea Plan and zoning amendments and general city codes have no specific programs for affordable housing, such as set asides, but the wider variety of housing types allowed are likely to include opportunities for additional residents of lower income. There

are no specific provisions for affordable housing in the Subarea, but the provisions of DMC 25.85, Affordable Housing Incentives Program apply citywide.

The proposed amendments will not affect the cultural sites currently owned by the Nisqually Tribe: the midden site in the southwest corner of the Subarea, the cemetery between the golf course Fairway 1 and the designated loop road. The tribe owns a 46-acre parcel between Sequelitchew Creek and Fairways 4 through 7 of the golf course, which is not included in Subarea Plan amendments and is designated for future negotiation of uses between the Tribe and the City. The City's land use code in DMC 25.80.040 will continue to provide for review of development for cultural, historic and archaeological resources and provides for coordination with the State Historical Preservation Office and the Nisqually Indian Tribe to assure that such resources are protected, preserved, or collected.

3.11.4 Mitigation

Mitigation measures for economic, cultural and social factors depends on the extent to which the land use and housing patterns described above are considered adverse as opposed to policy tradeoffs. If land use and housing patterns meet the needs of the community and fulfill the objectives of the Comprehensive Plan, they may be considered simply as the effects of adopted or proposed policies and regulations, rather than as adverse.

Both the existing Subarea Plan and zoning and the proposed amendments to the Subarea Plan and zoning further these goals to various extents. The major difference is that the existing Subarea Plan and zoning emphasizes economic development, although the type of economic development envisioned appears to have little regional market support. Since the land use plans and the differences between them involve policy tradeoffs, the options of modifying them may be seen as issues of legislative policy rather than environmental impact, therefore it is not appropriate to characterize other options as measures that mitigate environmental impacts.

Set asides for affordable housing could benefit vulnerable or overburdened communities that experience lack of housing opportunities because of income constraints.

4. ELEMENTS OF THE NATURAL ENVIRONMENT

4.1 EARTH, SOILS, GEOLOGY AND GROUNDWATER

This section provides qualitative analyses of soils, geology, earthwork, geologic hazards, and erosion/sedimentation that provides a general perspective on the range of impacts associated with the different type of development proposed under the alternatives for the Subarea: the existing Subarea Plan and zoning which is primarily non-residential and the proposed Subarea Plan and zoning amendments that provide for a primarily residential land use with supporting retail and service uses. Specific future development will be responsible for geotechnical analysis to determine the presence of site-specific limitations and specific means of addressing them.

This section was prepared based on review of existing data and a peer evaluation of existing studies and a qualitative evaluation of likely impacts. The analysis was based on existing site information and soil, geologic, and geotechnical studies performed for existing and proposed development.

4.1.1 Affected Environment

From a regional geologic perspective, the project area is located in the Puget Sound lowlands, which is a north-south trending structure that is a topographic trough. Glacial deposits consist of recessional outwash and till that unconformably overlay bedrock. Outwash generally consists of sands and gravels deposited by melt-water streams as glaciers receded to the north from the Puget Sound region. Till is a very dense mixture of clay, silt, sand, and gravel deposited at the base of a glacier and compacted by the tremendous weight of the glacial ice. These glacial units are overlain by lacustrine (lake-deposited) geologic strata.

4.1.1.1 Topography and Soils

The Site is situated on a glacial outwash plain that slopes gently from an elevation of about 200 feet at Center Drive to the top of the bluff above the Burlington Northern Santa Fe Railroad and Puget Sound. There is little variation in the generally flat topography except for glacial kettles (depressions), a number of which were filled in during hazardous materials cleanup and restoration. The largest kettle lake in the approximate center of the Subarea is Old Fort Lake in a steep-sided depression about 50 feet deep. The Subarea is bounded on the north by the east-west trending Sequelitchew Creek canyon which varies from about 15 feet deep at Center Drive to 200 feet deep at the bluff above Puget Sound. The stream cuts through most of the geologic units found on site.

The elevation across the Site generally ranges from about 230 feet to the east near Center Drive to about 210 feet at the southeast corner and about 200 feet at the northeast corner. There is a slight rise to about 220 feet located west of the tee at the north end of Fairway 16. This steps down in several terraces to the steepest part of the bluff above the railroad tracks. There is a pedestrian trail located at an inflection point between shallower slopes at the west end of the site and the steepest portion of the bluff bounded by the chain link fence installed by the DuPont Company to control access. Steep slopes within the Subarea are generally 10 to 15 feet in height and extend 15 to 20 feet east of the boundary.

The golf course fairways are generally at an elevation of 220 to 230 feet and are generally higher than the surrounding areas, at least partially because of placement of hazardous materials and the placement of additional materials as a cap.

The small kettles that formerly were numerous on the site have largely been covered by the golf course or were excavated and backfilled as part of hazardous materials remediation. The former kettle in the northwest corner of the site (restoration Area 7), referred to as Old Salt, which received liquid and other wastes and waste salts from the former nitric acid plant was excavated and filled.

In the south-central part of the site north of the current trail near Charles Alley, a landfill was located that disposed of explosives packaging, auto shop wastes, empty ammonium nitrate drums, and residual water gel. A depression about 18 feet deep in the vicinity of Jenson Street may be a kettle and may be a borrow pit used for cover for the landfill.

Soils on the site formerly were characterized by forest duff. Native soils remain largely within open space area such as surrounding Old Fort Lake or on the margins of the golf course. Most of the site was excavated to a depth of about a foot for hazardous materials remediation. Greater depths of excavation occurred at building foundations and areas where hazardous materials were found. Such excavated areas were filled with clean materials either from on or off-site, but it is unknown whether they meet specifications for structural fill.

4.1.1.2 Geology

The four major stratigraphic units beneath the Subarea, from the top down include Steilacoom Gravels, Vashon Till, the Olympia Beds, the Double Bluff Drift sequence (DBD-OB) (formerly known as the Kitsap Formation) and the Salmon Springs Glaciation (formerly known as the Salmon Springs) (DNR 2003).

Each of these units is described below and is shown in its surface horizontal extent in Figure 4-1 and in cross section in Figures 4-3 and 4-4. Figure 4-2 shows the location of the cross section.

Steilacoom Gravels (Qgog on the map and Qs on the cross section) comprise the surficial deposits over most of the Subarea and extend to a depth of about 40 feet in the easterly portion of the Subarea and 300 feet in the westerly portion. The Steilacoom Gravels consist of brown and gray stratified sands and gravels, with cobbles and occasional zones of siltier sand. They were deposited during retreat of the final (Vashon) glaciation. As the glaciers melted and receded, a lobe of ice blocked the drainage of the Puyallup valley, creating Glacial Lake Puyallup. When a series of ice dam bursts (jokulhlaups) released the glacially impounded water in Glacial Lake Puyallup. Floodwaters spilled and transported coarse-grained sediments into a broad outwash plain that extends from DuPont to South Tacoma. These coarse-grained deposits created thick deposits where the outburst channels flowed into a lower elevation lake (Glacial Lake Russell) that had formed behind the remaining Vashon glacial ice.

Glacial Lake Russell (now partially occupied by Puget Sound) was deep and had steep sided walls in the site area, similar to current coastal bluffs. Where the Steilacoom gravels flowed over the sides of the lake and extended into the lake is where the deepest deposits occurred. This contact is called the "Olympia Beds Truncation".

During glacial retreat, the stagnant melting ice sheet left blocks of stranded glacial ice called "dead ice." In addition, at the time of a glacial dam burst ice blocks would be carried by the flood. These blocks would be distributed throughout the deposit, but because ice is lighter than other materials, it would tend to be deposited near the surface. As these ice blocks later melted over time kettles were formed where there was a void previously occupied by ice. In addition, sediment within the ice, or that had been deposited adjacent to the ice blocks by water flowing around them would form a deposit of silt, sand and gravel, that typically would be much lower in permeability than the adjacent outwash. These kettles might be deep and steep sided, but also might be shallow and barely perceptible. The finer silts typically

would hold water longer than the more permeable Steilacoom gravels and, in some cases, might collect enough water to form peat and wetland complexes. Deposits were encountered near the ground surface in these low areas. Edmond Marsh to the east of the Subarea is an example of such an area. There are no wetlands or bogs within the Subarea, but there are likely areas of less permeable soils that may be obvious kettles or less obvious minor variations in topography.

The Olympia Bed (Qob on the map, Qv on the cross sections) also known as Vashon Drift or Vashon Advance Outwash, is found beneath the Steilacoom Gravel and is often difficult to differentiate from the overlying Steilacoom Gravel. These deposits resulted from the action of glacial rivers or streams during advance of the Vashon glaciation. The deposits are described as light brown to gray, slightly silty to non-silty, stratified sands and gravels; however, they are generally not as coarse-grained as the overlying Steilacoom Gravel. The Esperance Sand unit was observed beneath the Advance Gravel in some borings on the site and consists of dense, slightly gravelly to gravelly, non-silty to silty, coarse to fine sand, and silty, fine sand (Hart Crowser 1992).

The Double Bluff Drift sequence (DBD-OB on the map Qk on the cross section) is a fine-grained, interglacial deposit in this area approximately 70 to 100 feet thick, and very heterogeneous regionally. It was deposited in an interglacial period prior to the Vashon Glaciation. The DBD-OB sequence acts as a less permeable aquitard that restricts groundwater movement downward from the Vashon deposits above and upward from the Salmon Springs deposits below.

The Salmon Springs Glaciation (Qss) was deposited in the glacial period preceding the DBD-OB sequence interglacial. Regional information indicates that the formation is 70 to 120 feet thick and contains zones of organic silt and till. The Sea Level Aquifer is a regionally extensive aquifer that occurs within the Salmon Springs Glaciation and is generally confined, (i.e. its water is pressurized due to aquitard layers that overlie and underlie the aquifer) except in areas west of the Olympia Bed Truncation, with the approximate location of the truncation where the Sea Level Aquifer becomes unconfined.

4.1.1.3 Groundwater

The general hydrogeologic setting within the project area consists of an upper, unconfined water table aquifer within the Steilacoom gravel and glacial drift units which varies in depth from about 20 to 40 feet below the surface in the easterly and central portion of the Subarea and around 100 to 200 feet deep in the deep Steilacoom gravels in the westerly portion of the site west of the Olympia Beds Truncation; an aquitard formed by the fine-grained DBD-OB sequence; and a lower, semi-confined to unconfined sea-level aquifer within the Salmon Springs unit.

Extensive soil samples and groundwater monitoring wells were installed in the Weyerhaeuser hazardous material cleanup and remediation Phase I and Phase II Site Characterization Reports. Groundwater in the shallow unconfined aquifer is recharged by precipitation and recharge from surface water from Sequatchew Lake about two miles east of the Subarea and a series of wetlands between the lake and Center Drive including Edmond Marsh as well as additional wetlands within Joint Base Lewis McCord (JBLM), some of which are also part of the base stormwater management system.

Steilacoom gravels and glacial drift extend a short distance to the south and east of the Subarea and are bounded by ice contact and glacial till deposits in the Hoffman Hills Yehle Village areas with extensive till to the east in Fort Lewis. The major recharge of groundwater in the Subarea is more extensive Steilacoom Gravel and Vashon Drift deposits to the northwest and surface water interflow. The flows within the aquifer as a whole are generally toward the west-northwest, but groundwater within the Subarea likely flows largely from the surface water and wetlands to the northeast toward the

southwest. Modeling for the proposed aggregate mine to the north of Sequalitchw Creek shows changes in groundwater flow slightly reducing Old Fort Lake water levels (Aspect 2023). The shallow unconfined aquifer in this area is relatively unproductive , as indicated by the seasonal fluctuations in water level in excess of eight feet as indicated in measurements of Old Fort Lake and in monitoring wells installed as part of the hazardous materials investigations and shown in Figures 4-5 and 4-6. In a few cases, perched groundwater was encountered in monitoring wells between depths of approximately 20 and 33 feet in Steilacoom Gravels, however low-permeability soil units such as silts were generally not found in Steilacoom Gravels. The presence of perched groundwater and the presence of ponded water on the surface is interpreted as likely related to ice-rafted fine sediments deposited by inclusions smaller than those that created kettles. Where drilling occurred in kettles, zones of saturation beneath the kettles were found to be transient and discontinuous (both laterally and vertically) (Hart Crowser 1986, 1987,1992).

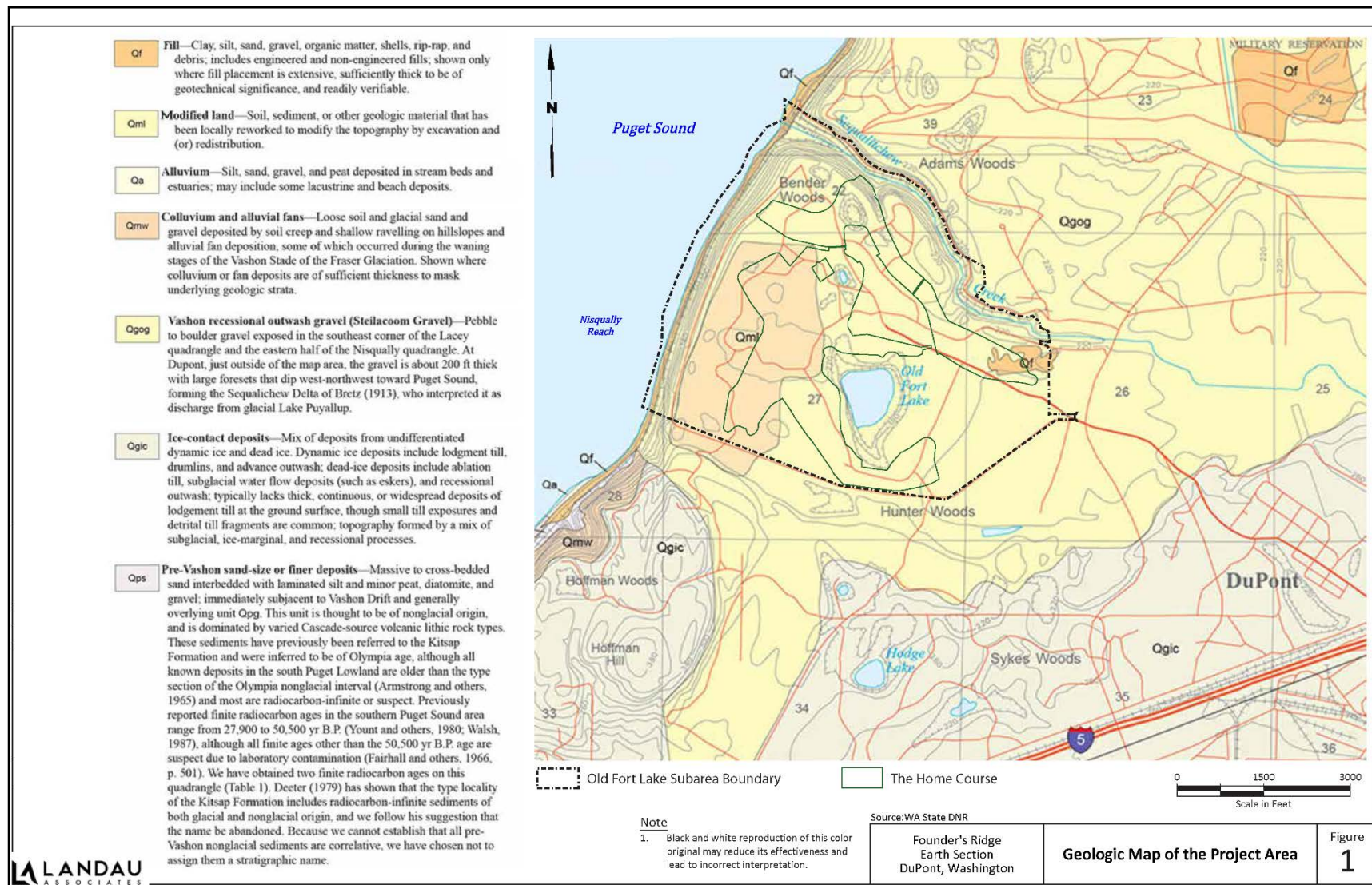


Figure 4-1 Geologic Map of DuPont

Figure 4-2 Locations of Geologic Cross Sections

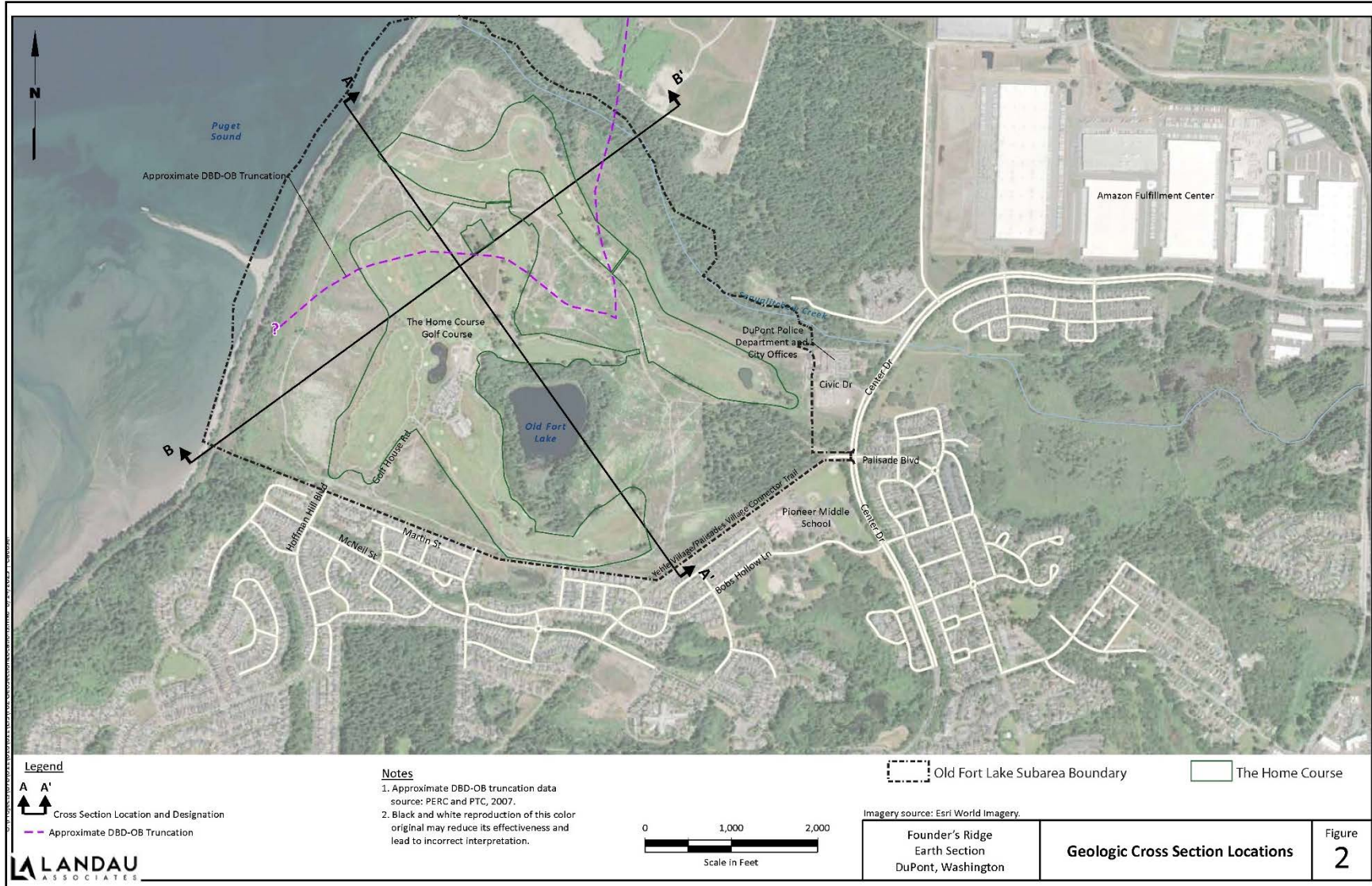


Figure 4-3 Geologic Cross Section A-A

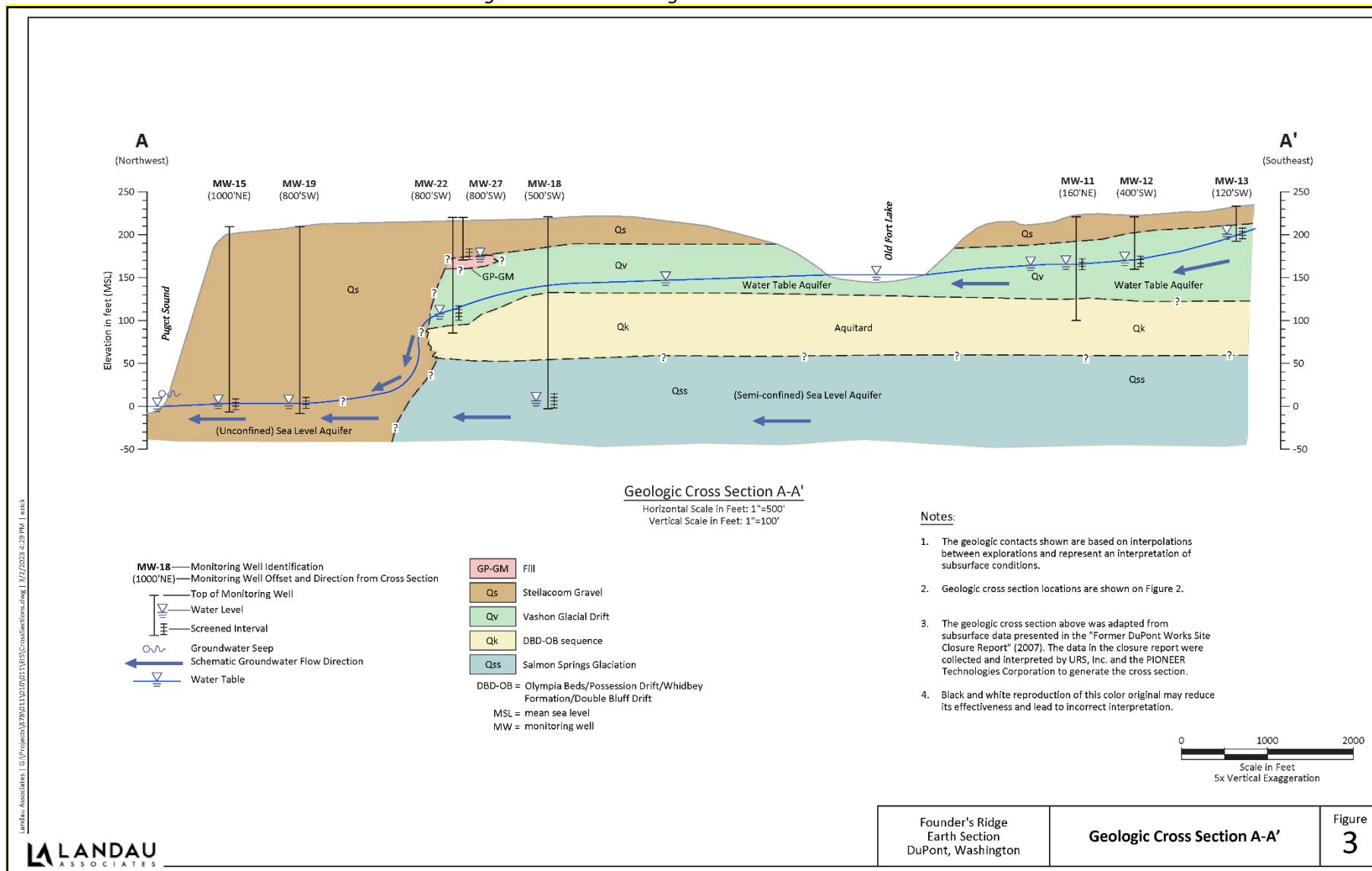
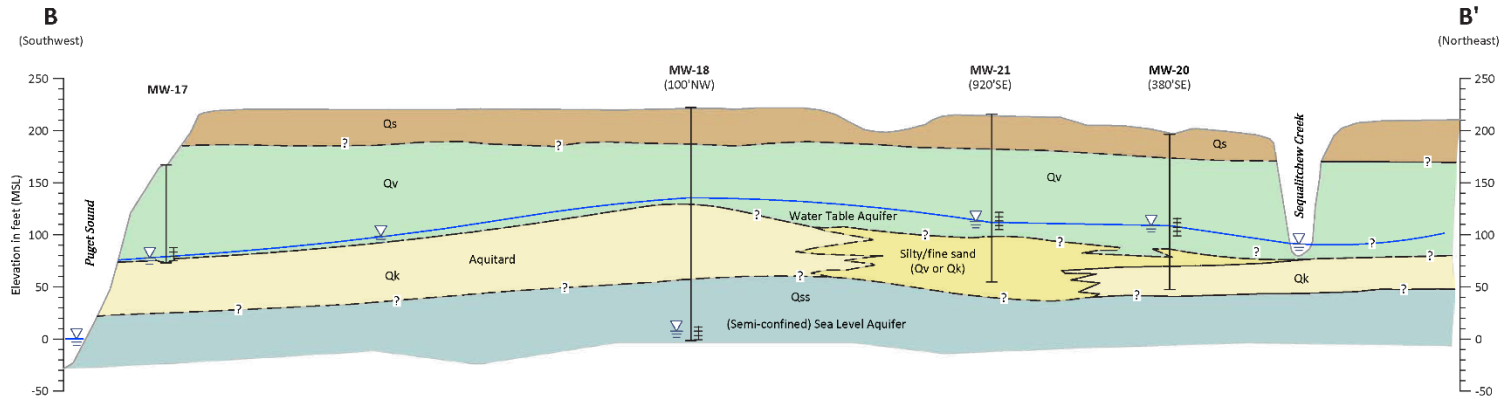


Figure 4-4

Geologic Cross Section B-B'



Geologic Cross Section B-B'

Horizontal Scale in Feet: 1"=500'
Vertical Scale in Feet: 1"=100'

MW-18 — Monitoring Well Identification
(100'NW) — Monitoring Well Offset and Direction from Cross Section
— Top of Monitoring Well
— Water Level
— Screened Interval
— Groundwater Seep
— Water Table

Qs Steilacoom Gravel
Qv Vashon Glacial Drift
Qv or Qk Silty/fine sand
Qk DBD-OB sequence
Qss Salmon Springs Glaciation
DBD-OB = Olympia Beds/Possession Drift/Whidbey Formation/Double Bluff Drift
MSL = mean sea level
MW = monitoring well

Notes:

1. The geologic contacts shown are based on interpolations between explorations and represent an interpretation of subsurface conditions.
2. Geologic cross section locations are shown on Figure 2.
3. The geologic cross section above was adapted from subsurface data presented in the "Former DuPont Works Site Closure Report" (2007). The data in the closure report were collected and interpreted by URS, Inc. and the PIONEER Technologies Corporation to generate the cross section.
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 1000 2000
Scale in Feet
5x Vertical Exaggeration

LANDAU
ASSOCIATES

Founder's Ridge
Earth Section
DuPont, Washington

Geologic Cross Section B-B'

Figure
4

The deeper sea level aquifer is effectively isolated from shallower groundwater by the intervening aquitards of dense largely impervious deposits. The City of DuPont's four primary water supply wells are developed in the Salmon Springs aquifer upgradient of the Subarea and due to the location and aquitard are not affected by shallow groundwater underlying the Subarea.

As part of hazardous materials cleanup and remediation Dinitrotoluene (DNT), a precursor to manufacture of trinitrotoluene (TNT), a component of dynamite and other explosives, was found in groundwater at levels below the surface water protective concentration of 9.1 µg/L. Nitrate was detected in monitoring wells located along the eastern (upgradient) edge of the Subarea (Pioneer 2007). Natural restoration was selected as the preferred alternative for groundwater remediation because of low risk and because the aquifer was not used as a drinking water source. Wells were monitored between 2008 and 2014 until the total DNT groundwater concentrations were below the applicable cleanup level and monitoring was discontinued. Removal of source DNT near the surface as a result of cleanup and remediation actions is believed to have been the mechanism for reduced levels. Restrictive covenants remain in place prohibiting the use of groundwater for drinking purposes (Pioneer 2024).

Old Fort Lake is completely landlocked and has no surface water source except possible runoff routed to the lake from the detention pond at Jenson Avenue and Ogden Avenue. An overflow pipeline was installed during development of the residential area to the south. The lake has no outlet. The water in the lake is controlled by regional groundwater conditions and has been observed to vary up to eight feet seasonally which corresponds with variation in ground water levels recorded in monitoring wells (Hart Crowser 1986).

The permeability of the Steilacoom gravels is generally sufficient to provide for infiltration of precipitation without observable overland flow. There are a few localized areas where standing water has been observed after rainfall. It isn't known whether these are areas of native ice contact deposits with associated localized fine deposits or whether they are areas that have been excavated and filled as a result of hazardous materials remediation.

Figure 4-5 Groundwater Elevations Wet Season



Figure 4-6 Groundwater Elevations Dry Season



4.1.1.4 Geologically Hazardous Areas

Geologically hazardous areas (GHA) are defined in Chapter 25.105 of the DuPont Municipal Code (DMC). GHAs are defined as being susceptible to erosion, sliding, seismic hazards, and other hazardous geological events and include the specific categories discussed below.

Landslide Hazards/Steep Slopes

Landslide hazard areas are defined in DMC 25.105.040(3)(a) as:

- Areas designated as quaternary slumps, earthflows, mudflows, or landslides on maps published by the USGS, WDNr, or other reputable sources.
- Areas with all three of the following characteristics: (DMC 25.105.030. 345)
 - Slopes steeper than 15 percent
 - Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock
 - Springs or ground water seepage
- Areas that have shown movement and/or are underlain or covered by mass wastage debris.
- Potentially unstable slopes resulting from river or stream erosion or undercutting by wave erosion.
- Areas that show past sloughing or calving of sediment or rocks resulting in a steep slope that is poorly vegetated.
- Slopes that are parallel or sub-parallel to planes of weakness (which may include, but are not limited to, bedding planes, soft clay layers, joint systems, and fault planes) in subsurface materials.
- Any area with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet, except areas composed of competent bedrock or a properly engineered slope designed and approved by a geotechnical engineer licensed in the State of Washington and familiar with the site.
- Areas where land-use activities could affect the slope stability, including but not limited to areas with subsurface hydrologic flow, groundwater recharge areas, and surface water flow.
- Areas of historical landslide movement including coastal shoreline areas mapped by the Ecology Coastal Zone Atlas or WDNr slope stability mapping as unstable (“U” or class 3), unstable old slides (“UOS” or class4), or unstable recent slides (“URS” or class 5).

Generally, the geology of the area does not meet the functional based criteria such as slopes that have shown sloughing or calving or have parallel or sub-parallel planes of weakness. The steep slopes along the Puget Sound are almost entirely Steilacoom gravels that are homogenous and lack bedding planes or fault planes. They are well drained and contain groundwater only near sea level. There are no reported cases of landslides and slumps along this bluff, which certainly would have interrupted rail service over the past 125 years since the rail line was installed. Nevertheless, this is a slope in excess of 40 percent which is not bedrock or engineered and is therefore a geologically hazardous area. Sequelitchew Creek intercepts a number of different geologic deposits some of which may be considered bedding planes and the slopes above the stream are generally in excess of 40 percent.

The setbacks from landslide hazard areas in DMC 25.105.040(3)(c) are to be “based on the findings of a qualified professional and shall minimize the risk of property damage, death, or injury resulting from landslides both on and off the property.” Additional site-specific investigation and investigation in relation to specific proposed developments would be required to establish the extent of setbacks that might be required.

Seismic Hazards

Seismic hazard areas. Are defined in DMC 25.105.020.313 as “...areas subject to severe risk of damage because of seismic induced ground shaking, slope failure, settlement, soil liquefaction or surface faulting. Ground shaking is a primary risk, followed by slope failure. Soils on slopes greater than 40 percent that are expected to be seasonally or perpetually saturated pose a specific risk of settlement, movement, or liquefaction. When saturated, these soils tend to be cohesionless and are unsuitable for foundations.

The Olympia Structure (Class B), an inferred fault trace, is located approximately 9.5 miles southwest of the project area and is the closest mapped fault (DNR 2012). Considering the proximity of the project area to the nearest mapped fault and the presence of Steilacoom gravel deposits more than 20 ft thick, the risk of ground rupture due to surface faulting is low. The entire Puget Sound region lies within a seismically active area, and moderate to high levels of ground shaking that may affect structural integrity should be anticipated during the design life of the proposed development. Seismic design should be conducted using current design codes and generally accepted engineering standards and practices.

It is unlikely that there are risks of slope failure during seismic events except on steep slopes adjacent to Puget Sound and Sequelitchew Creek. Slope failure in the area was not reported as a result of the Nisqually Earthquake in 2001, although Burlington Northern/Santa Fe Railroad estimated track repairs, in the Nisqually area were approximately \$200,000, due to shifting buckling damage (Hghland 2003).

Erosion Hazards

In addition to the general definition of geologically hazardous area (GHA) in DMC 25.105, the provisions of DMC 25.105.030.130 defines erosion hazard area as those areas containing soils which, according to the USDA Soil Conservation Service, may experience severe to very severe erosion; and in addition DMC 25.105.040(3)(a)(ii) describes erosion hazard areas as:

- Channel migration zones, also known as riverine erosion areas, along a river or stream within which the channel(s) can be reasonably predicted to migrate over time. Channel migration hazard areas include: potential channel migration, channel avulsion, bank erosion, and instability of slopes along the river or stream.
- Coastal erosion areas that are subject to shoreline retreat from wind, wave, and tidal erosion.

Sequelitchew Creek is separated from potential land alteration within the Subarea by approximately 600 feet. Except for the possibility of a trail connection down the canyon, it is unlikely that the development will be affected by potential channel migration, channel avulsion, bank erosion, or slope instability. The project area is not immediately adjacent to the Puget Sound shoreline and is separated by an active railroad. The shoreline will not be exposed to changes in wind, wave, or tidal erosion as a result of development within the Subarea. The US Department of Agriculture classification of Subarea soils as “Spanaway gravelly sandy loam,” includes the evaluation that it exhibits slight erosion potential when disturbed (USDA NRCS 2024). The sloped terraces above Puget Sound bluffs within the developable

areas of the Subarea, however, may be subject to erosion because of the inclination of the slope and the presence of fined silts and sands, if existing vegetation is removed or the slopes are regraded.

4.1.2 Impacts

Potential impacts of development of the Subarea under the existing Subarea Plan will be similar enough not to warrant separate analysis.

4.1.2.1 Buildings and Earthwork

The impacts of future development on earth resources and groundwater are likely to be similar. The size of buildings is likely to generally be greater under existing zoning which allows office, research and development and manufacturing uses over a larger area than the commercial and entertainment areas designated in the proposed Subarea Plan and zoning. The character of residential development is likely to be similar, except that a much larger area would be devoted to residential uses under the proposed amendments and a much larger component of middle housing/townhomes would be developed.

Standard building foundations are likely to be appropriate in areas where existing soils have not been excavated or filled. In areas where excavation and/or fill occurred deeper than a foot or so as the result of hazardous materials remediation, site specific investigations should be performed and appropriate designs for foundations implemented. In areas of landfills with a variety of debris that were not considered hazardous and were not remediated, appropriate investigations and designs should be implemented. The kettle or borrow-pit in the southeast corner of area D-1 may require structural fill to be developed as middle-housing/townhomes, or other open space or recreational use may be considered.

Utilization of infiltration for storm water management is generally suitable due to the permeability of the Steilacoom gravels. Because there are a few areas where standing water has been observed after rainfall and because perched groundwater has been observed at a few locations, detailed investigation of proposed infiltration facilities should be performed, and design parameters adjusted accordingly.

Because infiltration is the most likely mechanism used for stormwater management, the additional impervious surfaces from buildings, parking areas, streets and other impervious surfaces is not likely to affect the amount of groundwater recharge or patterns of groundwater movement. The infiltration systems are likely to recharge groundwater in a manner similar to the manner in which natural rainfall percolates to recharge groundwater. Engineered infiltration systems may increase groundwater recharge slightly because the concentration of groundwater recharge may result in slightly more water percolating to the depths where groundwater is present, whereas with natural precipitation, a proportion of rainfall is lost to recharge because of evapotranspiration. There is likely to be little or no impact on groundwater quality because of the requirements for pretreatment in the stormwater manual for western Washington that provides a high assurance that pollutants, particularly those from automobile use of streets and parking areas, consisting largely of hydrocarbons but also including heavy metals will be intercepted prior to infiltration. Fertilizers used in landscaping provide a low risk of percolation to groundwater because of the depth to groundwater. The city should assure that appropriate design parameters for infiltration and pretreatment are incorporated in each proposed future development.

4.1.2.2 Landslide Seismic and Erosion Hazards

In general, the geology of the area does not meet the functional based landslide risk criteria such as slopes that have shown sloughing or calving or have parallel or sub-parallel planes of weakness. The steep slopes along the Puget Sound are almost entirely Steilacoom gravels that are homogenous and lack bedding planes or fault planes. They are well drained and contain groundwater only near sea level. There are no reported cases of landslides and slumps along this bluff, which certainly would have interrupted rail service over the past 125 years since the rail line was installed. Nevertheless, this is a slope in excess of 40 percent which is not bedrock or engineered and is therefore a geologically hazardous area and may be subject to some risk. Sequalitchew intercepts a number of different geologic deposits, some of which may be considered bedding planes and the slopes above the stream are generally in excess of 40 percent which provides for a somewhat higher level of risk of landslide hazards particularly under seismic conditions.

Areas regulated as within 300 feet of 40 percent slopes should have additional review by qualified professionals and specific development proposals evaluated as to whether they meet the criteria in DMC 25.105.040(3)(d) that they:

- Generally are located and/or engineered and constructed to reduce risks to life, health, safety, and buildings, and not increase potential for landslides or erosion that could impact either other properties, public resources, or other critical areas;
- Protect human life and safety;
- Minimize the potential for property damage related to seismic events, erosion and/or landslides;
- Minimize the need for stream or river bank or coastal bluff stabilization in the future;
- Reduce public liabilities for damages associated with geologic hazards;
- Protect slope stability and minimize erosion, seismic, and/or landslide hazard risks; and
- Maintain natural sediment and erosion processes that are integral to the health and sustainability of freshwater and marine ecosystems as well as minimizing impacts to stream, river, and coastal processes such as channel infill, channel migration, sediment transport, or flooding.

4.1.2.3 Erosion and Sedimentation

Redevelopment of the project site would include clearing, grading, excavating, and filling portions of the site. Vegetation would be cleared within the construction footprint, which may cause erosion. Given the very permeable character of the Steilacoom gravels it is unlikely that surface water would be carried any distance over most of the Subarea. The sloped terraces above Puget Sound bluffs within the developable areas of the Subarea, however, also are likely to be subject to erosion because of the inclination of the slope and the presence of fine silts and sands, if existing vegetation is removed or the slopes are regraded. The steep slope around Old Fort Lake, the Puget Sound bluff or Sequalitchew Creek, are at risk during development of sediment-laden runoff causing surface gullying, although in most cases runoff probably would not discharge to Old Fort Lake, Puget Sound or Sequalitchew Creek, except possibly during frozen ground conditions, especially rain on snow events with frozen ground.

Wind erosion during dry seasons can produce dust. If soils are trucked off-site or if fill is transported into the project area, some soil may be blown off trucks while en route.

Standard building foundations are likely to be appropriate in areas where existing soils have not been excavated or filled. In areas where excavation and/or fill occurred deeper than a foot or so as the result

of hazardous materials remediation, site specific investigations should be performed and appropriate designs for foundations implemented. In areas of landfills with a variety of debris that were not considered hazardous and were not remediated, appropriate investigations and designs should be implemented. The kettle or borrow-pit in the southeast corner of area D-1 may require structural fill to be developed as middle-housing/townhomes, or other open space or recreational use may be considered.

Utilization of infiltration for storm water management is generally suitable due to the permeability of the Steilacoom gravels. Because there are a few areas where standing water has been observed after rainfall and because perched groundwater has been observed at a few locations, detailed investigation of proposed infiltration facilities should be performed, and design parameters adjusted accordingly.

4.1.3 Mitigation

4.1.3.1 Earthwork, Erosion, and Sedimentation

Site work should be phased to minimize the amount of exposed soils to the areas that are under construction. The permeability of Steilacoom gravels limits some impacts related to surface water and to storm events carrying materials overland and into streams. There are, however, localized impacts that can occur during severe storm events and there are potential impacts particularly when development is in proximity to steep slopes.

The following measures could potentially be used to limit erosion and sedimentation:

- Prepare comprehensive erosion, sedimentation and spill control plan to outline how the site would be managed for erosion and other hazards. It would cover appropriate measures for each phase of site development, training, pre-construction conference, coordination with utilities and contractors, monitoring, and reporting. It would provide for stockpiling of erosion control material on site. Monitoring of water quality and notice of problems may be appropriate. Provisions for contingency planning and revision to the plan should be provided.
- Delineate and mark clearing limits, limit the amount of the site opened for disturbance at any time.
- Buffer zones should be provided around steep slopes.
- Where possible, existing vegetation should be maintained as a buffer. A barrier should be placed along the creek and wetland areas to protect them from construction activities and prevent construction equipment or stockpiling within those areas.
- All exposed and non-worked soil should be stabilized by use of BMPs. Time periods of allowed exposure would depend on the season. Both temporary and permanent groundcover should be implemented as soon as possible.
- A stabilized construction entrance or other method should be installed to prevent sediment transport. If a standard gravel construction entrance is proposed, geo-textile fabric should be installed under the rock. A wheel wash would be required if wet season grading occurs.
- Control pollutants from construction equipment, leakage of fuels, fertilizers, application of chemicals, and water treatment systems.
- A monitoring plan, with independent testing, may be appropriate as part of the quality assurance plan.

4.1.3.2 Landslide Hazards

4.1.3.3 Seismic Hazards

Mitigation for seismic hazards relate primarily to potentially seismic induced instability of otherwise stable slope above Puget sound and Old Fort Lake and to the risks to buildings and their occupants.

The character of the facility and the population exposed to risk are important factors in determining appropriate mitigation strategies. Generally, public facilities such as schools, justify the most reliable seismic mitigation because those facilities have a high risk to occupants, a high public investment cost, high replacement and repair cost, and high social and economic cost of loss due to lack of access. Residential land use also generally receives mitigation with high levels of reliability because of the potential for loss of life. Commercial and industrial uses may receive lower levels of seismic protection because the potential loss of life may be less due to population density, and also the fact that workers are in an active state and awake so they can exit failing buildings.

Additional site investigation at the time of development will enhance the understanding of risk and the development of appropriate mitigation strategies based on a detailed understanding of the extent of area affected, the population at risk, and specific building type, size, and location.

Compliance with building code standards for seismic would mitigate seismic risks to buildings.

4.1.4 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, the implementation of either alternative will introduce a variety of land uses that will change the existing topography, soils, and other characteristics of the surface of the earth and introduce man-made features. The extent to which they are adverse will depend upon the particular character of introduced elements and the extent to which they recognize inherent constraints of the geologic substrate.

4.2 PLANTS AND ANIMALS

Technical studies that form the basis of the analysis presented in this section may be found at <https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>

4.2.1 Affected Environment

The Old Fort Lake Subarea is characterized by several distinct habitats: areas of mixed coniferous forests in the east end of the project area, around Old Fort Lake, and associated with Sequelitchew Ravine; an active golf course; and an early successional forest adjacent to the golf course in areas of recent soil hazard remediation.

4.2.1.1 Vegetation Communities

The majority of the site is characterized by slightly rolling terrain. However, there are very steep slopes to the west associated with the Puget Sound Burlington Norther Santa Fe Railway bluff, and to the north associated with Sequelitchew Ravine. Old Fort Lake occupies a deep topographical depression in the south-central portion of the site.

Mature Coniferous Forest

Approximately 22 acres of mature forest is located in the eastern portion of the project site. This second-growth forest is dominated by a canopy of widely-spaced Douglas fir (*Pseudotsuga menziesii*),

ranging from 45 to 70 feet tall with occasional snags. There are a few interspersed Oregon white oak (*Quercus garryana*). These do not, however, meet the definition of a priority white oak woodland as defined by the Washington Department of Fish and Wildlife (WDFW). The understory is mainly comprised of Scotch broom (*Cytisus scoparius*, UPL), Nootka rose (*Rosa nutkana*, FAC), trailing blackberry (*Rubus ursinus*, FACU), tall Oregon grape (*Mahonia aquifolium*, FACU), and sword fern (*Polystichum munitum*, FACU). There also is a moderate amount of small, downed woody debris throughout the southeastern forested area, with fewer areas of large, downed woody debris, as well as one downed oak tree.

The coniferous forest can provide valuable nesting, breeding, roosting, denning, and foraging habitat for a variety of birds, mammals, amphibians, and invertebrates. The snags can provide insect habitat and can act as foraging and nesting areas for woodpeckers and other birds. Fruits and seeds within these forests are a food source as well as the plants themselves. The high amount of Scotch broom in the area, however, negatively affects wildlife habitat value and inhibits structural diversity. The forest does not have trees with sufficient height or enough suitable platforms to facilitate marbled murrelet nesting.

Early Successional Forest

The majority of the site was cleared and soil was removed to a depth of about one foot as part of hazardous materials mitigation for contaminants related to the manufacture of munitions on site and fallout of arsenic and other pollutants from the Ruston ASARCO copper smelter. In the approximately two decades since the clearing occurred, an early successional forest has been established primarily dominated by dense stands of Douglas fir saplings, with occasional madrone (*Arbutus menziesii*, N.L) and black cottonwood (*Populus balsamifera*, FAC) saplings. Patches of Scotch broom are also present throughout the site. Average tree height in these areas was 10 to 15 feet and appears to have been recently established. In the southern portion of the regenerating forest, there were several larger topographic depressions, some of which included patches of field meadow-foxtail (*Alopecurus pratensis*, FAC), and reed canary grass (*Phalaris arundinacea*).

The majority of the early successional forest has little to no soil depth, as the upper 1 to 2 feet of soil was removed in 2005 as part of a mitigation effort (City of DuPont, 2021). In locations where soil remained or has developed, soils consisted of up to 12 inches of very dark brown to very dark brown (10YR 2/2 to 3/3) compacted gravelly sandy loams.

The early successional forest areas provides nesting and foraging habitat for smaller songbirds and hunting areas for bird-eating species. Nocturnal mammals likely use the regenerating forest as a transit corridor and foraging area. Trees and plants in the area can prevent erosion and fix nitrogen while decaying plant materials aids in the regeneration of soil. Plants growing in the early successional forest uptake and store carbon from the atmosphere. The forest also acts as a buffer between human disturbance from the golf course and other important habitats. However, the prevalence of Scotch broom in the area negatively affects wildlife habitat value and inhibits structural diversity.

Old Fort Lake and Surrounding Mixed Forest

Old Fort Lake is a large glacial kettle wetland in the south-central portion of the project site. A mixed coniferous and deciduous forest surrounds Old Fort Lake. Dominant vegetation includes an overstory of Douglas fir, with interspersed occasional western red cedar (*Thuja plicata*) and bigleaf maple (*Acer macrophyllum*.) Areas of Oregon white oaks are present closer to the edge of the shoreline, primarily along the southern, western, and eastern portions of Old Fort Lake. Understory vegetation includes oceanspray (*Holodiscus discolor*, FACU), dull Oregon grape (*Mahonia nervosa*, FACU), beaked hazelnut

(*Corylus cornuta*, FACU), and sword fern. Soils are typically black or very dark brown (10YR 2/1 to 2/2) to depths of at least 14 inches.

The forest around the lake provides valuable nesting, breeding, roosting, denning, and foraging habitat for a variety of birds, owls, bats, mammals, amphibians, and invertebrates. The presence of oak woodlands, as described in more detail below, also increases the diversity and value of this forest. In addition, the forest acts as a buffer surrounding Old Fort Lake and provides several functions to protect the wetland from human activities in the immediate vicinity of the wetland. The forest infiltrates adjacent stormwater and fertilizer runoff from the golf course, shields wildlife from lights and noise, and provides critical habitat for wildlife that may use the wetland for all or part of their life cycle.

Mammals present in the Old Fort Lake Forest buffer, and throughout the Subarea include black-tailed deer, coyote, and Eastern cottontail, deer mouse raccoon, Douglas squirrel, opossum, shrew mole, Townsend's vole, masked shrew, and striped skunk (Raedeke 2023).

A wide variety of birds typical of this forest type and include American crow, American robin, Anna's hummingbird, black-capped chickadee, Bewick's wren, bushtit, chestnut-backed chickadee, dark-eyed junco, golden-crowned kinglet, Hutton's vireo, northern flicker, red-breasted nuthatch, song sparrow, spotted towhee, Steller's jay and California scrub jay, brown creeper, hairy woodpecker (excavations), pacific wren, pileated woodpecker, red-breasted sapsucker, cedar waxwings red-wing blackbirds, American wigeon, barn owl, barred owl, downy woodpecker, great horned owl, and others (Raedeke 2023). Other bird species may use the site on varying occasions. A bald eagle nest was previously located in a tree in the forest surrounding the lake, but the pair has since relocated to Ketron Island (City of DuPont 2021). A bald eagle nest was not observed, but bald eagles may still use the area to forage. Bald eagle habitat consists of open water areas with abundant prey (i.e., fish and waterfowl) and nearby large trees for nesting, perching, and roosting. These habitat characteristics are more common along the Puget Sound. Old Fort Lake is less rich in these features.

Bufflehead, lesser scaup, and Canada goose have been observed in Old Fort Lake and other typical waterfowl that may use the lake include American wigeon, wood duck, teal, hooded merganser, mallard, and gadwall.

Amphibian species typical of this type of lowland habitats found in the area include, Pacific tree frogs, red-legged frog, northwestern salamander, long-toed salamander, Pacific giant salamander, roughskin newt, ensatina, western redback salamander, and western toad. Reptiles that may use the area include northern alligator lizard, rubber boa, and common garter snake. Many large thatching ant mounds were observed throughout the forested portion of the site.

Old Fort Lake consists of palustrine scrub-shrub (PSS) and palustrine emergent (PEM) vegetation classes, in addition to open deep-water habitat, according to the USFWS wetland classification system (Cowardin et al. 1992). Old Fort Lake is rated as a Category III wetland using the WDOE wetland rating form (Hruby 2014). The wetland is predominantly permanently ponded at depths greater than three feet but experiences large seasonal fluctuations in ponding due to changes in groundwater levels (City of DuPont, 2021). Changes in water depth allows for the growth of vegetation that prefers seasonal inundation, such as red-osier dogwood, Douglas spiraea, hard-stem bulrush, and reed canary grass. Open water provides habitat for invertebrates, which in turn are food for a variety of birds and bats. Emergent and scrub-shrub vegetation in and around the lake can provide cover and nesting habitat for waterfowl, turtles, and amphibians. Diving ducks that prefer deeper water may not be present in Old Fort Lake during times of low water.

Aquatic vegetation within Old Fort Lake consisted of patches of yellow pond lily (*Nuphar polysepala*), and hardstem bulrush (*Schoenoplectus acutus*). In areas of deeper ponding, large-leaved pondweed (*Potamogeton amplifolius*, OBL), and Canadian waterweed (*Elodea canadensis*, OBL) were observed. Scrub-shrub species on the edge of the seasonally ponded areas include Douglas spiraea (*Spiraea douglasii*, FACW) and red-osier dogwood (*Cornus alba*, FACW). There is a significant monocrop of reed canary grass (*Phalaris arundinacea*) in the southern portion of the wetland. Reed canary grass is a non-native species and a listed Class C Noxious weed in Washington State. Invasive Chinese mystery snails (*Cipangopaludina chinensis*) were observed. The snails may “depress or exclude populations of native snails locally or alter bacterial community composition” (USFWS 2016). Chinese mystery snails may be aquarium castoffs or be unintentionally transported by humans and may compete with native species for food and space (Raedeke 2023).

Oak Woodlands

The Jones & Stokes (1996) Oak Woodlands and Management Zones Map shows several oak woodlands within the boundaries of the project site. Several of these woodlands are associated with the forest surrounding Old Fort Lake (MO-7 through MO-10), with a few isolated woodlands (MO-11 & MO-12). There is a large mixed woodland associated with the eastern portion of Sequelitchew Creek ravine (MO-13).

The areas associated with MO-7, MO-10, MO-11, and MO-13 within the Subarea are generally intact mixed oak woodlands as described in the 1996 report. In the area labeled MO-9, east of Old Fort Lake the extent of living oak trees had been reduced and appeared to have shifted to occupy a narrow strip along the eastern shoreline of Old Fort Lake. The oak woodlands surrounding Old Fort Lake were previously rated as being in low to moderate condition due to their association with Old Fort Lake, generally small size, lack of wildlife features, and co-dominance of conifers. The oak trees that comprise the mixed woodlands on the eastern shore of Old Fort Lake (in the area previously identified as MO-9) were generally small to moderate in size. A few small snags were present, as were occasional cavities in dead portions of oak trees. On the southern and western portions of the forest, larger individual oak trees were present, along with a few snags. Due to the consistent canopy of Douglas fir, limited amount of oak regeneration was observed around Old Fort Lake.

The Oak woodland associated with the eastern portion of the Sequelitchew Creek ravine was previously rated as being in high condition due to its location along the riparian corridor, its relatively undisturbed condition, its well-developed vegetation structure, and the presence of habitat features such as snags and cavities, however, the intervening canopy of Douglas fir and bigleaf maple had become more dominant, although the general size and extent of the mixed oak woodland is intact, and habitat features are still present.

Oak woodlands are an uncommon vegetation community in western Washington and have been largely reduced due to human development. They comprise unique and distinct woodland ecosystems that contribute to wildlife diversity and provide valuable habitat for breeding, resting, and feeding for many wildlife species. Oregon white oak woodlands are used by an abundance of mammals, birds, reptiles, amphibians, and invertebrates, including various moths, butterflies, and spiders. Several species, such as gall wasps, are found exclusively in association with Oregon white oak. Mixed oak conifer forests provide contiguous pathways for animals such as the State Threatened western gray squirrel, and they provide important roosting, nesting, and feeding habitat for wild turkeys and other birds and mammals (Larsen 1998). The mixed conifer and oak forests in the vicinity of the project site lack the mature forest stands required to provide the adequate canopy cover required for secure nest sites. Western gray

squirrels are not expected to be in the vicinity of the project site due to lack of mature forest, small size of oak forests, prevalence of invasive species, such as Scotch broom and presence of humans.

Bird species that may use the lowland habitats found in the Old Fort Lake area include barn owl, barred owl, downy woodpecker, great horned owl, olive-sided flycatcher, Pacific slope flycatcher, pine siskin, purple finch, red-tailed hawk, rufous hummingbird, ruby-crowned kinglet, sharp-shinned hawk, Swainson's thrush, Townsend's solitaire, Townsend's warbler, western tanager, western wood pewee, varied thrush, and yellow-rumped warbler. Other bird species may use the site on varying occasions.

Golf Course

A central part of the Subarea is an active golf course. The golf course primarily consists of maintained lawn areas, with man-made water features and various paved paths. There are minor patches of mature madrone and Douglas fir trees. Several Douglas fir trees ranging from 36-to-42-inches diameter-at-breast-height and up to 70 feet tall within the golf course. Overall, the golf course provides limited habitat value due to its heavy, regular use by humans, its lack of structural diversity, and limited food resources for most species. However, the golf course area may be used at night for minor foraging and as a transit corridor by wildlife species.

Sequalitchew Creek Ravine

The northern boundary of the Subarea is the Sequalitchew Creek ravine. The flows generally east to west in a steep ravine along the northern edge of the study area. The creek outlets from Edmonds Marsh to the east and crosses under Center Drive at an elevation of approximately 225 feet above sea level. The creek becomes increasingly incised in a ravine until it reaches sea level where it discharges into Puget Sound to the west. Within the ravine, its flow is due primarily to groundwater.

The south slope of the ravine is a steep slope which often exceeds 40 percent. Vegetation in the ravine is characterized by a canopy of Douglas fir with patches of western hemlock (*Tsuga heterophylla*, FACU), and bigleaf maple, with an understory of oceanspray, dull Oregon grape, beaked hazelnut, and sword fern. As mentioned above, a mixed oak woodland mapped by Jones & Stokes (1996) is present in the eastern portion of the ravine. The canopy in this area consists of Oregon white oak, bigleaf maple, and Douglas fir, with an understory of trailing blackberry (*Rubus ursinus*), snowberry (*Symphoricarpos albus*), vine maple (*Acer circinatum*), and sword fern.

Wildlife associated with the forest canopy would be similar to that outlined for the Old Fort Lake open space, above.

Puget Sound Shoreline and Bluff

The Puget Sound Shoreline is located west of the Subarea and is separated from the Subarea by a chain-link fence, a soft-surface pedestrian trail, a steep forested slope, and the BNSF railroad track. The forested slope is dominated by Douglas fir, Pacific madrone, oceanspray, holly-leaf Oregon grape (*Mahonia aquifolium*), and Scotch broom. The shoreline provides forest, beach, estuarine, and marine habitat which provides nesting, breeding, roosting, foraging, perching, and resting areas for a variety of avian, terrestrial, and marine wildlife species. The forested corridor extends from the Nisqually Wildlife Refuge on the south to the City of Steilacoom, about five and a half miles to the north. About two miles of this is adjacent to Joint Base Lewis McCord (JBLM) which is heavily forested open space. Although separated from the wildlife refuge by an active railway corridor, there are opportunities for a variety of species to cross the rail corridor and use the forested bluff. The area adjacent to the Subarea is an important corridor for animal movement from the wildlife refuge and substantial forested areas on JBLM to the Subarea.

4.2.1.2 Rare Plants and Plant Communities

The WDFW Priority Habitats and Species map identifies the onsite wetlands and a biodiversity area along Sequelitchew Creek as priority habitats. An estuarine and marine wetland is mapped within the nearshore areas of Puget Sound. Other priority habitats that are present but not mapped include the instream and riparian habitats along Sequelitchew Creek (WDFW 2023b).

None of these areas are within the portions of the Subarea designated for development.

Threatened and endangered plants that occur in Pierce County include golden paintbrush and marsh sandwort (USFWS 2023a) (Table 2; Appendix B). However, no threatened and endangered plants were observed or likely to be found on the site, given the management history including removal of most vegetation as a result of hazardous materials cleanup and the prevalence of invasive species such as Scotch broom. The Washington Natural Heritage Program (WNHP 2023) Rare Plant and Ecosystem Locations map identifies giant chain fern (*Woodwardia fimbriata*) offsite to the north of Sequelitchew Creek and white top aster (*Seriocarpus rigidus*), offsite to the east across Center Drive, near Edmond Marsh. Both plants are identified as sensitive species in Washington State.

Northern wolverine, marbled murrelet, streaked horned lark, yellow-billed cuckoo, northwestern pond turtle, monarch butterfly, Taylor's checkerspot butterfly, marsh sandwort, and western gray squirrel are not known or expected to occur on or within the vicinity of the project site.

4.2.1.3 Endangered, Threatened, Sensitive, and Other Priority Wildlife Species

As mentioned above, the WDFW (2023b) Priority Habitats and Species database and the NWIFC (2022) Statewide Integrated Fish Distribution map show no known occurrences of endangered or threatened wildlife species on the project site or in the vicinity. The endangered, threatened, or candidate species that occur in Pierce County include Chinook salmon, steelhead trout, bull trout, North American wolverine, marbled murrelet, northern spotted owl, streaked horned lark, yellow-billed cuckoo, monarch butterfly, and Taylor's checkerspot (USFWS 2023a; NOAA Fisheries 2023).

The NOAA Fisheries endangered and threatened species list includes the Puget Sound evolutionarily significant unit (ESU) of chinook salmon (hereafter "chinook") and the Puget Sound distinct population unit (DSU) of steelhead trout (hereafter "steelhead"). These anadromous salmonid fish species are not documented on the project site or within Sequelitchew Creek (WDFW 2023b; NWIFC 2023). However, both chinook and steelhead occur offsite in Puget Sound.

Bull Trout (*Salvelinus confluentus*) were listed as a threatened species by the USFWS on November 1, 1999. There is no habitat suitable for Bull trout in the Subarea. They have not been identified in the adjacent Sequelitchew Creek.

Bull trout critical habitat was designated by the USFWS on September 26, 2005. Under the ESA listing, the USFWS assumes that bull trout are present in suitable habitat in Pierce County waters unless proven otherwise. Bull trout are not documented in Sequelitchew Creek but occur offsite in estuarine and nearshore waters of Puget Sound. Therefore, it is our assessment that critical habitat for bull trout is not found within the project site.

Marbled Murrelet (*Brachyramphus marmoratus*) and Northern Spotted Owl (*Strix occidentalis caurina*). Marbled murrelets and northern spotted owls are known to occur in Pierce County throughout the year (Smith et al. 1997, WDFW 2023b). However, the lack of old, multi-layered forest on the site or in the vicinity and the urbanized, lowland setting make it highly unlikely that these species would occur in the

project area. There are no records of known breeding sites or occurrences of either species within at least several miles of the project site.

U.S. Fish and Wildlife Service (Federal Register 2013d) listed the streaked horned lark as a threatened species under the ESA and designated critical habitat for the species. The streaked horned lark is a ground-nesting bird found in open, sparsely-vegetated areas on Puget Sound prairies, on sandy islands in the Columbia River, along the Washington coast, and in the Willamette Valley in Oregon. Streaked horned larks have declined throughout their range and have been extirpated from British Columbia. Streaked horned larks nest and winter in flat, open areas with sparse low-stature vegetation and substantial areas of bare ground and are most often found at airports and on agricultural lands.

The streaked horned lark typically occurs in native prairies and open, sparsely vegetated areas. In Washington, native prairies are the state's fastest-disappearing ecosystem type. Since the mid-1800s over 90 percent of Washington's Puget Prairie habitat has been lost through conversion to human uses such as development or agriculture, or to encroachment of forest or invasive species. This species is mapped at Gray Army Airfield on Joint Base Lewis-McChord, approximately 3 miles to the east southeast (WDFW 2023b). No individuals have been documented at or near the Subarea. The habitat contained within the project site is not suitable for the streaked horned lark, due to the lack of prairie habitat, management history, presence of humans, and prevalence of invasive species, such as Scotch broom.

Yellow-billed Cuckoo (*Coccyzus americanus*) are not currently known to occur regularly in Washington, therefore none of the proposed critical habitat is located in Washington (Federal Register 2014a, 2014b, 2014c), and based on the relative lack of suitable riparian habitat on the project site or vicinity, we do not expect this species to occur anywhere within the project vicinity.

A candidate species, the Monarch butterfly is not federally listed as threatened or endangered. Although the U.S. Fish and Wildlife Service indicated it currently meets the criteria for listing. The Monarch is widespread throughout the contiguous United States and are known to occur in Washington, generally east of the Cascade Crest. One would not expect monarch butterflies to be present in the Subarea due to the likely nonexistence of their preferred forage.

The Taylor's Checkerspot was listed as an endangered species and critical habitat was designated in October 2013 (Federal Register 2013d). The Taylor's Checkerspot butterfly is endemic to the Pacific Northwest and is found in prairie and grassland habitat, coastal bluffs, and small forest openings (balds) (WDFW 2023c). Only eight populations currently exist in Washington. The nearest documented occurrence of Taylor's Checkerspot is approximately 6 miles east of the project site, on Joint Base Lewis-McChord, (WDFW 2023b) and the nearest designated critical habitat is approximately 14 miles south (USFWS 2022). The project site does not provide native prairie or grassland habitats and the habitat contained within the project site and is not suitable for the Taylor's checkerspot due to the management history, presence of humans, and prevalence of invasive species, such as Scotch broom.

The western gray squirrel (*Sciurus griseus*) was listed as threatened in Washington State in 1993 (Wiles et al. 2023). Their populations in the state are limited to three geographically isolated areas including one in Pierce County, on Joint Base Lewis-McChord, where they occupy oak woodlands and conifer forests. Oak trees are known to provide acorns for food and natal den sites for the squirrels. The mixed conifer and oak forests in the vicinity of the project site lack the mature forest stands required to provide the adequate canopy cover required for secure nest sites. No western gray squirrels or their nests have been observed in DuPont and would not be expected due to the management history, presence of humans, lack of mature forest, small size of oak forests, and prevalence of invasive species, such as Scotch broom.

Great blue heron (*Ardea herodias*) breeding areas are listed as vulnerable aggregations on the WDFW priority habitats and species list (WDFW 2008). Vulnerable aggregations are defined as “species or groups of animals susceptible to significant population declines, within a specific area or statewide, by virtue of their inclination to aggregate.” No heron breeding areas have been observed in DuPont and heron rookeries are not likely to be present in the vicinity due to the management history and current human use.

4.2.2 Impacts

Impacts of both alternatives would be similar as the extent and boundaries of disturbance would be virtually the same.

4.2.2.1 Impacts to Wetlands

No direct impacts to wetlands or their associated buffers are anticipated. All the wetlands on the site are located within Parks, Recreation, and Open Space (PROS) designated areas. Clearing and grading outside of the wetland buffers has the potential to result in an increase in sediment reaching the wetlands if stormwater runoff were to reach the wetlands. However, because stormwater management would be by infiltration, this is unlikely. Best management practices would be employed to control erosion and sediment in the vicinity of the wetlands, and it is unlikely any significant impact to the wetlands would occur under the proposed alternative.

Operational impacts on wetlands would likely be minor. Wetlands would be subject to City of DuPont critical area regulations. Encroachment on wetlands and wetland buffers from buildings, landscaped areas, and access roadways would not be allowed. Some increase in human access to the wetlands and associated disturbance would be anticipated because of increased human activity in the vicinity. This disturbance is not expected to be significant compared to existing conditions.

4.2.2.2 Impacts to Aquatic Habitat

Both alternatives would retain Sequelitchew Creek, its associated riparian and estuarine wetlands, and Old Fort Lake and habitat within dedicated open space. An adjoining area of managed open space would be retained as well, allowing only recreational activities, such that no residential, commercial, or civic development would occur within at least 100 feet of the stream or wetlands. Thus, no direct impacts to aquatic and fish habitat would occur under this alternative. No surface waters are known to occur on the site in the areas owned by the Nisqually Tribe or the Home Course, so future development is unlikely to impact aquatic habitats.

4.2.2.3 Impacts to Stormwater Management and Water Quality Treatment

Development will follow erosion control measures as directed in the Stormwater Management Manual for Western Washington (and associated regulations for the City of DuPont). All stormwater will be infiltrated. As no other stream channels occur on site, infiltration of stormwater will result in no stormwater runoff discharges to Sequelitchew Creek or Old Fort Lake during construction.

4.2.2.4 Impacts to Fish and Aquatic Habitat

An increased local population could have impacts on riparian and shoreline habitats. Trails proposed near Sequelitchew Creek and Old Fort Lake would likely increase human presence near those aquatic habitats which may increase disturbance, noise, erosion, and trash in the area. The existing trail near Puget Sound will likely see an increase in usage as the local population increases.

No direct impacts to riparian habitat on Sequelitchew Creek or the Puget Sound will occur, and infiltrated stormwater will not have a measurable direct effect on the Sequelitchew Creek or the Puget Sound. Thus, impacts to fish and associated habitat should be minimal under both Subarea alternatives.

4.2.2.5 Impacts on Vegetation

Impacts of constructing the development of either Subarea alternative includes both temporary impacts during construction and longer-term impacts that would displace much of the existing early successional forest vegetation communities. Existing vegetation would be replaced by buildings, roads, and other impervious surfaces, as well as non-native plantings. Most of the forest vegetation impacted by the proposed development under this alternative consists of early successional forest dominated by saplings of Douglas fir, madrone, black cottonwood, and large patches of Scotch broom. The trees in the areas are typically no greater than 15 feet tall.

The proposed development under this alternative would result in disjunct patches of native forest, increasing forest fragmentation on the site and leaving these retained open space areas within or between the various development areas to become more isolated. Note, however, that past activities on the site, such as the extensive clearing and soil removal from remediation efforts have already left patches of retained forest separated from one another. The retained forest along Sequelitchew Creek would remain connected to off-site forest areas.

The retained open space areas on site would include a network of trails and associated active and passive features such as interpretive signs. These soft surface trails will be added near or within the buffer around Old Fort Lake and Sequelitchew Creek which may require some clearing of vegetation. The trails will increase human disturbances in these areas. Oak woodlands are located within these areas and may be damaged by human disturbances. The existing trail through the Shoreline forest will likely be expanded and paved which will result in clearing and increased human disturbances.

4.2.2.6 Impacts on Wildlife

Impacts of constructing the development of either Subarea alternative include both temporary impacts during construction and longer-term impacts of habitat alteration. Construction related impacts include increases in noise, dust, human activity, temporary disturbance of vegetation for staging areas, potential erosion and sediment transport from exposed soils, and other potential water quality impacts. These can alter animal behavior, causing avoidance of adjoining habitats, alteration of movement and dispersal patterns, abandonment of nest sites, reduced breeding success, and increased mortality.

Direct alteration (removal) of the existing mixture of vegetation communities resulting from construction of these developed areas and associated facilities would affect the distribution and composition of wildlife populations on the project area and vicinity. As previously mentioned, at buildout the proposed development and associated facilities would remove existing habitat available for wildlife across the project area within areas that are currently early successional forest.

There are several terrestrial state priority habitat and species mapped by WDFW as being located within the city limits: the big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifungus*), and Yuma myotis (*Myotis yumanensis*). There is no evidence that they are present within the subarea.

Diversity of present bird species may decrease on developed portions of the site, which can be accompanied by an increase in bird density (Batten 1972, Vale and Vale 1976, Woolfenden and Rohwer 1969; see also Bollinger and Linder 1994, Dowd 1992, Herkert 1994, Martin-Yanny 1992). This may result in increased densities of omnivores and seed-eaters and a corresponding decrease in insectivores (Beissinger and Osborne 1982). The species typically favored in urban or urbanizing environments are habitat generalists, some of which are invasive exotic species. Planted ornamentals often support far fewer insect species per unit area than native vegetation due to a smaller amount of foliage (less foliage volume) and simpler vegetation structure. Birds in the urban environment primarily forage on the ground while birds in the nearby forest primarily forage in the tree canopy. Landscaped areas along the roadways throughout the development would likely be managed to limit the growth of tall woody vegetation.

Developed landscapes can often facilitate the spread of exotic invasive species (both plants and animals), especially along a linear corridor. No invasive species would be included in the proposed landscaping of the development.

Species that dwell primarily in forested habitats, but can persist in partly-urbanized environments, such as chickadees, squirrels, shrews, garter snakes, and some species of amphibians, may persist in the larger open space areas in open space areas of the site near the Sequelitchew Creek and its associated wetlands as well as near Old Fort Lake, but in lower numbers. Other native species adapted to a wide range of habitats, or urban environments, such as American robin, American crow, hummingbirds, bushtit, dark-eyed junco, song sparrow, raccoon, and coyote may increase in abundance on the site, especially in developed areas (Robbins 1979, Penland 1984, Tilghman 1987).

Animals that are least tolerant of human disturbance, such as ground- and shrub-nesting birds, ground-dwelling mammals, and carnivores, would be most affected by the proposed development. For areas of native habitat that remain (such as in the open space areas near Sequelitchew Creek and Old Fort Lake), studies have shown that some species may not be able to consistently produce young due to competition from urban-adapted species, habitat fragmentation, or increased exposure to edges (e.g., Donovan et al. 1995, Friesen et al. 1995). For example, species such as brown creeper, golden-crowned kinglet, and black-throated gray warblers, which tend to occupy forest interior settings (e.g., Pearson and Manuwal 2000, 2001) may be adversely affected by predation, nest parasitism, and competition with other species under the proposed development (Marzluff et al. 2007).

Populations of reptiles and amphibians, which rely on forest duff, downed logs, snags, and wetlands, would be substantially reduced within developed areas across the site. Existing wetlands and streams on the site will remain intact, but other special habitat features throughout the site and some local dispersal habitat would be eliminated due to increased fragmentation of retained habitats and the introduction of roadways throughout all the dwelling areas.

The clearing, grading, and construction relating from development would separate habitat areas and increase fragmentation. This, together with increased disturbance (e.g., vehicular traffic, human presence throughout the trail systems) may affect movement patterns of some wildlife species, creating a barrier to movements of small mammals, reptiles, and amphibians. Increased mortality would likely result from animals attempting to cross roads, and some animals may alter movement patterns to avoid areas or time periods of high activity. Increased fragmentation of remaining native habitat, together with the expected increased human activity on existing and proposed trails, would affect animal

movement patterns by causing the animals to avoid areas or time periods of high activity. However, many species would probably continue to use undeveloped areas of the site.

The introduction of a large number of dwellings and activity centers under the proposed alternative will result in an increased amount of human activity throughout the project site. This includes human presence on trails, driving through the site on developed roads, increased noise at the dwellings, and introduction of foreign materials by occupants. All these activities could lead to avoidance by local wildlife populations and even mortality due to interactions such as vehicular strikes.

In addition, an increase in the presence of domestic pets would increase the likelihood of disturbance of retained habitats and potentially affect movements and activities of animals on site. Native species can be adversely impacted by domestic cats and dogs, which can act as “super-predators,” (Leu et al. 2008, Odell and Knight 2001, Penland 1984), particularly with a greater human population at full buildout.

Materials brought on-site by new occupants could have potentially detrimental impacts on local wildlife populations. The use of insecticides by homeowners has been shown to reduce the food resource of insectivorous animal species (Penland 1984), and the introduction of features such as birdfeeders could also lead to an increase in generalist bird species that could compete with previously present populations.

4.2.3 Mitigation

Measures to minimize impacts to wetlands, water quality, and associated vegetation and fish and wildlife habitat both during and after construction include a variety of Best Management Practices (BMPs):

- Designation of construction limits, including staging areas, would be clearly marked in the field prior to beginning construction activities.
- Marking the limits of wetland buffer areas and designated open space areas on construction plans and in the field to prevent unauthorized damage to critical areas during construction.
- Construction staging areas would be located outside of stream and wetland buffers to minimize impacts to vegetation.
- Avoiding vehicle re-fueling and maintenance activities within wetland and stream buffers, or within at least 100 feet of wetlands and streams.

Long-term mitigation may include:

- Designation of animal movement corridors between areas of retained vegetation can reduce the effects of habitat fragmentation. The golf course can be incorporated into these corridors, especially for nighttime movement. Although it has limited habitat value it can function as a movement corridor.
- Provision of landscape strips within the road corridors may also include native plants that have some value for wildlife cover and food, where feasible, given considerations of maintaining adequate sight distance for public safety and other applicable road standards.
- All hiking trails could be located outside the wetland and stream buffers and at the edges of large blocks of mature vegetation to avoid further human disturbance to species that remain in those areas.

4.2.4 Significant Unavoidable Adverse Impacts

Compared to pre-development conditions, the implementation of either alternative will introduce a variety of land uses that will add population and employees and a variety of economic activities which will change the natural environment and affect plants and animals in a variety of ways including:

- Removal of a substantial area of the existing native and non-native vegetation and soils and replacement by non-native communities or impervious surfaces outside of the critical areas and their buffers would result in a reduction in the local populations of most native wildlife species in the area, and continuation of a shift in species composition to favor species more adapted to urban environments; those animals displaced from the site would likely perish; and
- An increase in disturbance of adjoining areas of native forest and riparian habitat and on adjacent lands as a result of increased human activity including vehicular traffic, will reduce the productivity of such areas for species that may find them suitable habitat.

Such impacts are typical and unavoidable in the context of urban development.

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6. DISTRIBUTION LIST

Old Fort Lake Subarea Distribution List 2024		
	Contact Name and/or Agency	Email Address/Street Address
1	WA St. Dept of Archaeology & Historic Preservation	SEPA@dahp.wa.gov
2	Anne Fritz, AICP WA St. Dept of Commerce	Anne.fritzel@commerce.wa.gov
3	WA St. Dept. of Ecology	Separegister@ecy.wa.gov
4	Jerome Lambiotte SWRO Toxic Cleanup Program Section Manager WA St Dept of Ecology	Jerome.lambiotte@ecy.wa.gov
5	Marian Abbett Tacoma Smelter Plume Unit Supervisor Toxic Cleanup Program- SWRO	marian.abbett@ecy.wa.gov
6	Diana Ison Tacoma Smelter Plume Technical Assistance Coordinator Toxic Cleanup Program-SWRO WA St. Dept of	Diana.Ison@ecy.wa.gov
7	Eli Newby WA St. Dept of Ecology NPDES Permit Inspector-Water Quality Program	Eli.newby@ecy.wa.gov
8	Zachary Meyer Wetlands/Shorelands Specialist WA St. Dept of Ecology-SW Regional	Zmey461@ecy.wa.gov
9	Mike Gallagher WA St Dept of Ecology	mike.gallagher@ecy.wa.gov
10	Maria Sandercock WA St Dept of Ecology	MARI461@ECY.WA.GOV
11	Bobbak Talebi SW Regional Director WA St Dept of	bobbak.talebi@ecy.wa.gov
12	WA St. Dept of Health	SEPA.reviewteam@doh.wa.gov
13	Portia Leigh Area Habitat Biologist WA St Dept of Fish & Wildlife (WDFW)	Portia.leigh@dfw.wa.gov
14	WA St Dept of Fish & Wildlife (WDFW) SEPA	R6SSplanning@dfw.wa.gov

15	Michele Culver Regional Director	Teammontesano@dfw.wa.gov
16	WA St. Dept of Natural Resources SEPA Center	SEPACENTER@dnr.wa.gov
17	WA St Dept of Natural Resources South Puget Sound	Southpuget.region@dnr.wa.gov
18	Pierce County Planning & Public Works Barbara Ann Smolko Chambers Clover Creek Watershed Council	barbaraann.smolko@piercountywa.gov
19	Steilacoom Community Development Tanner Fuller	Tanner.fuller@ci.steilacoom.wa.us
20	WA St Dept of Transportation Olympic	OR-SEPA-REVIEW@wsdot.wa.gov
21	WA St Parks and Recreation Commission	Planning@parks.wa.gov
22	Nick Tealer Environmental Planner Puget Sound	Nick.tealer@psp.wa.gov
23	Puget Sound Clean Air Agency	SEPA@pscleanair.org
24	Alex Funderburg Project	605 Puyallup Ave Tacoma, WA 98421
25	Ms. Jaimie Wharton Chief, Environmental Division Compliance Branch JBLM	jaimie.l.wharton.civ@army.mil
26	William C. Britton Environmental Project Review JBLM	William.c.britton.civ@mail.mil
27	JBLM Richard Bain DPW	Richard.e.bain.civ@army.mil
28		
29	David Fullmer	David.j.fullmer4.civ@mail.mil
30	Land Use Review Capital Development-Pierce Transi	P.O. Box 99070 <u>Lakewood, WA 98499-0070</u>
31	DuPont Post Office Attn:	1313 Thompson Circle DuPont, WA
32	National Marine Fisheries Service Northwest Regional	7600 Sand Point Way NE Seattle, WA 98115-
33	Glynnis Nakai Nisqually Nat'l Wildlife Refuge	Glynnis_Nakai@fws.gov

34	Sean Gaffney Planning Manager	Sean.gaffney@piercecountywa.gov
35	Adonis Clark Pierce Co.	aclark@co.pierce.wa.us
36	Deland Hand Pierce Co Assessor/Treasurer-Commercial	Delane.hand@piercecountywa.gov
37	Taran Bedi, P.E. Engineering Supervisor Planning & Public Works, Sewer Div	Taran.bedi@piercecountywa.gov
38	John Graves	John.Graves1@dhs.gov
39	Lakewood Community & Economic Development Planning	planning@cityoflakewood.us
40	Tanner Fuller Planner	Tanner.fuller@ci.steillacoom.wa.us
41	Terri Hebert Admin Secretary for Capial Projects Clover Park School	Thebert@cloverpark.k12.wa.us
42	Shawn Lewis Assistant Superintendent Steilacoom Historical School	shlewis@steillacoom.k12.wa.us
43	Lemay	Cust2180@wcnx.org
44	David P. Brown Municipal Liaison Manager PSE	david.p.brown@pse.com
45	Debbie Germer Sr. TDM Planner-Sustainable Resources Pierce Co. Public Works	Debbie.germer@piercecountywa.gov
46	Windy Kruse Planner, Planning & Programming Sect. Planning & Public Works Pierce Co. Environmental Services Bldg	Windy.kruse@piercecounnywa.gov
47	Joe Cushman Nisqually Indian	Cushman.joe@nisqually-nsn.gov
48	Annette Bullchild Nisqually Tribal Historic Preservation Office Nisqually Indian Tribe	Bullchild.annette@nisqually-nsn.gov
49	Brad Beach Nisqually Tribal Historic Preservation Office Nisqually Indian Tribe	Beach.brad@nisqually-nsn.gov

50	David Troutt Natural Resources Director Nisqually Natural	troutt.david@nisqually-nsn.gov
51	George Walter Environmental Program Supervisor Nisqually Natural	walter.geroge@nisqually-nsn.gov
52	James Gordon Natural Resources Dept Cowlitz Indian	jgordon@cowlitz.org
53	Cowlitz Indian Tribe Permit	Permitreview@cowlitz.org
54	Elizabeth Sanchey Yakama	Elizabeth_sanchey@yakama.com
55	Emily Griffith Assistant Director NWL	Emily.griffith@agynbyte.com
56	Shirley Ely Director	Shirley.ely@agynbyte.com
57	Kirk Kirkland Environmental	Kirkkirkland@gmail.com
58	Kate Walsh	3mcwals@gmail.com
59	Renee Buck	renee.ihs@gmail.com
60	Lee Chase	Leeandchrischase@gmail.com
61	Vicki Keys	vickikeys@comcast.net
62	Beth Elliott	Bethelliott1953@gmail.com
63	Mike Brown	Bluemax36@gmail.com
64	Christi Glenn	christiglenn@hotmail.com
65	Penny Coffey	Pcoffey1@comcast.net
66	Robin Barrow	barpow1@msn.com
67	John Colvin	jpcolvin327@gmail.com
68	Carol Estep	Estepcarol@gmail.com
69	Chris Barnes	chrisbarnes5000@gmail.com
70	Lisa Humphrey	ftsillhomes@aol.com
71	Cara Mitchell	caraemitch@gmail.com
72	Michael Courts	mrcourts@gmail.com
73	Michelle Cayetano-Brandon	kuulei2000@icloud.com
74	Linda Smith	lums94@earthlink.net
75	David Russell	david_8257@msn.com
76	Anthony Hemstad	anthony@hemstad.us
77	Jeff Schramm, TENW	schramm@tenw.com
78	Heidi Lee	heidillee@comcast.net
79	Lyssa Rau	lyssarau@gmail.com
80	Allison Rook	rook.allison@gmail.com

81	Susan McBride	smcbride@piercecountylibrary.org
82	Melissa and RG Mc Gann	mcgannrm@yahoo.com
83	Janice Swartz	jjswartz1@comcast.net
84	Michael Farley	debbieandmile1@comcast.net
85	Tom Rylander	tomrylander@hotmail.com
86	Otis Harris	otishb1@hotmail.com
87	Jon Potter	potter.nwp@gmail.com
88	Becca Most	bmost@thenewtribune.com
89	Raysa Contreras	raysacontreras@icloud.com
90	Cindy Taber-Lowry	cltlowry@icloud.com
91	Heather Burgess	hburgess@dfpblaw.com
92	Becky Topp	btopp4@gmail.com
93	Joe Callero	Joecallero@hotmail.com
94	Ali Masterson	amasterson@AHBL.com
95	Amy Rakes	arakes01@gmail.com
96	Amy Walker	AWalker@dupontwa.gov
97	Andy Estep	andynsons@yahoo.com
98	Becky & Richard Kinney	bkajigal@comcast.net
99	Brad Haymond	brad@northpointkc.com
100	Bryan Bright	lbright@comcast.net
101	Christi Glenn	christiglenn@hotmail.com
102	Cooper Champlin	cchamplin@northpointkc.com
103	Cynthia Worstell	cworste@gmail.com
104	David Sherrard	Desherrardassoc@gmail.com
105	Dennis Larkin	dennis.larkin31@gmail.com
106	Gordon Karg	gkarg@dupontwa.gov
107	James Stanton	jstanton@htland.com
108	Jason Gauthier	jason.gauthier@piercecountywa.gov
109	Jeff Foe	jeffrey.foe@gmail.com
110	John Colvin	Johnpcolvin@gmail.com
111	John Sweeney	jsweeney@northpointkc.com
112	Justin Gravatt	justin.gravatt@thehomecourse.com
113	Justine Capra	caprajustine@nisqually-nsm.gov
114	Katrin Hall	cathrina81@hotmail.com
115	Keith Campbell, City Administrator	CityAdministrator@dupontwa.gov
116	Kelsie Clark	kelc9009@gmail.com
117	Lee Striar	lstriar@htland.com
118	Lisa Klein	LKlein@AHBL.com
119	Maria Tobin	mtobin@ssmcp.org
120	Mariah May	Mariah@authenticwagyu.com
121	Mark Towery	barracuda6@hotmail.com
122	Michelle Ryder	arradia@gmail.com
123	Mickey Gillie	MGillie@DupontWA.GOV
124	Murray Hutchins	mhutchins@gchsite.com

125	Pamela Foe	pfoe1959@gmail.com
126	Nancy Rudel	nisfornancy@gmail.com
127	Richard Ducharme	richard@copperleafinv.com
128	Robey Willis	rwillis@gchsite.com
129	Ronald Frederick, Mayor	rfrederick@dupontwa.gov
130	Roger Westman	rwestman@msn.com
131	Sarah Colleen Sotomish	sarah.sotomish@piercecounwa.gov
132	Susan Walton	fin327@comcast.net
133	Tom Wargo	thomasjwargo@yahoo.com
134	Tony Haynesworth	tonyhay68@hotmail.com
135	Troy Andrew	tandrew@wagolf.org
136	Dayna Miller	dupontchamberofcommerce@gmail.com
137	Bryan Moore	Bryan.Moore@dupontwa.gov

APPENDICES

- A. Existing Subarea Plan Available at: <https://wa-dupont2.civicplus.com/DocumentCenter/View/6350/Comprehensive-Plan---2017-Appendix-E---Old-Fort-Lake-Subarea-Plan>
- B. Existing Zoning Code Available at: [DuPont Municipal Code \(codepublishing.com\)](#)
- C. Proposed Subarea Plan Available at: <https://www.dupontwa.gov/DocumentCenter/View/8373/Draft-OFLSPU-and-Amended-Regulations--Comb-docsPDF>
- D. Proposed Zoning Amendments Available at: <https://www.dupontwa.gov/DocumentCenter/View/8373/Draft-OFLSPU-and-Amended-Regulations--Comb-docsPDF>
- E. All Technical Reports are Available at: <https://www.dupontwa.gov/696/Old-Fort-Lake-Subarea-Plan-Update>