



November 16, 2022

City of Lake Stevens
c/o Mackenzie
500 Union Street, Suite 410
Seattle, Washington 98101

**Subject: Geologic Hazard Assessment
Lake Stevens Industrial Center
Lake Stevens, Washington 98258
RGI Project No. 2022-463-2**

As requested, The Riley Group, Inc. (RGI) is providing this Geologic Hazard Assessment of the Lake Stevens Industrial Center located in Lake Stevens, Washington. The Lake Stevens Industrial Center is comprised of approximately 280 acres, and includes properties between Hartford Drive and North Machias Drive and properties west of Hartford Drive, extending south to north between 20th Street Northeast and 36th Street Northeast. The site is shown on Figure 1.

Geology

Review of the *Geologic Map of the Lake Stevens Quadrangle, Snohomish County, Washington* by James P. Minard (1985) indicates the central portion of the site is underlain by Till (Map Unit Qvt), which is a mixture of clay, silt, sand, and gravel deposited at the base of the Vashon ice sheet.

The western portion of the site is primarily mapped as Older Alluvium (Qoal), which is sand and gravel deposited as terraces above the younger alluvium. Younger Alluvium (Qyal) is recently deposited fine grained and organic rich soils mapped in localized areas along the eastern and western edges of the site adjacent to Catherine Creek and Little Pilchuck Creek. Portions of the site east of Little Pilchuck Creek are mapped as Advance Outwash (Qva), which is sand and gravel deposited by meltwater streams issuing from and subsequently overrun by the advancing Vashon ice sheet.

Erosion Hazard Areas

Review of the *Soil Survey of Snohomish County Area Washington* by the USDA Soil Conservation Service (1983) indicates much of the site is mapped as Tokul gravelly loam, 0 to 8 percent slopes (Map Unit 72), which formed in glacial till and is characterized by a slight erosion hazard potential. In the northeastern portion of the site, the west slope of a channel occupied by Little Pilchuck Creek is mapped as Tokul gravelly loam, 8 to 15 percent slopes (73), and is also characterized by a slight erosion hazard potential.

The remainder of the site primarily occupying the stream valleys of Catherine Creek and Little Pilchuck Creek, are mapped as Everett gravelly sandy loam, 0 to 8 percent slopes (17), McKenna gravelly silt loam, 0 to 8 percent slopes (32), Mukilteo muck (34), Norma loam (39), and Pastik silt loam, 0 to 8 percent slopes (47), all of which are characterized by a slight to no erosion hazard potential.

The site generally does not have high erosion hazard areas; however, an erosion and sedimentation control plan should be implemented for developments at the site, particularly for properties adjacent to Catherine Creek and Little Pilchuck Creek.

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Landslide Hazard Areas

Based on the available topography, the site does not appear to have steep slopes greater than 40 percent, but isolated areas close to or exceeding 40 percent could be found on the west slope of the channel occupied by the Little Pilchuck River in the northeastern portion as identified on Figure 2. A separate east-west-trending channel in the northern portion of the site appears to contain slopes in the 15 to 40 percent range that may contain soils that meet the criteria of a landslide hazard area. Additional localized areas along Catherine Creek and Little Pilchuck Creek could also meet the criteria of a landslide hazard area due to stream bank erosion.

Seismic Hazard Areas

Review of the Liquefaction Susceptibility Map of Snohomish County, Washington by Stephen P. Palmer, etc. (2004) indicates the western portion and localized eastern edges of the site are mapped as having a high liquefaction susceptibility as shown on Figure 3. The remainder of the site is mapped as having a very low liquefaction susceptibility. The high liquefaction hazard areas are in the relatively recent older and younger alluvial deposits adjacent to Catherine Creek and Little Pilchuck Creek. The Younger Alluvium deposits are limited to the creek drainages and generally cannot be developed. Most of the high liquefaction hazard area is located west of Hartford Road in the Older Alluvium deposit and will likely have a deeper water table and coarser soils than the Younger Alluvium.

Critical Aquifer Recharge Areas

Review of the *Snohomish County Critical Aquifer Recharge Areas Map* (2016) indicates the younger and older alluvial deposits are mapped as having a high aquifer sensitivity, with localized areas having a moderate aquifer sensitivity. The glacial till in the central portion of the site is mapped as having a low aquifer sensitivity. A Snohomish County Well Head Protection Radius occupies the northern portion of the site.

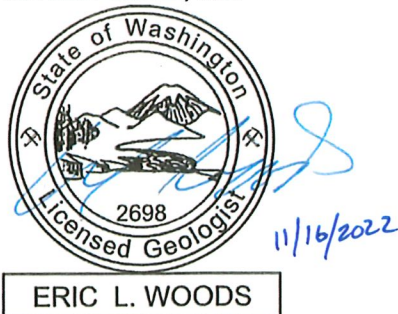
Infiltration

Infiltration may be feasible in the younger and older alluvial deposits on the site. The older alluvial deposits west of Hartford Road are at a higher elevation and may have more soils suitable for infiltration above the water table.

Please call us if you have any questions or need additional information at (425) 415-0551.

Sincerely,

THE RILEY GROUP, INC.

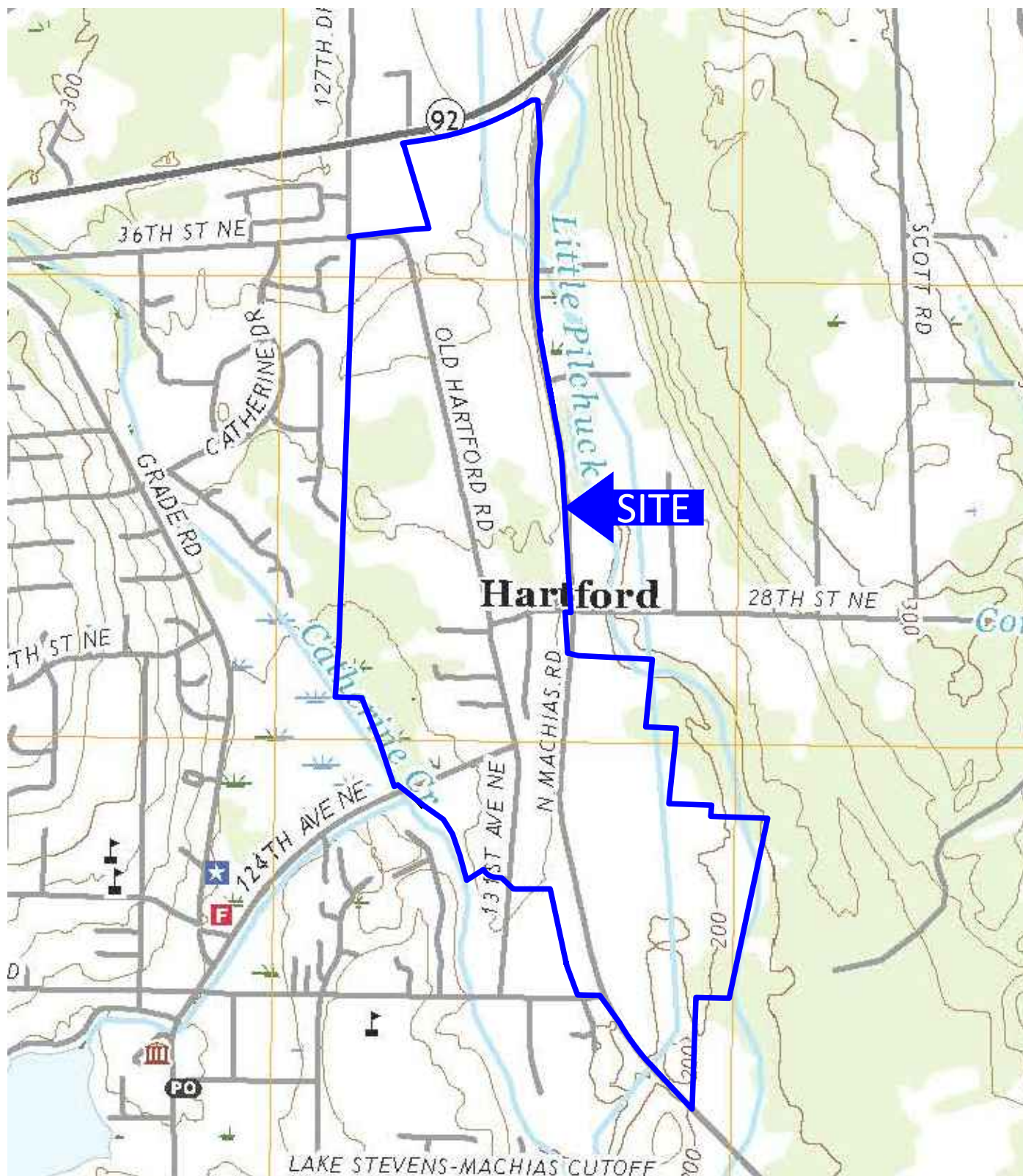


Eric L. Woods, LG
Project Geologist



Kristina M. Weller, PE
Principal Geotechnical Engineer

Attachments: Figure 1 Vicinity Map
 Figure 2 Landslide Hazard Areas
 Figure 3 Liquefaction Hazard Areas



USGS, 2020, Lake Stevens, Washington
7.5-Minute Quadrangle

Approximate Scale: 1"=1000'

0 500 1000 2000



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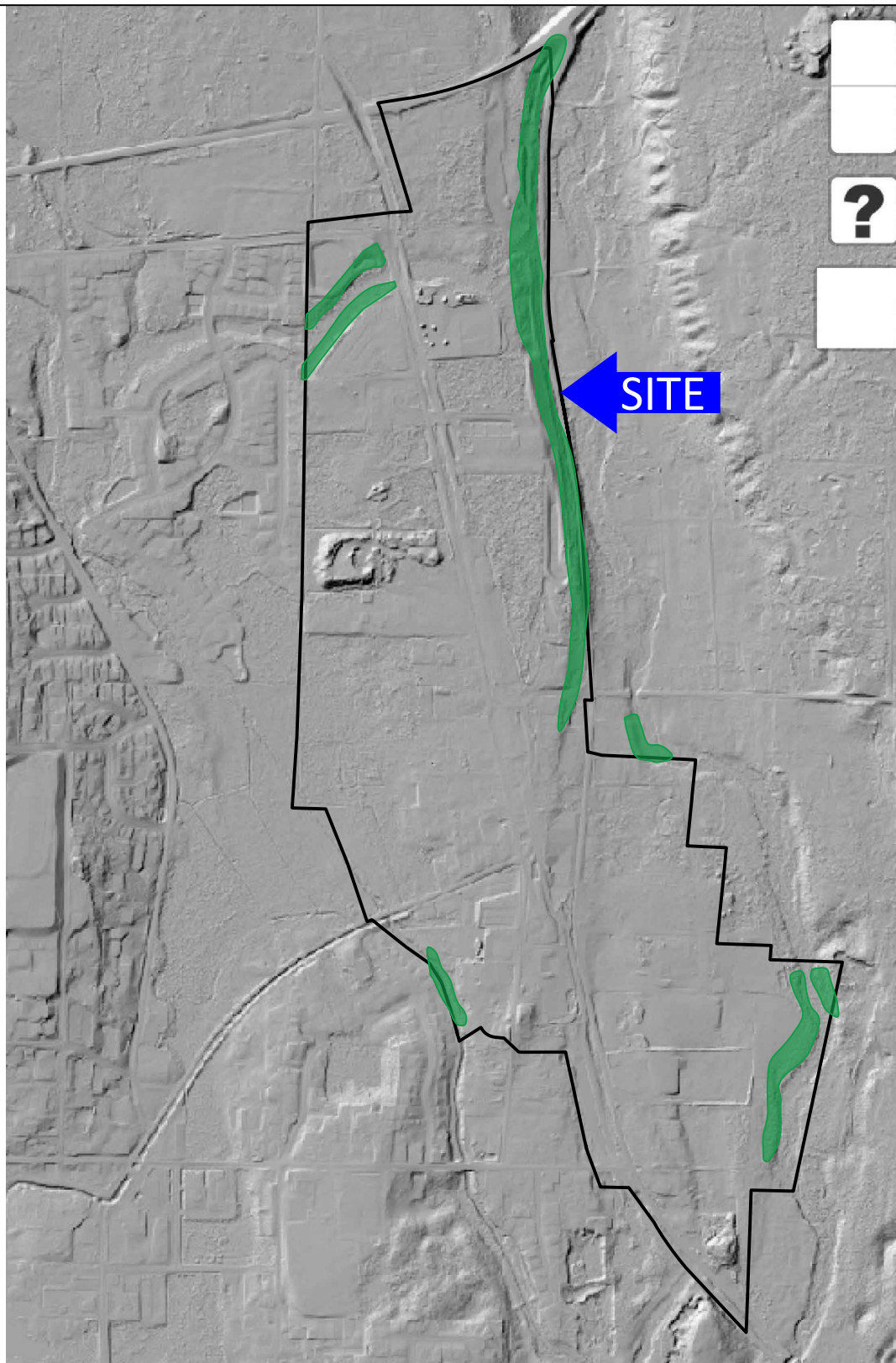
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Site Vicinity Map

Figure 1

Date Drawn:
11/2022

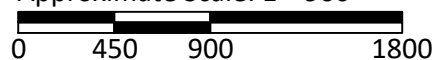
Address: Old Hartford Road and 28th Street Northeast, Lake Stevens, Washington 98258



 = Potential Landslide Hazard Area

2017, Washington Lidar Map

Approximate Scale: 1"=900'



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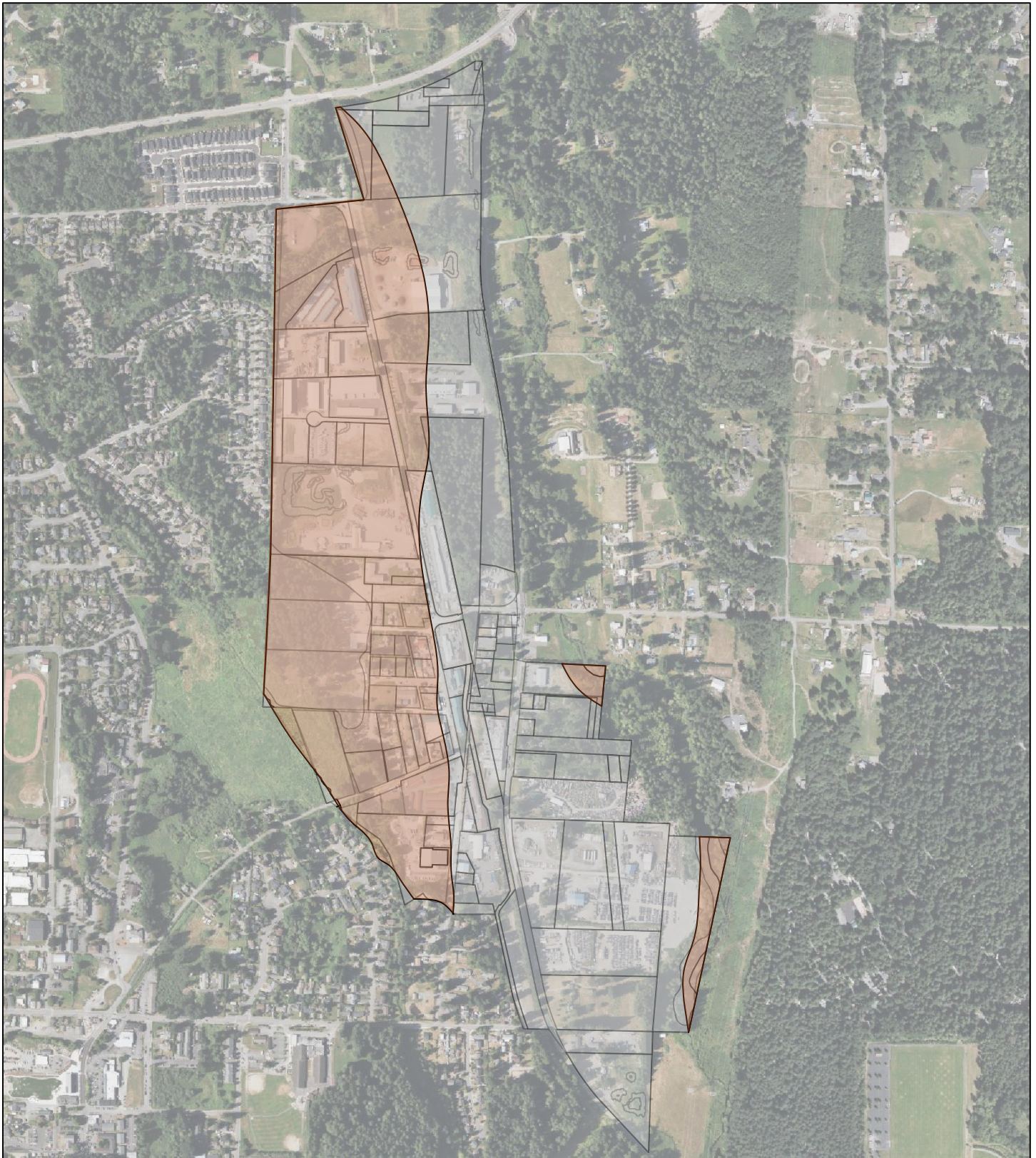
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Landslide Hazard Areas

Figure 2

Date Drawn:
11/2022

Address: Old Hartford Road and 28th Street Northeast, Lake Stevens, Washington 98258



- = Subject Property Boundary
- = High Liquefaction Hazard Area

Approximate Scale: 1"=900'

0 450 900 1800



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Liquefaction Hazard Areas

Figure 3

Date Drawn:
11/2022

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