3D geologic map of the Brinnon 7.5-minute quadrangle, Jefferson and Kitsap Counties, Washington

Disclaimer

Citation and link

This 3D geologic map is derived from previously published geologic mapping and analysis. Some of the borehole data are considered preliminary and have not been examined for accuracy of either location or lithologic identification. While lithologic identification for all wells was made by the author of the published geologic map, not all of the wells shown in this 3D product were necessarily used to construct the geologic cross section. The map, cross section, and the borehole data within the 3D model are not intended for analytical use. Instead, the published map and (or) pamphlet should be consulted for original data and interpretation.

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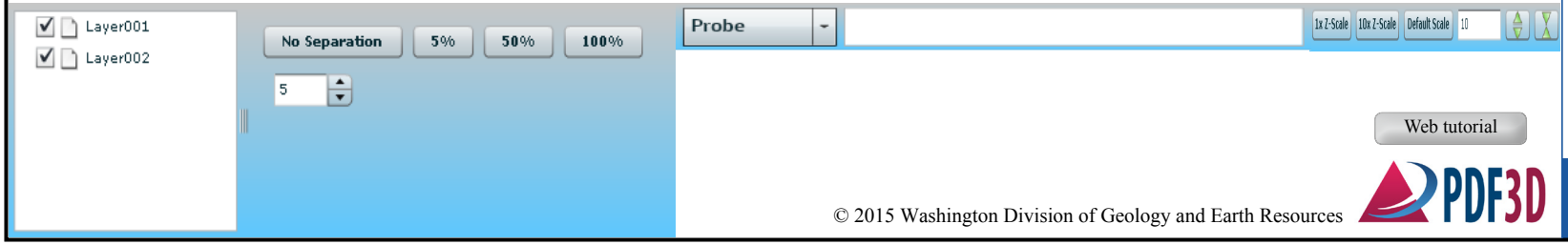

Web tutorial

PDF3D

WASHINGTON STATE DEPARTMENT OF
Natural Resources
Peter Goldmark - Commissioner of Public Lands

3D PDF INSTRUCTIONS

NAVIGATION
(1 of 2)

- Click inside the window to manipulate the 3D view—the compass will rotate to point towards north
- Hold the left mouse button and move the mouse to tilt the view
- Use the mouse wheel to zoom
- Hold both the right and left mouse buttons to pan the view
- Toggle individual layers in the lower left corner
- Change the vertical scaling or layer separation in the lower toolbar
- Selecting an object will display its data below

OBJECT DATA

undefined

undefined

undefined

undefined

3D model creation: Daniel W. Eungard

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WASHINGTON STATE DEPARTMENT OF
Natural Resources
Peter Goldmark - Commissioner of Public Lands
Division of Geology and Earth Resources
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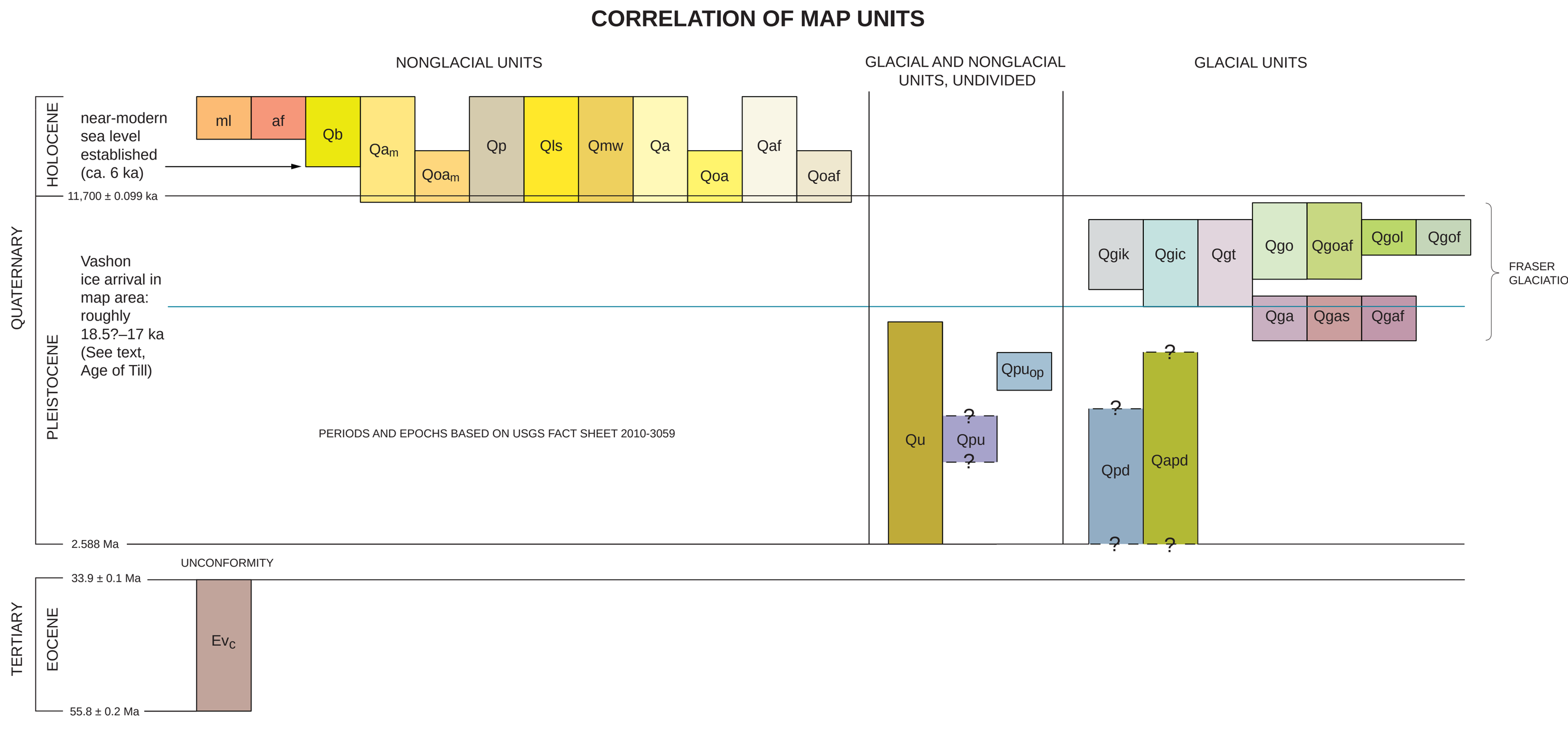
WASHINGTON DIVISION OF GEOLOGY AND EARTH RESOURCES
Map Series 2012-02
Brinnon 7.5-minute Quadrangle
December 2012

Pamphlet accompanies map

MAJOR FINDINGS

- Structural data suggest that the Seattle fault system is present in the southern third of the map area.
- A new 17.8 to 17.5 ka radiocarbon date indicates that Vashon Puget lobe ice had arrived and reached a 1,350 ft altitude before rising to 3,100 ft at glacial maximum.
- Hood Canal relict lake shorelines extend farther north than previously recognized and suggest post-glacial tectonic lowering of the map area relative to southern Hood Canal.
- No glaciers from the Olympic Mountains appear to have entered the Brinnon quadrangle during or after the Vashon Stade.
- Patchy till distribution and development allow groundwater to readily leak through the till.

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

(see pamphlet for detailed map unit descriptions)

Quaternary Unconsolidated Deposits

HOLOCENE NONGLACIAL DEPOSITS

af **Artificial fill**—Sand, cobbles, pebbles, boulders, silt, clay, organic matter, rip-rap, and concrete placed to elevate the land; engineered or non-engineered.

ml **Modified land**—Locally derived sand, pebbles, cobbles, boulders, silt, clay, and diamicton; excavated and redistributed to modify topography.

Qb **Beach deposits**—Sand, pebbles, pebbly sand, cobbles, silt, clay, shells, and isolated boulders; loose; clasts moderately to well rounded and oblate; locally well sorted.

Qoa_m Qa_m **Marine deltaic alluvium**—Sand, mud, pebbles, cobbles, and organic salt marsh deposits; well rounded and moderately to well sorted; loose; stratified to massively bedded; unit Qoa_m (cross section only) where relict.

HOLOCENE TO POST-GLACIAL PLEISTOCENE NONGLACIAL DEPOSITS

Qp **Peat**—Organic and organic-rich sediment; includes peat, muck, silt, and clay; typically in closed depressions.

Qls **Landslide deposits**—Cobbles, pebbles, sand, silt, clay, boulders, and diamicton in slide bodies and toes; angular to rounded clasts and grains; unsorted; generally loose, jumbled, and unstratified.

Qmw **Mass-wasting deposits**—Cobbles, pebbles, sand, silt, clay, boulders, and diamicton; loose; generally unsorted, but locally stratified; shown along potentially or demonstrably unstable slopes.

Qoa Qa **Alluvium**—Boulder, cobble, and pebble gravel and sand, some silt, clay, peat; moderately to well sorted; stratified to massive; deposited in flood plains and on terraces; unit Qoa where relict.

Qoaf Qaf **Alluvial fan deposits**—Cobble and pebble gravel with sand, silt, and boulders; loose; moderately to poorly sorted; stratified; forms concentric lobes where streams emerge from valleys; unit Qoaf where relict.

PLEISTOCENE GLACIAL AND NONGLACIAL DEPOSITS

Vashon Drift (northern-sourced)

Qgo **Vashon recessional outwash**—Pebble and cobble gravel; some sand, silt, clay; moderately fresh; clasts subrounded; moderately sorted; some exposures difficult to separate from unit Qga. Subdivided into:

Qgoaf **Vashon recessional alluvial fan deposits**—Cobble and pebble gravel, sand, silt, and boulders; loose; moderately to poorly sorted and stratified; forms concentric lobes where streams once emerged from valleys.

Qgol **Vashon recessional glacial lake–deltaic outwash**—Pebble and cobble gravel, sand, and some mud; gray; loose; moderately to well-sorted and clean; deltaic assemblage.

Qgof **Vashon recessional(?) glacial lake deposits**—Silt, locally ranges to sand and clay and rare dropstones; gray; loose, but some exposures moderately stiff; well sorted.

Qgic **Vashon ice-contact deposits**—Cobble and pebble gravel, sand, ablation till, flow till, lodgment till, lacustrine mud, and rare boulders; tan to gray; loose to compact; variously sorted; massive to well stratified; includes sub-ice flow and collapse features. Subdivided into:

Qgik **Vashon ice-contact kames and kame deltas**—Pebble and cobble gravel, sand, lacustrine mud, and diamicton; mostly loose.

Qgt **Vashon Till**—Diamicton, mostly lodgment till, of clay, silt, sand, pebbles, cobbles, and isolated boulders; mostly brown to gray; lightly weathered or unweathered, but locally includes inherited weathering; unsorted; unstratified; compact, commonly resembling concrete.

Qga **Vashon advance outwash**—Pebble and cobble gravel, silt, sand, clay, and diamicton; gray to tan; compact; clasts well rounded and well sorted; thinly to thickly bedded. Subdivided into:

Qgas **Vashon advance outwash sand**—Sand, some interbeds of silt, clay, pebbles, cobbles or diamicton; gray to brown; compact; subrounded to well rounded and well sorted; thinly to thickly bedded.

Qgaf **Vashon advance lacustrine silt and clay**—Silt and clay, some interbeds of sand, pebbles, cobbles or diamicton; gray; compact; well sorted; laminated to massive.

Pre-Vashon Olympic-sourced Glacial and Nonglacial Deposits, Undivided

Qpu_{op} **Pre-Vashon alluvium**—Sandy to muddy pebble gravel and scattered charcoal, wood, and gyttja seams; gray to orange brown; compact; moderately sorted; bedded.

Pre-Vashon Glacial Deposits

Qapd **Pre-Vashon Olympic-sourced glacial drift, undivided**—Till and outwash consisting of sand to cobble and pebble gravel with sparse boulders; brown to orange; compact; faintly bedded or unbedded.

Qpd **Pre-Vashon northern-sourced glacial drift, undivided**—Till and outwash consisting of clay, silt, sand, pebbles, cobbles, and boulders; brown or gray; compact; unstratified to well-stratified.

Glacial and Nonglacial Deposits, Undivided

Qpu **Undivided Quaternary sediment older than Vashon Till**—Sandy pebble gravel and sand, with mud interbeds; compact; gray, with surficial iron staining and some light-brown mud beds.

Qu **Undivided Quaternary sediment (cross section only)**—Undifferentiated deposits, includes pebbles, sand, cobbles, silt, clay, diamicton, organic sediment, and rare boulders.

Tertiary Sedimentary and Volcanic Bedrock

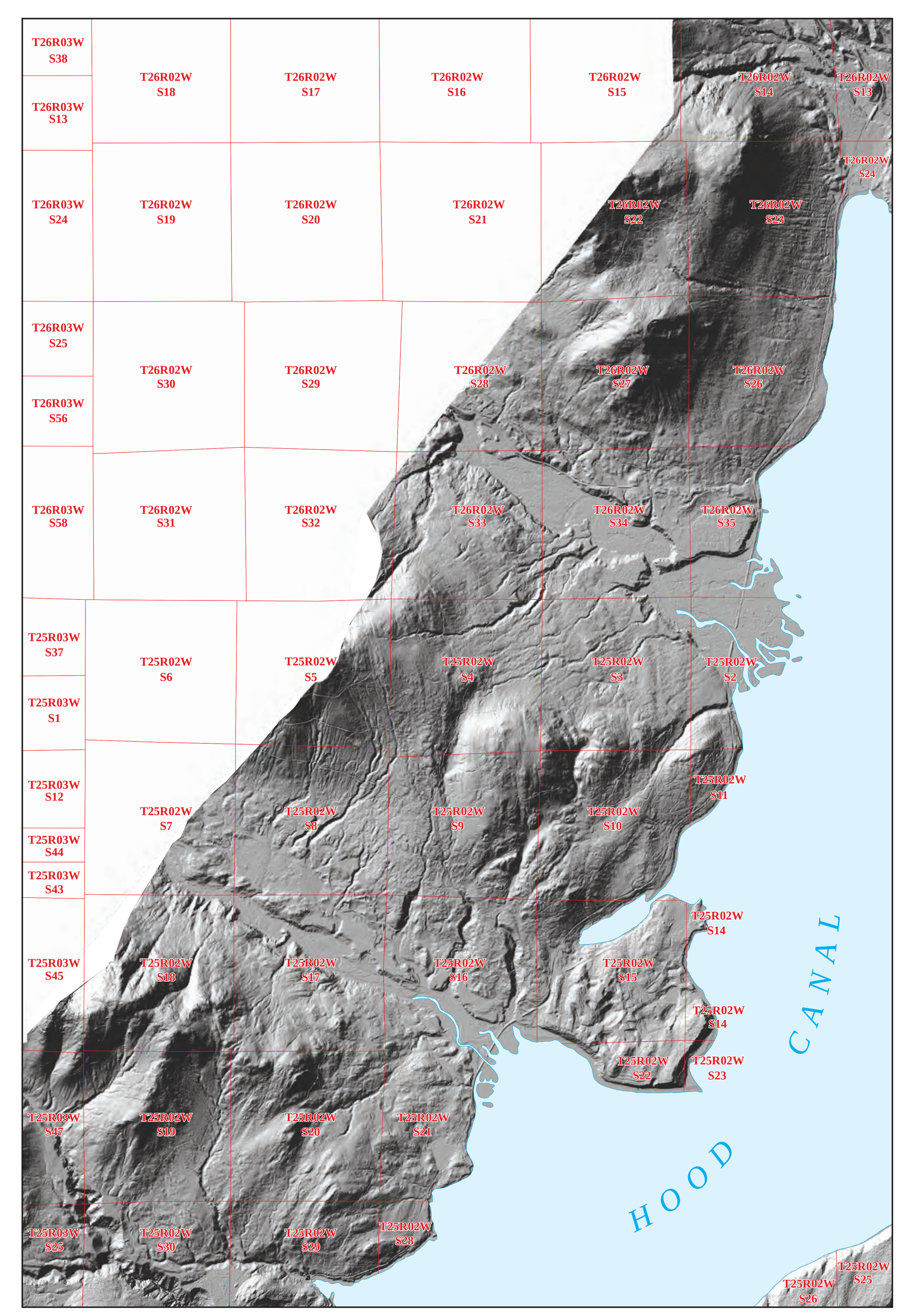
Ev_c **Crescent Formation (early to middle Eocene)**—Fine- to coarse-grained blocky subaerial basalt flows with rare and thin sedimentary interbeds; typically weathered and fractured.

GEOLOGIC SYMBOLS

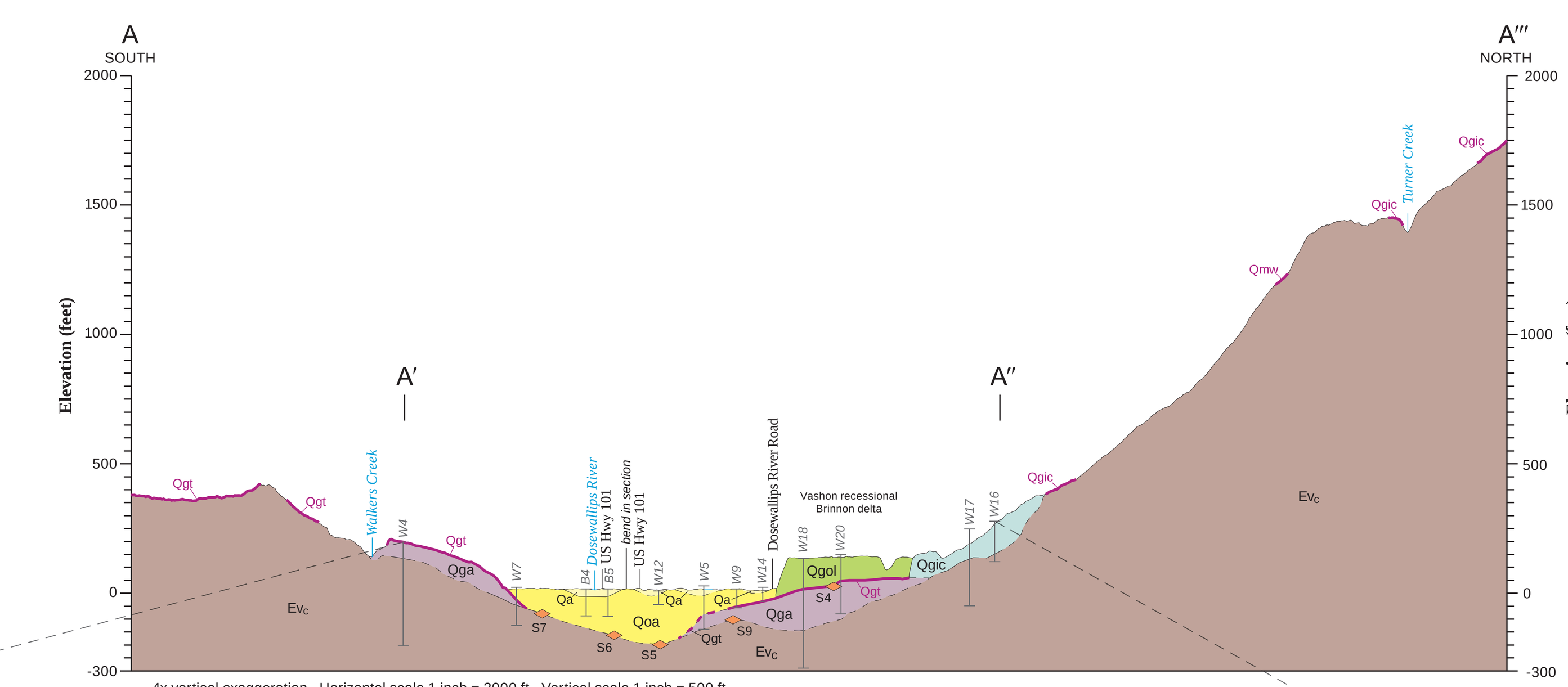
- Contact—Identity and existence certain, location accurate; long dashed where location approximate; short dashed where location inferred
- Fault, unknown offset—Identity and existence certain, location accurate; queried where identity or existence questionable; dashed where location inferred
- Thrust fault, sawteeth on upper (tectonically higher) plate—Identity or existence questionable, location approximate; dotted where location concealed
- Anticline—Identity and existence certain, location approximate; queried where identity or existence questionable; dotted where location concealed
- Syncline—Identity and existence certain, location approximate; queried where identity or existence questionable; dotted where location concealed
- Geologic unit too thin to show as a polygon (cross section only)—Identity and existence certain, location accurate; dashed where location inferred
- Fluvial terrace riser—Identity and existence certain, location accurate; hachures point down slope
- Landslide scarp—Identity and existence certain, location accurate; hachures point down slope
- A A‴ Cross section line
- Continental ice limit (late Wisconsinan)—Identity and existence certain, location inferred
- Geomorphic lineament apparent in lidar hillshade image—Identity questionable; extends southwest into neighboring quads (see Structure discussion in pamphlet)
- Alignment of geomagnetic field strength gradients and crustal earthquake hypocenters—Nature and significance unresolved (see Structure discussion in pamphlet)
- 26 Bedding—Showing strike and dip
- 63 Joint—Showing strike and dip
- Vertical or near vertical joint—Showing strike
- 32 Minor fault—Showing strike and dip
- 86 Slickensided surface—Showing strike and dip
- Vertical slickensided surface—Showing strike
- 17 Bedding in unconsolidated sedimentary deposits—Showing strike and dip
- 22 Foreset bedding in unconsolidated sedimentary deposits—Showing strike and dip
- Glacial striae—Showing bearing
- 20 Flow layering in lava flow—Showing strike and dip
- 62 Shear—Showing strike and dip
- Shear—Showing strike
- G3 Geochemistry site
- W5 Water well (W5) or geotechnical boring (B8)
- S10 Significant site
- Ev_c Geologic unit too small to show as a polygon at map scale (only unit Ev_c)
- GD1 Date site, radiocarbon analysis by ^{14}C or accelerator mass spectrometry (AMS)
- GD7 Date site, ^{40}Ar-^{39}Ar, argon-40 to argon-39 series analysis
- GD5 Date site, optically stimulated luminescence (OSL) and infrared stimulated luminescence (IRSL) analysis

Table 1. List of geochemistry sites, geotechnical sites, well sites, significant sites, and age sites for the Brinnon quadrangle. DOE, Washington State Department of Ecology; AMS, radiocarbon analysis by accelerator mass spectrometry; ^{14}C, radiocarbon analysis; ^{40}Ar-^{39}Ar, Argon-40 to Argon-39 series analysis; OSL, optically stimulated luminescence analysis; IRSL, infrared stimulated luminescence analysis.

Geochemistry site	Type	Site location	Site information
G1	whole-rock geochemistry site	sec. 23, T25N R2W	Quatsap Point andesite (pebble)
G2	whole-rock geochemistry site	sec. 19, T26N R2W	Rocky Brook Crescent
G3	whole-rock geochemistry site	sec. 22, T26N R2W	Mount Turner
G4	whole-rock geochemistry site	sec. 28, T26N R2W	Rocky Brook falls
G5	whole-rock geochemistry site	sec. 34, T26N R2W	Green Hill
G6	whole-rock geochemistry site	sec. 33, T26N R2W	lower Dosewallips valley – south side
G7	whole-rock geochemistry site	sec. 12, T25N R3W	Duckabush River
G8	whole-rock geochemistry site	sec. 18, T25N R2W	south of Duckabush – western
G9	whole-rock geochemistry site	sec. 47, T25N R3W	Fulton Creek north
G10	whole-rock geochemistry site	sec. 20, T25N R2W	south of Duckabush – center
G11	whole-rock geochemistry site	sec. 20, T25N R2W	upper McDonald Creek
G12	whole-rock geochemistry site	sec. 47, T25N R3W	Fulton Creek south
G13	whole-rock geochemistry site	sec. 20, T25N R2W	south of Duckabush – eastern
G14	whole-rock geochemistry site	sec. 30, T25N R2W	lower McDonald Creek
G15	whole-rock geochemistry site	sec. 30, T25N R2W	lower McDonald Creek 2
G16	whole-rock geochemistry site	sec. 25, T25N R3W	South Fork Fulton Creek
Geotechnical boring site	**Type**	**Site location**	**Site information**
B1	Shannon & Wilson (1998)	sec. 2, T25N R2W	boring B-1
B2	Shannon & Wilson (1998)	sec. 2, T25N R2W	boring B-2
B3	Shannon & Wilson (1998)	sec. 2, T25N R2W	boring B-3
B4	Shannon & Wilson (1998)	sec. 2, T25N R2W	boring B-4
B5	Shannon & Wilson (1998)	sec. 2, T25N R2W	boring B-5
B6	Shannon & Wilson (1998)	sec. 2, T25N R2W	boring H-2-93
B7	Shannon & Wilson (1998)	sec. 2, T25N R2W	boring H-4-94
B8	Shannon & Wilson (1998)	sec. 2, T25N R2W	boring H-5-94
Well site	**Type**	**Site location**	**Site information**
W1	Department of Ecology well	sec. 2, T25N R2W	DOE internal tracking no. 44065
W2	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 44519
W3	Department of Ecology well	sec. 34, T26N R2W	DOE internal tracking no. 45169
W4	Department of Ecology well	sec. 2, T25N R2W	DOE internal tracking no. 47686
W5	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 48479
W6	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 49701
W7	Department of Ecology well	sec. 2, T25N R2W	DOE internal tracking no. 50638
W8	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 51971
W9	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 53927
W10	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 54239
W11	Department of Ecology well	sec. 2, T25N R2W	DOE internal tracking no. 54723
W12	Department of Ecology well	sec. 2, T25N R2W	DOE internal tracking no. 54726
W13	Department of Ecology well	sec. 2, T25N R2W	DOE internal tracking no. 277065
W14	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 341555
W15	Department of Ecology well	sec. 2, T25N R2W	DOE internal tracking no. 354421
W16	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 401461
W17	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 412770
W18	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 47699
W19	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 734342
W20	Department of Ecology well	sec. 35, T26N R2W	DOE internal tracking no. 734511
Significant Site	**Type**	**Site location**	**Site information**
S1	HVSR	sec. 25, T25N R2W	horizontal-to-vertical spectral ratio (HVSR) site 12, spectral ratio 0.20
S2	HVSR	sec. 21, T25N R2W	horizontal-to-vertical spectral ratio (HVSR) site 3, spectral ratio 2.8
S3	HVSR	sec. 16, T25N R2W	horizontal-to-vertical spectral ratio (HVSR) site 4, spectral ratio 2.8
S4	HVSR	sec. 35, T26N R2W	horizontal-to-vertical spectral ratio (HVSR) site 6, spectral ratio 0.31
S5	HVSR	sec. 2, T25N R2W	horizontal-to-vertical spectral ratio (HVSR) site 7, spectral ratio 63.97
S6	HVSR	sec. 2, T25N R2W	horizontal-to-vertical spectral ratio (HVSR) site 8, spectral ratio 1.84
S7	HVSR	sec. 2, T25N R2W	horizontal-to-vertical spectral ratio (HVSR) site 9, spectral ratio 3.59
S8	HVSR	sec. 29, T26N R2W	horizontal-to-vertical spectral ratio (HVSR) site 10, spectral ratio 5.6
S9	HVSR	sec. 35, T26N R2W	horizontal-to-vertical spectral ratio (HVSR) site 11, spectral ratio 2.81
S10	site of interest	sec. 4, T25N R2W	weathered northern drift
S11	site of interest	sec. 4, T25N R2W	weathered northern drift
S12	site of interest	sec. 34, T26N R2W	weathered northern drift
S13	site of interest	sec. 23, T26N R2W	weathered northern drift
S14	site of interest	sec. 4, T25N R2W	weathered northern drift
S15	site of interest	sec. 4, T25N R2W	weathered northern drift
S16	site of interest	sec. 4, T25N R2W	weathered northern drift
S18	sedimentary rock sample site	sec. 30, T25N R2W	fossil content analyzed for biostratigraphic significance
S19	sedimentary rock sample site	sec. 29, T25N R2W	fossil content analyzed for biostratigraphic significance
S20	sedimentary rock sample site	sec. 29, T25N R2W	fossil content analyzed for biostratigraphic significance
S21	sedimentary rock sample site	sec. 20, T25N R2W	fossil content analyzed for biostratigraphic significance
S22	site of interest	sec. 18, T25N R2W	Duckabush glaciolacustrine
S23	site of interest	sec. 34, T26N R2W	lower Dosewallips glaciolacustrine
S24	site of interest	sec. 28, T26N R2W	Garcia Vashon alpine moraine
S25	site of interest	sec. 33, T26N R2W	basaltic Vashon till
S26	site of interest	sec. 18, T26N R2W	Rocky Brook westernmost granitic
S27	site of interest	sec. 25, T26N R3W	western Dosewallips valley northern till
S28	site of interest	sec. 15, T26N R2W	uppermost Mount Turner till
S29	site of interest	sec. 32, T26N R2W	uppermost till
S30	site of interest	sec. 5, T25N R2W	uppermost northern till
S31	site of interest	sec. 5, T25N R2W	uppermost granitic till
S32	site of interest	sec. 5, T25N R2W	uppermost granitic
S33	site of interest	sec. 47, T25N R3W	Fulton Creek joint-controlled channel
S34	site of interest	sec. 34, T26N R2W	channel constriction (lower Dosewallips valley)
S35	thin-section discussion site	sec. 26, T26N R2W	Qgt sample – represents northern source
S36	thin-section discussion site	sec. 2, T25N R2W	Qa sample – represents mixed Crescent and Olympic core source
S37	thin-section discussion site	sec. 16, T25N R2W	Qa sample – represents mixed Crescent and Olympic core source
S38	thin-section discussion site	sec. 22, T25N R2W	Qgic sample – represents northern source
S39	thin-section discussion site	sec. 47, T25N R3W	Qapd sample – represents Upper Crescent source
S40	thin-section discussion site	sec. 25, T25N R2W	Qga sample – represents northern source
S41	thin-section discussion site	sec. 25, T25N R3W	Qapd sample – represents Upper Crescent source
S42	thin-section discussion site	sec. 26, T25N R2W	Qga sample – represents northern source
Age site	**Type**	**Site location**	**Site information**
GD1	AMS	sec. 34, T26N R2W	Dosewallips relict alluvium (4,140 BP)
GD2	OSL and IRSL	sec. 35, T26N R2W	Brinnon delta Vashon recessional (21.7 ka [OSL]; 36.7 ka [IRSL])
GD3	AMS	sec. 18, T26N R2W	Rocky Brook Vashon advance (14,490 BP)
GD4	AMS	sec. 47, T25N R3W	Fulton Creek pre-Vashon (19,600 BP)
GD5	IRSL	sec. 22, T25N R2W	Quatsap Point delta (42.6 ka)
GD6	OSL and IRSL	sec. 14, T25N R2W	Black Point (39.2 ka [IRSL]; 40.2 ka [OSL])
GD7	^{40}Ar-^{39}Ar	sec. 19, T26N R2W	Rocky Brook Crescent Formation (36.76 Ma)
GD8	AMS	sec. 16, T25N R2W	Duckabush landslide (1,350 BP)
GD9	^{14}C	– – –	Duckabush delta (1,350 BP)



The area for which lidar was available is shown by the hillshade image above. Where available, lidar was used in the preparation of this map, but in order to provide a consistent map image, the hillshade backdrop shown on the map plate was generated using a 10-m digital elevation model not derived from lidar. To assist map users in relating locations on the map plate to locations on this figure, township, range and section (TRS) lines are shown on this figure. Because TRS lines are occasionally resurveyed and adjusted, there may be minor discrepancies between TRS lines on this figure and those shown on the base map, and areas identified as 'protection blocks' (PB unsurveyed) on the map are shown as numbered sections in this figure.

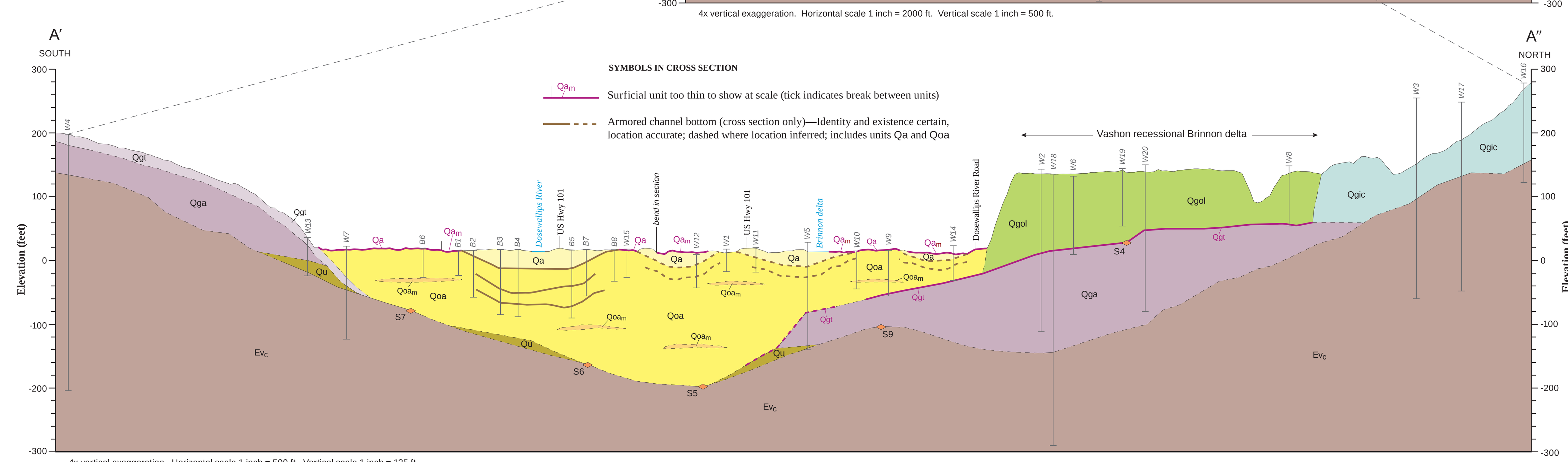


4x vertical exaggeration. Horizontal scale 1 inch = 2000 ft. Vertical scale 1 inch = 500 ft.

SYMBOLS IN CROSS SECTION

Qa_m Surficial unit too thin to show at scale (tick indicates break between units)

Armored channel bottom (cross section only)—Identity and existence certain, location accurate; dashed where location inferred; includes units Qa and Qoa

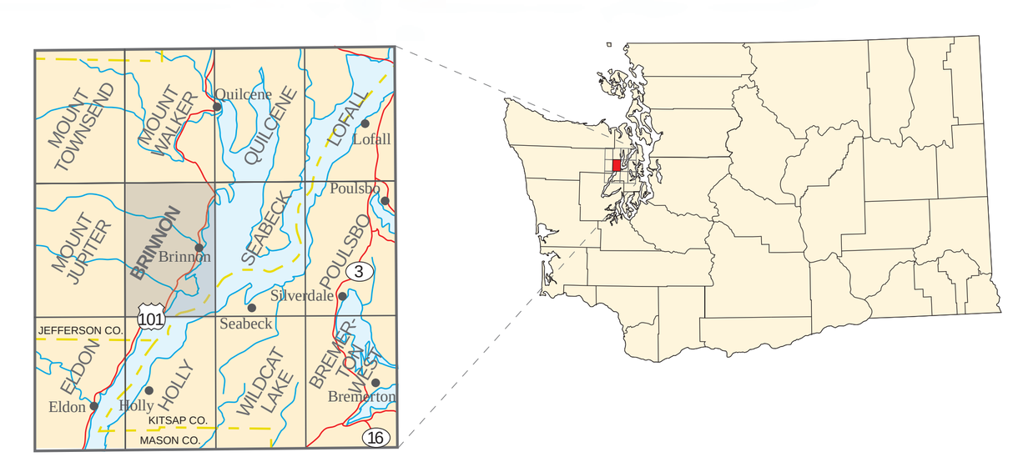


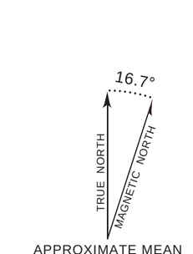
4x vertical exaggeration. Horizontal scale 1 inch = 500 ft. Vertical scale 1 inch = 125 ft.

Lambert conformal conic projection
North American Datum of 1927; to place on North American Datum of 1983, move the projection lines approximately 19 meters north and 94 meters east as shown by crosshair corner ticks
Base map from scanned and rectified U.S. Geological Survey Brinnon 7.5-minute quadrangle, 1999
Shaded relief generated from U.S. Geological Survey 10-meter digital elevation model; sun azimuth 340°; sun angle 60°
GIS by Michael Polenz, Eleanor Spangler, and Logan A. Fusso
Digital cartography by J. Eric Schuster and Anne C. Olson
Editing and production by Katherine M. Reed, Karen D. Meyers, Meredith C. Payne, and Jaretta M. Roloff

SCALE 1:24,000
contour interval 40 feet

This geologic map was funded in part by the U.S. Geological Survey National Cooperative Geologic Mapping Program.





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Geologic Map of the Brinnon 7.5-minute Quadrangle, Jefferson and Kitsap Counties, Washington

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