

**Figure 3-1: Geologic Units in the Brightwater Area**

| Symbol  | Unit Description  |
|---|---|
| <b>POSTGLACIAL DEPOSITS</b>                                     |   |
| m   | <u>Modified land (Holocene)</u> – Fill, or extensively graded natural deposits that obscure or substantially alter the original deposit. Locally subdivided into:   |
| af  | <u>Fill</u> – Artificial fill of substantial areal extent or thickness.   |
| gr  | <u>Graded</u> – Extensively graded.   |
| Qal   | <u>Alluvium (Holocene)</u> – Moderately sorted deposits of gravel, sand, and silt along the floodplains of lowland streams and rivers.  |
| Qb  | <u>Beach deposits (Holocene)</u> – Loose sand and gravel deposited by wave action, and silt-sand-gravel mixtures deposited in nearshore and marine slope environments. Narrow beaches not delineated.   |
| Qe  | <u>Estuarine deposits (Holocene)</u> – Loose interbedded silt and sand deposited at the mouth of a stream. Woody debris, marsh plants, and shells common.   |
| Qtf   | <u>Tideflat deposits (Holocene)</u> – Loose and soft sand and silt deposited by wave action. Narrow tideflats not delineated.   |
| Qmw   | <u>Mass-wastage deposits (Holocene)</u> – Colluvium, soil, and landslide debris that have indistinct morphology; mapped where sufficiently thick and continuous to obscure underlying material. Numerous unmapped areas of mass-wastage deposits also occur. Deposits, both mapped and unmapped, may include discrete landslides 1-10 m in lateral extent.                                  |
| Qls   | <u>Landslide deposits (Holocene)</u> – Diamicts composed of broken to internally coherent surficial deposits derived from upslope. Numerous unmapped areas of landslide deposits occur along the coastal bluffs of Puget Sound, particularly where coarse-grained deposits (units Qva, Qpofg, and Qpfnf) overlie fine-grained deposits (particularly units Qvlc, Qpogl, and Qpfnl,).        |
| Ql  | <u>Lake Deposits (Holocene)</u> – Sand, silt, and clay in closed depressions and lake bottoms. Areas grade into units Qal and Qw.   |
| Qw  | <u>Wetland and marsh deposits (Holocene)</u> – Peat, organic silt, and organic-rich alluvium, poorly drained and intermittently wet. Areas grade into units Qal and Ql.   |
| <b>GLACIAL DEPOSITS OF FRASER GLACIATION AGE (VASHON STADE)</b> |   |
| Qv  | <u>Glacial sedimentary deposits of the Vashon stade of the Fraser Glaciation (Pleistocene)</u> – Sediment of Vashon age based on the stratigraphic position and inferred glacial (northern) origin based on the presence of clasts or mineral grains requiring southward ice-sheet transport.   |
| Qvrf  | <u>Recessional fluvial deposits</u> – Stratified sand and gravel, moderately sorted to well sorted, and less common silty sand and silt. Exposed primarily in broad outwash channels, this generally carried glacial meltwater that drained southward away from the ice margin during retreat.  |
| Qvrl  | <u>Recessional lacustrine deposits</u> – Fine-grained sand, silt, and clay deposited in slackwater environments during ice recession.   |
| Qvi   | <u>Ice-contact deposits</u> – Deposits similar in texture to unit Qvr but locally containing a much higher percentage of silt intermixed with lenses and pods of sand, gravel and till. Normally consolidated. Commonly with steeply dipping beds.  |
| Qvt   | <u>Subglacial till</u> – Basal till. Compact diamict containing subrounded to well-rounded clasts, glacially transported and deposited. Generally forms an undulating surface. A few meters to a few tens of meters thick. Also found sporadically within areas mapped as unit Qvi. Subglacial till may be lodgement or subglacial melt-out in origin; but in any case has been overridden. |
| Qvtm  | <u>Subglacial Meltout till</u> – Dense, overridden heterogeneous deposits of till interlayered or intermixed with sand, silt, and/or gravel lenses. Till tends to be sandy rather than silty.   |

**Figure 3-1: Geologic Units in the Brightwater Area (continued)**

| Symbol  | Unit Description  |
|---|---|
| <b>GLACIAL DEPOSITS OF FRASER GLACIATION AGE (VASHON STAGE)</b>               |   |
| Qva   | <u>Advance outwash deposits</u> – Well-bedded sand and gravel deposited by streams and rivers issuing from the front of the advancing ice sheet. Generally unoxidized; almost devoid of silt or clay, except near the base of the unit where Qva is sometimes transitional with Qvlc when present.  |
| Qvlc  | <u>Lawton Clay</u> – Laminated to massive silt, clayey silt, and silty clay deposited in lowland or proglacial lakes. Marks transition from nonglacial to glacial time although unequivocal evidence for glacial or nonglacial origin may be absent. Deposits of correlative age and texture may be included in units Qpfr, Qpogf, or Orgf where evidence of age and/or depositional environment is absent. Locally includes top of Qob and distal deposits of Evans Creek outwash. |
| <b>PRE-FRASER GLACIAL AND NONGLACIAL DEPOSITS (MAJOR FORMATION DIVISIONS)</b> |   |
| Qob   | <u>Olympia Beds (Non-Glacial)</u>   |
| Qpd   | <u>Possession Drift (Glacial)</u>   |
| Qwb   | <u>Whidbey Formation (Non-Glacial)</u>  |
| Qdb   | <u>Double Bluff Drift (Glacial)</u>   |
| <b>PRE-FRASER NONGLACIAL DEPOSITS (GEOLOGIC ENVIRONMENT SUBDIVISIONS)</b>     |   |
| Qpfn  | <u>Nonglacial sedimentary deposits of pre-Fraser glaciation age (Pleistocene)</u> – Sediment of inferred nonglacial origin, based on the presence of peat, paleosols, and tephra layers; or a southern Cascade Range provenance for sedimentary clasts. Further subdivision by age not yet established. Locally subdivided into:  |
| Qpfnl   | <u>Lacustrine</u> – Deposits similar in texture to Holocene lake deposits (Ql). May include interbeds of Qpfnf, Qpfnp, and organic-rich sediments.  |
| Qpfnf   | <u>Fluvial</u> – Deposits similar in texture to Holocene alluvium (Qal). May include interbeds of Qpfnl and scattered to abundant organics.   |
| Qpfnb   | <u>Beach Deposits</u> – Deposits similar in texture to Holocene beach deposits (Qb).  |
| Qpfnw   | <u>Wetland Deposits</u> – Deposits similar in texture to Holocene wetland deposits (Qw). May include interbeds of Qpfnl and Qpfnf.  |
| Qpfnm   | <u>Marine Deposits</u> – Deposits of marine origin similar in texture to Holocene marine (Qms) and Holocene and Pre-Fraser lake (Ql and Qpfnl) deposits. May contain scattered shell fragments.   |
| Qpfnе   | <u>Estuarine Deposits</u> – Silts, sands, and muds deposited in rivermouth environment. Commonly contains organic matter and scattered shell fragments.   |
| Qpfnmw  | <u>Mass Wastage Deposits</u> – Similar in texture to Holocene mass-wastage deposits (Qmw).  |
| <b>PRE-OLYMPIA GLACIAL DEPOSITS (GEOLOGIC ENVIRONMENT SUBDIVISIONS)</b>       |   |
| Qpog  | <u>Glacial sedimentary deposits of pre-Olympia interglaciation age (Pleistocene)</u> – Sediment of inferred glacial (northern) origin, based on the presence of clasts or mineral grains requiring southward ice-sheet transport. Further subdivision by age not yet established. Locally subdivided into:  |
| Qpogm   | <u>Glaciomarine Deposits</u> – Fine-grained deposit similar in texture to Qpogl and Qvlc, deposited in a marine environment with floating ice. May contain dropstones and lenses of glaciofluvial deposits, diamictos, and scattered marine shells.   |
| Qpogt   | <u>Glacial Till</u> – Similar in texture to Vashon till (Qvt and Qvtm).   |
| Qpogtm  | <u>Glacial Meltout Till</u> – Similar in texture to Vashon meltout till (Qvtm).   |
| Qpogf   | <u>Glacial Outwash</u> – Similar in texture to Vashon advance outwash (Qva) and Vashon recessional outwash (Qvr). May occur as thin lenses or interbeds within other glacial deposits.  |
| Qpogl   | <u>Glaciolacustrine Deposits</u> – Similar in texture to Lawton Clay (Qvlc).  |
| Qpogd   | <u>Glacial Diamict Deposits</u> – Matrix supported diamict containing variable amounts of subrounded to well-rounded sand and gravel clasts glacially transported and deposited in a fine-grained matrix. May occur as lenses within glaciomarine or glaciolacustrine deposits.   |