

# Surficial Geologic Map and Cross-Sections of the Middlesex 7.5-minute Quadrangle, Vermont

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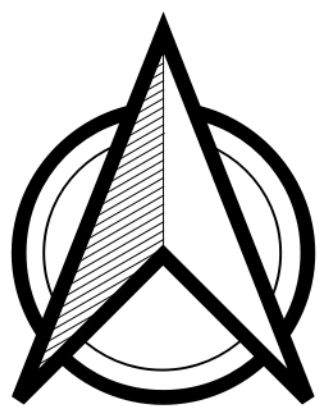
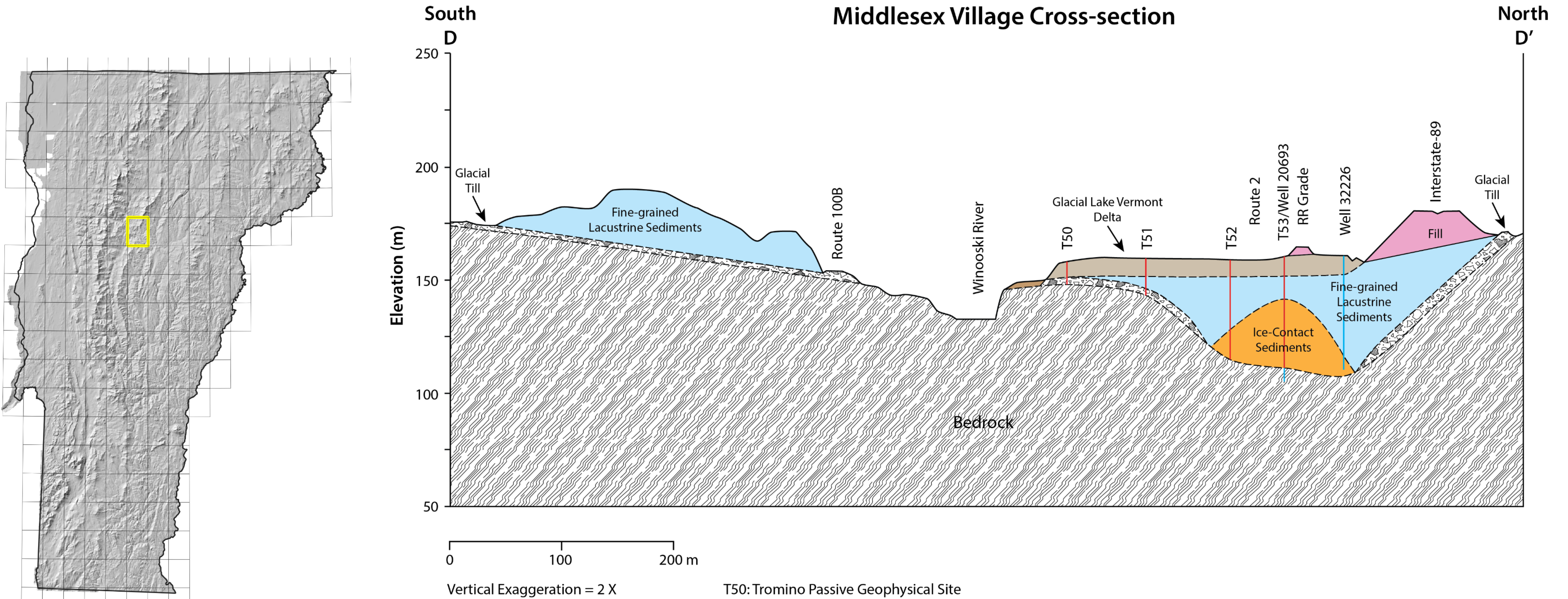
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## Explanation

<b>af</b>	af Artificial Fill: Artificially-emplaced material along road beds, embankments and in developed areas. Material varies from natural sand, gravel, or till to various artificial waste materials. Thickness varies.		Geologic Cross-sections (Note: Cross-section C-C' straddles the western border of the quadrangle and appears on the Surficial Geologic Map of the Waterbury, VT 7.5-minute Quadrangle, VG2023-1.
<b>Hw</b>	Hw Wetlands: Accumulations of organic matter and/or clastic sediment in low-lying areas. Includes a wide variety of wetland types. Commonly overlying other deposits such as alluvium, lacustrine sediment, or till. Larger deposits are shown.		Mad River Watershed Boundary
<b>Ha</b>	Ha Alluvium: Silt, sand, and gravel deposited by modern streams. Includes stream channel, bar, and floodplain deposits. Wetland deposits are common within these areas and are not distinguished. Thickness in tributary valleys is typically less than 3 meters, although the depth may be much greater in the valleys of the larger streams.		Southern Worcester Mountain Map Boundary (Springston and Dunn, 2006)
<b>Hat</b>	Hat Alluvial Terrace: Silt, sand, and gravel deposited on terraces above the modern floodplains of streams. They are composed of a variety of channel, bar, and floodplain deposits. May include late Pleistocene alluvial sediment deposited onto freshly-drained glacial lake bottoms before the main stream and its tributaries incised down into the lacustrine deposits. Commonly less than 5 m thick.		Landslide Scarp
<b>Haf</b>	Haf Alluvial Fan: Boulder, cobble, and pebble gravel, pebbly sand, and diamict deposited at sites where steep, stream gradients are sharply reduced. Holocene alluvial fans (Haf) are common at the mouths of steep tributaries where they meet the main stream.		Abandoned Stream Channel
<b>Plf</b>	Plf Lacustrine Deposits, Fine-grained: Clay, silt, and very-fine to fine sand deposited in quiet-water environments of a glacial lake. Commonly laminated.		Buried Stream Channel: Inferred from landforms or geophysical surveys
<b>Pl</b>	Pl Lacustrine Deposits, Undifferentiated: Coarse- to fine-grained sediment deposited in a glacial lake, generally in an ice-proximal environment. Grain size generally decreases up-section, but marked changes in grain size occur over short distance both laterally and vertically.		Moraines: Generally contour-parallel till benches forming a stair-step topography inferred to form along the retreating ice-sheet margin.
<b>Pld</b>	Pld Glacial Lake Delta: Well-sorted sand and gravel deposited in a glacial lake at the mouth of a tributary stream. Includes topset, foreset, and proximal bottomset beds. Pldv: Glacial Lake Vermont delta Pldm: Glacial Lake Mansfield delta Pldw: Glacial Lake Winooski delta Pldg: Glacial Lake Granville delta	<b>Additional Symbols</b>	
<b>Pldi</b>	Pldi Lacustrine Stratified Diamict: Interbedded massive diamict layers and sandy layers fining upwards to silt-clay layers. Dropstones may be common in the stratified layers. Interpreted to represent subaqueous debris flows and turbidity flows deposited in an ice-proximal setting. Diamict layers may merge with subair above shoreline.		Surficial Field Site
<b>Pi</b>	Pi Ice-Contact Deposits, Undifferentiated: Unsorted to poorly-sorted stratified sand, gravel, and silt deposited in contact with glacial ice. Surface may contain scattered kettle holes formed by melting of buried ice blocks or be a highly complex kame and kettle topography.		Glacial Striation
<b>Pie</b>	Pie Esker Deposits: Elongate ridge of ice-contact stratified sand and gravel deposited by glacial meltwater streams in tunnels within or beneath the glacial ice.		Landslide (small)
<b>Pt</b>	Pt Glacial Till: Very dense to loose, unsorted to very poorly sorted material deposited directly from glacial ice. Contains a wide range of grain sizes, from clay or silt up to large boulders. Matrix commonly dominated by the silt or sand fraction. Surface boulders are generally common. Thickness is highly variable, from less than 3 meters to greater than 30 meters.		Large (>4 m diameter) Erratic
<b>Symbols</b>			Bedrock Outcrops
	Gravel Pit (Most are inactive.)		Projected Glacial Lake Mansfield 2 Early Phase Shoreline
			Projected Glacial Lake Mansfield 1 Shoreline
			Projected Glacial Lake Winooski Shoreline
			Projected Glacial Lake Thatcher Shoreline

**Note:** Geologic units and contacts in the Mad River Watershed (area outlined with red dashed line in the southwestern corner of the quadrangle) were modified from Dunn, Springston, and Donahue (2007) by the principal author utilizing landforms visible on the LiDAR basemap. Similarly, geologic units and contacts appearing on the Surficial Geologic Map of the Southern Worcester Mountains , Vermont (Springston and Dunn, 2006; areas outlined by the red dotted line north of the Winooski River), have also been modified by the principal author.



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