

Topography and Landforms

The upheaval and gradual weathering and erosion of the diabase, gneiss and shale/sandstone geology over the last 200 to 240 million years largely shape the topography of the Upper Perkiomen Creek watershed. These events have produced at least three main topographic landscape types: with the narrow, steeply sloping stream valleys of the Unami Creek and Deep Creek, draining toward the Perkiomen; the broad headwaters valleys in the upper reaches of the watershed; and the prominent ridges that provide the source waters for the Perkiomen. The northeast-southwest orientation of the diabase and gneiss ridges is due in part to their location in the southwest section of a broad circle of diabase bedrock, approximately 8 miles across in the upper Perkiomen Creek watershed. This circle may have resulted from the intrusion of the igneous diabase as molten lava in the form of a "caldora", or volcanic formation.

The highest point in the Upper Perkiomen Creek watershed occurs along the ridge above Bally and Hereford, which reaches an elevation of 1,100 feet above sea level. Mill Hill, located just north of Pennsburg, is the highest point in Montgomery County at 700 feet above sea level. The lowest point in the Upper Perkiomen Valley is at the confluence of the Unami and the Perkiomen, which is approximately 200 feet above sea level. The steepest slopes throughout the area can be found along the ridges and narrow valleys at the headwaters of the watershed, and along the Unami Creek and Deep Creek valleys. The sides of the diabase and gneiss ridges feature numerous areas of steep slopes ranging from 15 to 25%, and 25% or greater. Some of the most dramatic examples of this steep topography (often in excess of 25% in grade) can be found along the Ridge Valley Creek and the Unami Creek, which experience drops of 300 feet over distances of less than 1,000 feet, from ridgetops to stream channels. The Unami Hills area, though steep, only reaches a high elevation of 620 feet at the base of the radio tower along Hill Road. However, the Unami Creek valley has one of the steeper drops in the area, falling 400 feet in approximately 1.5 miles before reaching the confluence with the Perkiomen.

The topography of the majority of the watershed is more gently rolling, with low hills and broad, level headwaters areas. Floodplains of the Upper Perkiomen Creek watershed are formed over thousands of years of floodwaters causing scouring and deposition of material. In some portions of the watershed, the alluvial sediment deposits form specific floodplain soils that spread throughout floodplains and support native vegetation such as floodplain forest and marsh conditions.

Planning Implications

The underlying geology and topography has determined much of the land use in the Upper Perkiomen Valley, and will continue to play an important role in the future. While the area has a long history of agricultural use in the rolling topography and industry in the valleys, many of the ridges, slopes and narrow valleys of the area today

are left wooded with scattered residential development in less steep or wet areas. Road networks in the area are local, indirect and winding, and in some of the wooded ridges roads are unpaved. In the Unami Creek area only the ridge top roads provide through access to other destinations. The topography of the Unami Creek and Ridge Valley Creek, Deep Creek, and the headwaters area ridges is not conducive to high-density residential development, modern industrial or commercial development or agricultural use. The diabase topography reinforces the sense of this land use division by the limitation it places on the use of on-site septic systems, water supply and the construction of new access roads.

To best protect the steep slopes in the Upper Perkiomen watershed area, the local municipalities should enact updated ordinances to restrict development on inappropriate topographic areas. Steep slope ordinances limit, and sometimes prohibit, development on slopes considered too steep to be built upon without danger to public health and safety. Steep slopes erode rapidly if exposed, which can cause silting of streams. It is also difficult to build safe driveways and roads on steep slopes without excessive grading, disturbance to vegetation, erosion of soils and sediment, and salt impacts to streams in winter. Generally two categories of steep slope are defined:

- slopes falling one vertical foot for every 6.67 linear feet (15%) to one foot for every four linear feet (25%),
- slopes greater than 25%.

Restrictions on the second category are greater, concomitant with their greater sensitivity. These are overlay-zoning districts, like the floodplain districts. Residential structures on large lots (3 to 5 acres or more) can be designed to be “notched” into a slope (like a bank barn), rather than re-grading the slope to create a flat “pad” site for construction.

In the greater than 25% slope areas (often called “Very Steep Slopes”), structures and septic fields are usually prohibited. In the 15-25% category (“Steep Slopes”) buildings and septic systems are often allowed as conditional uses requiring Zoning Hearing Board approval. In other cases a maximum percentage of each slope type may be disturbed (e.g., Upper Providence). Marlborough Township’s Zoning Ordinance includes a Steep Slope Overlay District and maps that show the greatest concentration of slopes over 15% along both sides of the Unami Creek. Development on slopes of 15% or greater is limited to state- and county-permitted on-site sewage disposal systems. Public wells, stormwater facilities, underground utility lines, roads and driveways, and construction of structures on slopes of 15% or greater are permitted, but only as a Special Exception when the applicant has demonstrated to the Zoning Hearing Board that no alternative exists and that health, safety and welfare of the community are protected. *All such ordinances should include standards greatly limiting development and protecting vegetation, particularly on slopes adjacent to the floodplain and small tributaries.*