STATE OF OHIO
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGICAL SURVEY
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SURFICIAL GEOLOGY OF THE PORTSMOUTH, OHIO REGION
(PORTSMOUTH, FRIENDSHIP, WEST PORTSMOUTH, & NEW BOSTON 7.5-MINUTE QUADRANGLES)

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Map SG-2-POR
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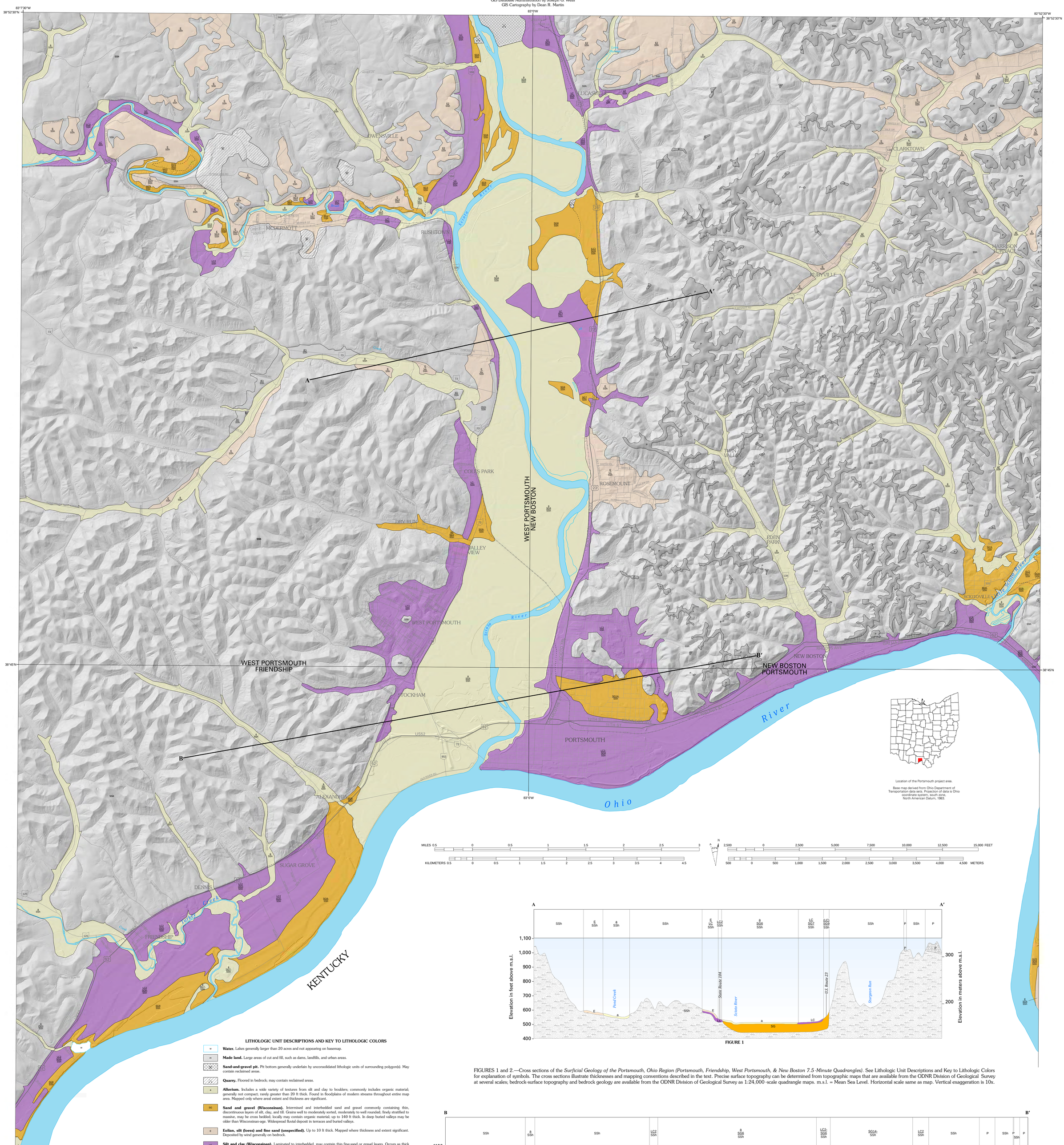

Location of the Portsmouth project area.

Base map derived from Ohio Department of Transportation data sets. Projection of data is Ohio coordinate system, south zone, North American Datum, 1983.

FIGURE 1

FIGURES 1 and 2.—Cross sections of the *Surficial Geology of the Portsmouth, Ohio Region (Portsmouth, Friendship, West Portsmouth, & New Boston 7.5 -Minute Quadrangles)*. See Lithologic Unit Descriptions and Key to Lithologic Colors for explanation of symbols. The cross sections illustrate thicknesses and mapping conventions described in the text. Precise surface topography can be determined from topographic maps that are available from the ODNR Division of Geological Survey at several scales; bedrock-surface topography and bedrock geology are available from the ODNR Division of Geological Survey as 1:24,000 -scale quadrangle maps. m.s.l. = Mean Sea Level. Horizontal scale same as map. Vertical exaggeration is 10x.

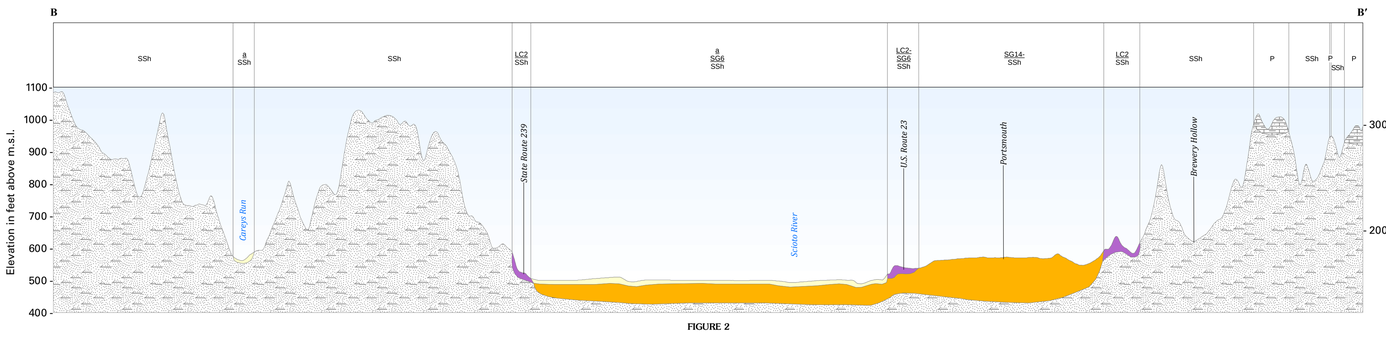

FIGURE 2

LITHOLOGIC UNIT DESCRIPTIONS AND KEY TO LITHOLOGIC COLORS

Water. Lakes generally larger than 20 acres and not appearing on basemap.

Made land. Large areas of cut and fill, such as dams, landfills, and urban areas.

Sand-and-gravel pit. Pit bottom generally underlain by unconsolidated lithologic units of surrounding polygon(s). May contain reclaimed areas.

Quarry. Floored in bedrock; may contain reclaimed areas.

Alluvium. Includes a wide variety of textures from silt and clay to boulders; commonly includes organic material; generally not compact; rarely greater than 20 ft thick. Found in floodplains of modern streams throughout entire map area. Mapped only where areal extent and thickness are significant.

Sand and gravel (Wisconsinan). Intermixed and interbedded sand and gravel commonly containing thin, discontinuous layers of silt, clay, and till. Grains well to moderately sorted, moderately to well rounded; finely stratified to massive, may be cross bedded; locally may contain organic material; up to 140 ft thick. In deep buried valleys may be older than Wisconsinan-age. Widespread fluvial deposit in terraces and buried valleys.

Eolian, silt (loess) and fine sand (unspecified). Up to 10 ft thick. Mapped where thickness and extent significant. Deposited by wind generally on bedrock.

Silt and clay (Wisconsinan). Laminated to interbedded, may contain thin fine-sand or gravel layers. Occurs as thick lacustrine valley fill deposits of larger fluvial valleys. Present as thick, deltaic deposits or outwash deposits in upland depressions.

Sandstone, shale, siltstone, clay, limestone, and coal bedrock and associated colluvium (Pennsylvanian). Sandstone nonbedded to massive, medium to coarse grained with abundant rounded quartz pebbles; quartz-pebble conglomerate may be present in basal portion. Interbeds of shale, sandstone, siltstone, clay, coal, and limestone common in upper portion of unit. Common horizontal and vertical changes of rock types. Stratigraphic names: Breathitt Group.

Sandstone and shale bedrock and associated colluvium (Mississippian). Interbedded shale, siltstone, and sandstone with common vertical and horizontal changes. Stratigraphic names: Borden Formation, Sunbury Shale, Berea Sandstone, and Bedford Shale.

Note: The colors on the map correspond to the uppermost continuous map units and serve to assist in visualizing the geology of the area. Discontinuous units (in parentheses) and subsurface-only units are not assigned colors.

'Fill patterns shown only in cross section. Units without patterns do not appear in cross section.

EXPLANATION OF MAP SYMBOLS

Boundary between map-unit areas having **different** uppermost, continuous lithologies or significant bedrock lithology change; underlying lithologies may or may not differ.

Boundary between map-unit areas having the **same** uppermost, continuous lithology but different thicknesses or different underlying lithologies.

Note: Boundary types reflect the relationships among uppermost continuous lithologies only and not patchy, discontinuous lithologies (in parentheses).

MAPPING CONVENTIONS

This map provides a three-dimensional framework of the study area's surficial geology and depicts four important aspects of surficial geology:

1. Geologic deposits, indicated by **letters** that represent the major lithologies.
2. Thicknesses of the individual deposits, indicated by **numbers** and **modifiers**.
3. Lateral extents of the deposits, indicated by map-unit area boundaries (solid and dashed lines).
4. Vertical sequence of deposits, indicated by the stack of symbols within each map-unit area.

Figures 1 and 2 illustrate cross sections A–A′ and B–B′ and mapping conventions. Letters, numbers, and modifiers are arranged in stacks that depict the vertical sequences of lithologic units for a given map-unit area. A single stack of symbols occurs in each map-unit area and applies only to the thicknesses of sediments within that particular map-unit area.

Letters represent geologic deposits (lithologic units) and are described in detail below. Lithologic units may be a single lithology, such as sand (S) or clay (C), or a combination of related lithologies that are found in specific depositional environments, such as sand-and-gravel (SG) or ice-contact (IC) deposits. The bottom symbol in each stack indicates the bedrock lithologies that underlie the surficial deposits. The detailed lithologic unit descriptions below summarize:

1. Geologic characteristics, such as range of textures, bedding, and age.
2. Engineering properties or concerns attributed to the unit.
3. Depositional environments.
4. Geomorphology or geomorphic locations.
5. Geographic locations within the map area, if pertinent.

Numbers (without modifiers) that follow the lithology designators represent the average thickness of a lithologic unit in tens of feet (for example, *3* represents 30 feet [ft]). If no number is present, the average thickness is implied as *1* (10 ft). These unmodified numbers correspond to a thickness range centered on the specified value, but the thickness may vary ±50 percent. For example, *74* indicates an average thickness of till in a map-unit area is 40 ft, but that thickness may vary from 20 to 60 ft.

Modifiers provide additional thickness and distribution information:

1. Parentheses indicate that a unit has a patchy or discontinuous distribution and is missing in portions of that map-unit area. For example, *(72)* indicates that till with an average thickness of 20 ft is present in only part of that map-unit area.

2. A negative sign (-) following a number indicates the maximum thickness for that unit in an area such as a buried valley or ridge. Thickness decreases from the specified value, commonly near the center of the map-unit area, to the thickness of the same lithologic unit and vertical position specified in an adjacent map-unit area. For example, a *SG9-* map-unit area adjacent to a *SG3* area indicates a sand-and-gravel unit having a maximum thickness of 90 ft that thins to an average of 30 ft at the edge of the map-unit area. If the material is not present in an adjacent area, it decreases to zero at that boundary.

The small scale of this reconnaissance map generalizes the great local variability within surficial deposits. That variability is explained in the Lithologic Unit Descriptions and by the use of thickness ranges. Some areas and lithologies are too small to delineate at 1:24,000 scale and have been included in adjacent areas. This map should serve only as a regional predictive guide to the area's surficial geology and not as a replacement for subsurface borings and geophysical studies required for site-specific characterizations.

DATA SOURCES

Data were collected from numerous sources (see "References"). The concentration of data was greatest near the surface and decreased with depth. County soil survey maps, which describe the top 5 ft of surficial materials, provided an initial guide to map-unit areas. These areas were modified through interpretation of local geomorphic settings and other data that indicated changes of deposits at depth, including water-well logs from the Ohio Department of Natural Resources (ODNR), Division of Soil and Water Resources (flg. 3); test-boring logs provided by the Ohio Department of Transportation, Office of Geotechnical Engineering Geotechnical Document Management system, available online at **www.dot.state.oh.us/Divisions/Engineering/Geotechnical/Pages/GeoMS.aspx#GRSR** and at Ohio Environmental Protection Agency (EPA) and county engineers offices (flg. 4); theses; and published or unpublished geologic reports, maps, and field notes (on file at the ODNR Division of Geological Survey). These data also provided the basis for lithologic unit descriptions that summarize, as accurately as possible, recognized associations of genetically related materials. Total thickness of each surficial deposit was calculated using ODNR Division of Geological Survey open-file bedrock topography maps, and bedrock units were summarized from ODNR Division of Geological Survey bedrock geology maps, all of which are available for each 7.5-minute quadrangle in the map area. Land-surface topography was derived from LiDAR data, collected as part of the Ohio Statewide Imagery Program, and then converted into a 12.5 x 12.5-ft-resolution digital elevation model (DEM) and shaded-relief model by the Ohio EPA. The Ohio Statewide Imagery Program collected LiDAR data and converted it into a 2.5 x 2.5-ft-resolution digital elevation model (DEM). Using this DEM, the ODNR Division of Geological Survey generated a shaded-relief model and a percent slope.

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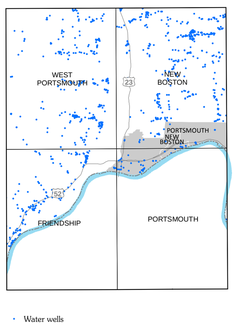

FIGURE 3.—Plot of water wells in the *Surficial Geology of the Portsmouth, Ohio Region (Portsmouth, Friendship, West Portsmouth, and New Boston 7.5-Minute Quadrangles)*. Water-well logs on file at ODNR Division of Soil and Water Resources.

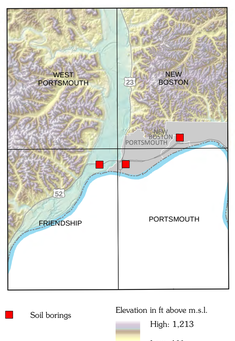

FIGURE 4.—Plot of soil boring locations in the *Surficial Geology of the Portsmouth, Ohio Region (Portsmouth, Friendship, West Portsmouth, & New Boston 7.5-Minute Quadrangles)*. Test-boring logs provided by Ohio Department of Transportation, Ohio Environmental Protection Agency, and county engineer offices. m.s.l. = mean sea level

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