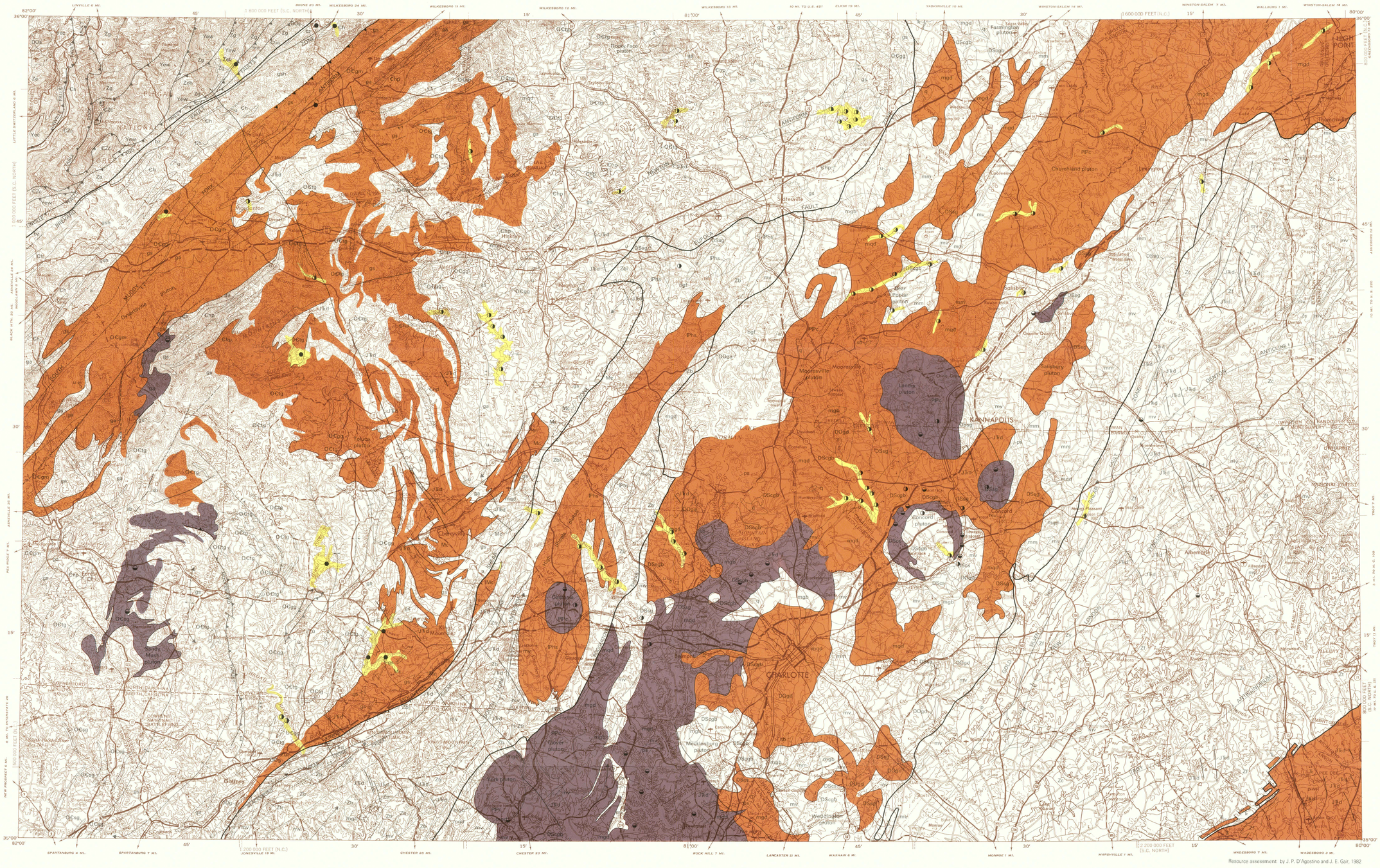
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS INVESTIGATIONS SERIES
MAP I–1251–M (SHEET 2 OF 2)



EXPLANATION

Most favorable areas for potential resources

- Geologic formation or zone with potential for sand or gravel deposits
- Geologic formation or zone with potential for residual gravel deposits and some minor sand
- Alluvial deposits with potential for sand and (or) gravel
- Boundary of major lithotectonic belt

Production sites

- Residual sand and (or) gravel
- Alluvial sand
- Alluvial gravel

MAP B— SAND AND GRAVEL RESOURCE POTENTIAL

Determination of the resource potential for sand and gravel was based on information about the major sites of sand and (or) gravel production in the quadrangle (McDaniel and McKenzie, 1976), and on the extent of alluvial deposits or the geologic formations (Goldsmith and others, in press) with which the sand and gravel deposits are associated. The value of sand and gravel produced in the Charlotte quadrangle has been about $140 million (1967 dollars) (DeYoung and others, in press).* Sand and gravel in either residual or transported alluvial deposits is potentially available in all the major lithotectonic belts in all parts of the quadrangle.

Quartz- and (or) feldspar-bearing rocks are potential contributors to sand and gravel deposits. The distribution of sand and gravel operation sites (Map B) shows that the most favorable geologic formations for residual deposits are 1) the granitic rocks of the Charlotte and Kings Mountain belts, 2) a unit of quartz-sillimanite schist in the Inner Piedmont belt, and 3) local quartzose-volcanic formations (unmapped at 1:250,000 scale) in the Carolina slate belt. Other quartzo-feldspathic gneisses and schists of the Charlotte, Kings Mountain, and Inner Piedmont belts were sources for transported sand deposits that have been worked along streams in those belts. In addition to the alluvial deposits shown on the map, many other stream channels throughout the quadrangle (not marked on the map) have some potential for sand and gravel resources. To some degree, the locations of the deposits that have been worked have been controlled by their proximity to areas of urban development. As the need for such materials arises in other parts of the quadrangle, it is likely that they will be found and developed where none are known now. Such new deposits might be found within areas represented by both colored and uncolored parts of the map, but the probability of occurrences within the areas of potential shown here is greatest.

*See sheet 1 for references.

Resource assessment by J. P. D'Agostino and J. E. Gair, 1982

Map B—Sand and gravel resource potential

by

John P. D'Agostino and Jacob E. Gair



EXPLANATION

Areas of resource potential— Weathered (saprolitized) parts of mapped rock units in colored areas contain either abandoned or active clay pits, or deposits of fine-grained alluvium. Resource potential ranges from none to high, depending on depth and nature of weathering. Uncolored areas contain few clay pits and are less favorable areas for clay resources than the colored areas. Initials indicate type of clay (CBC, common brick clay; (CBC(L), light-colored common brick clay; DBC, dark brick clay; WBC, white brick clay; CC, high-quality ceramic clay).

Favorable rock types—Grouped by major geologic belt; see generalized geologic base and Description of Map Units for corresponding formations.

- Blue Ridge belt (CC)
  - Pegmatite (Spruce Pine area just west of quadrangle and extending into northwest corner of quadrangle; individual bodies not mapped)
  - Schist and gneiss (host rock for pegmatite bodies)
- Inner Piedmont belt (CBC and CBC (L))
  - Granite and included pegmatite
  - Mica schists and included pegmatite
- Kings Mountain belt
  - Manganiferous schist (DBC)
  - Pyroclastic schist (WBC)
- Charlotte belt (CBC)
  - Metavolcanic schist
  - Phyllite
  - Granite
- Carolina slate belt (CBC and argillaceous rocks ground up for CBC)
  - Mudstone and argillaceous schist
  - Phyllite
  - Graywacke

Other favorable areas

- Alluvium in stream valley bottoms (CBC); clay obtained from short-lived pits near edges of alluvial zones
- Alluvium flooded by reservoir (CBC); clay is abundant but unlikely to be available for development

Boundary of major lithotectonic belt

Claypit symbols

- Claypit in saprolite; more than 1 million m^3 clay produced
- Claypit in saprolite; less than 1 million m^3 clay produced; queried where production uncertain

MAP C— CLAY RESOURCE POTENTIAL

The assessment of clay resources utilizes information on 1) distribution of clay pits in residual clay deposits (McDaniel and McKenzie, 1976; D'Agostino and Rowe, in press)* 2) geologic formations (Goldsmith and others, in press) which contain producing or previously worked clay deposits and 3) workings in alluvial clay deposits along stream valleys.

The type of clay found in the quadrangle depends on the lithology of the weathered rock unit. Rock units from which clay is or has been produced were mapped during CUSMAP (Goldsmith and others, in press)* and are identified on Map C as the most favorable areas for clay resources. Such rocks have a substantial original content of feldspar, mica, or clay minerals. However, the formation of clay depends largely on local weathering conditions and on the degree of fracturing, folding, and faulting that might have facilitated and increased weathering along selected zones. As a rock is weathered and converted to saprolite, the amount of residual clay increases while soluble substances are removed. Rocks less favored by original composition as sources of clay still may yield clay if weathering conditions are particularly favorable. In general, however, such rocks (the ones in the quadrangle not containing many, if any, clay pits and not colored on the map) have less overall potential for clay resources. Common brick clay is derived from a variety of source rocks as well as from alluvium. On the other hand, specialty clays (ceramic clay and dark and white clays) are derived from specific types of source rocks which have a very restricted distribution in the quadrangle. Therefore, common brick clay is more widely available and the potential resources of such clay are much greater than are resources of the specialty clays.

Clay has been an important commodity in the Charlotte quadrangle. Production, including shale used for brick, has been valued at more than 35 million dollars (1967 dollars) (DeYoung and others, in press).*

*See sheet 1 for references.

Base from U.S. Geological Survey, 1953
Photorevised 1974
100,000-foot grids from North Carolina coordinate system and South Carolina coordinate system, north zone

SCALE 1:250 000

5 0 5 10 15 20 25 MILES
5 0 5 10 15 20 25 30 35 KILOMETERS

CONTOUR INTERVAL 100 FEET
WITH SUPPLEMENTARY CONTOURS AT 50 FOOT INTERVALS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA.—1986—G84260

Resource potential by J. E. Gair and J. P. D'Agostino, 1982. Data by R. D. McDaniel and B. J. McKenzie, 1976; P. J. Loferski, 1981; J. P. D'Agostino and W. D.Rowe, Jr., 1982; R. Goldsmith, D. J. Milton, and J. W. Horton, Jr., 1982
Geologic base modified from Goldsmith and others, in press

Map C—Clay resource potential

by

Jacob E. Gair and John P. D'Agostino

RESOURCE POTENTIAL FOR CRUSHED STONE, SAND AND GRAVEL, AND CLAY IN THE CHARLOTTE 1° x 2° QUADRANGLE, NORTH CAROLINA AND SOUTH CAROLINA

By

Richard Goldsmith, J. Wright Horton, Jr., Daniel J. Milton,
Jacob E. Gair, and John P. D'Agostino

1986