U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

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U.S. ARMY-ROCKY MOUNTAIN ARSENAL, U.S. DEPARTMENT OF ENERGY-ROCKY FLATS FIELD OFFICE, COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, COLORADO DEPARTMENT OF NATURAL RESOURCES-STATE ENGINEERS OFFICE, DENVER WATER DEPARTMENT, LITTLETON-ENGLEWOOD WASTEWATER TREATMENT PLANT, EAST CHERRY CREEK VALLEY WATER AND SANITATION DISTRICT, METRO WASTEWATER RECLAMATION DISTRICT, WILLOWS WATER DISTRICT, AND CITIES OF AURORA, LAKEWOOD, AND THORNTON

HYDROLOGIC INVESTIGATIONS ATLAS HA–736
Altitude of the bedrock surface—SHEET 2 of 5
Robson, S.G., 1996, Geohydrology of the shallow aquifers in the Denver metropolitan area, Colorado

Altitude and Configuration of the Bedrock Surface

The altitude of the bedrock surface underlying the unconsolidated sediments (fig. 3) was calculated by subtracting the thickness of the unconsolidated sediments from the altitude of the land surface. Land-surface altitude was defined by digital coverages, which were smoothed to produce a generalized land-surface coverage that has a resolution commensurate with the thickness coverage. The geographic information system subtracted the thickness coverage (fig. 2) from the smoothed land-surface coverage and plotted the resulting map of the altitude of the bedrock surface (fig. 3). Figure 3 is a smoothed surface and does not show small-scale features present in the land surface or the bedrock surface. Thus, in areas where the unconsolidated sediments are thin, a smoothed bedrock contour might be slightly above or below a corresponding unsmoothed land-surface contour shown on the base map. These small discrepancies are beyond the intended resolution of this map. Readers who need such small-scale information can consult the data base or undertake drilling to obtain site-specific data. More detailed mapping of the bedrock surface has been undertaken by the U.S. Army near the Rocky Mountain Arsenal and by the U.S. Department of Energy near Rocky Flats.

The bedrock surface is similar in altitude and configuration to the land surface because of the small thickness of unconsolidated sediments in much of the area. Present-day streams coincide with most of the principal valleys in the bedrock surface (fig. 3). However, to the east of the South Platte River, paleovalleys of Cherry Creek, First Creek, Sand Creek, and the South Platte River are no longer occupied by natural watercourses. Cherry Creek paleovalley has no surficial expression and was abandoned when lower Cherry Creek moved southward to its present course. The First Creek-Sand Creek paleovalley might have been formed by First Creek or Sand Creek or a confluence of the two creeks. First Creek apparently moved northward to its present-day well-defined valley; Sand Creek moved southward, crossed the Toll Gate Creek channel, and now has no well-defined valley in the bedrock surface in its lower reach. The South Platte River paleovalley likely was formed by the ancestral South Platte River when it occupied Beebe Seep Draw (Scott, 1982). Barr Lake occupies the upstream end of Beebe Seep Draw.

The upper reach of the South Platte River paleovalley and the lower reach of Cherry Creek paleovalley are no longer evident in the bedrock surface. Erosion, prior or subsequent to the downcutting of the paleovalleys, might have obscured or obliterated the trace of the paleovalleys in the bedrock surface.

Geologic sections A-A′ and B-B′ (fig. 4) drawn across the South Platte Valley show the varied thickness of the unconsolidated sediments and the altitude and configuration of the land surface and bedrock surface. The valley of the South Platte River is asymmetrical in most of the study area: a broad alluviated valley is present to the east of the river; steep bedrock outcrops and little alluvium are present to the west of the river.

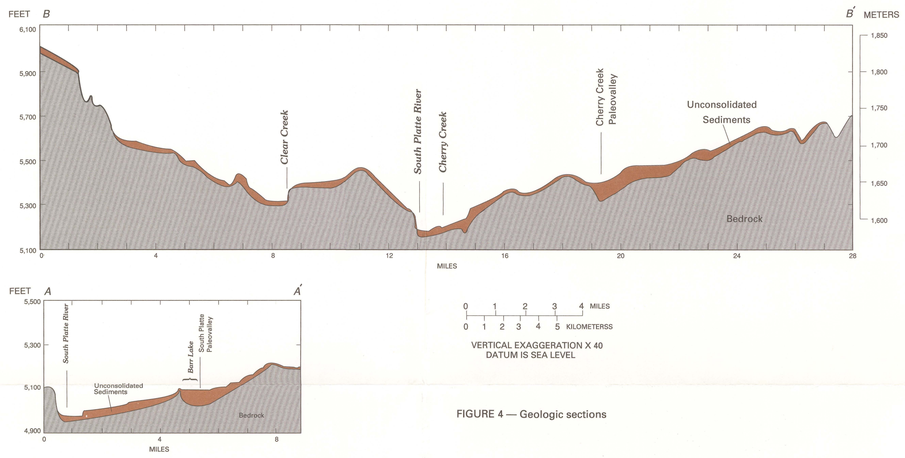

FIGURE 4 — Geologic sections

EXPLANATION

- Bedrock outcrop
- Approximate alignment of principal valleys in bedrock surface—Line pattern indicates paleovalley.
- —5720— Bedrock-surface contour—Shows approximate altitude of bedrock surface underlying unconsolidated sediments. Dashed where inferred. Hachures indicate depression features. Contour interval 20 feet. Index contour interval 100 feet. Datum is sea level.
- A —— A′ Line of geologic section

FIGURE 3 — Altitude and configuration of the bedrock surface

Base from U.S. Geological Survey 1:50,000 County Maps for Adams, Arapahoe, Denver and Jefferson Counties

SCALE 1:50,000
1 1/2 0 1 2 3 4 MILES
1 1/2 0 1 2 3 4 5 KILOMETERS
CONTOUR INTERVAL 20 AND 80 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1996

GEOHYDROLOGY OF THE SHALLOW AQUIFERS IN THE DENVER METROPOLITAN AREA, COLORADO

By
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1996