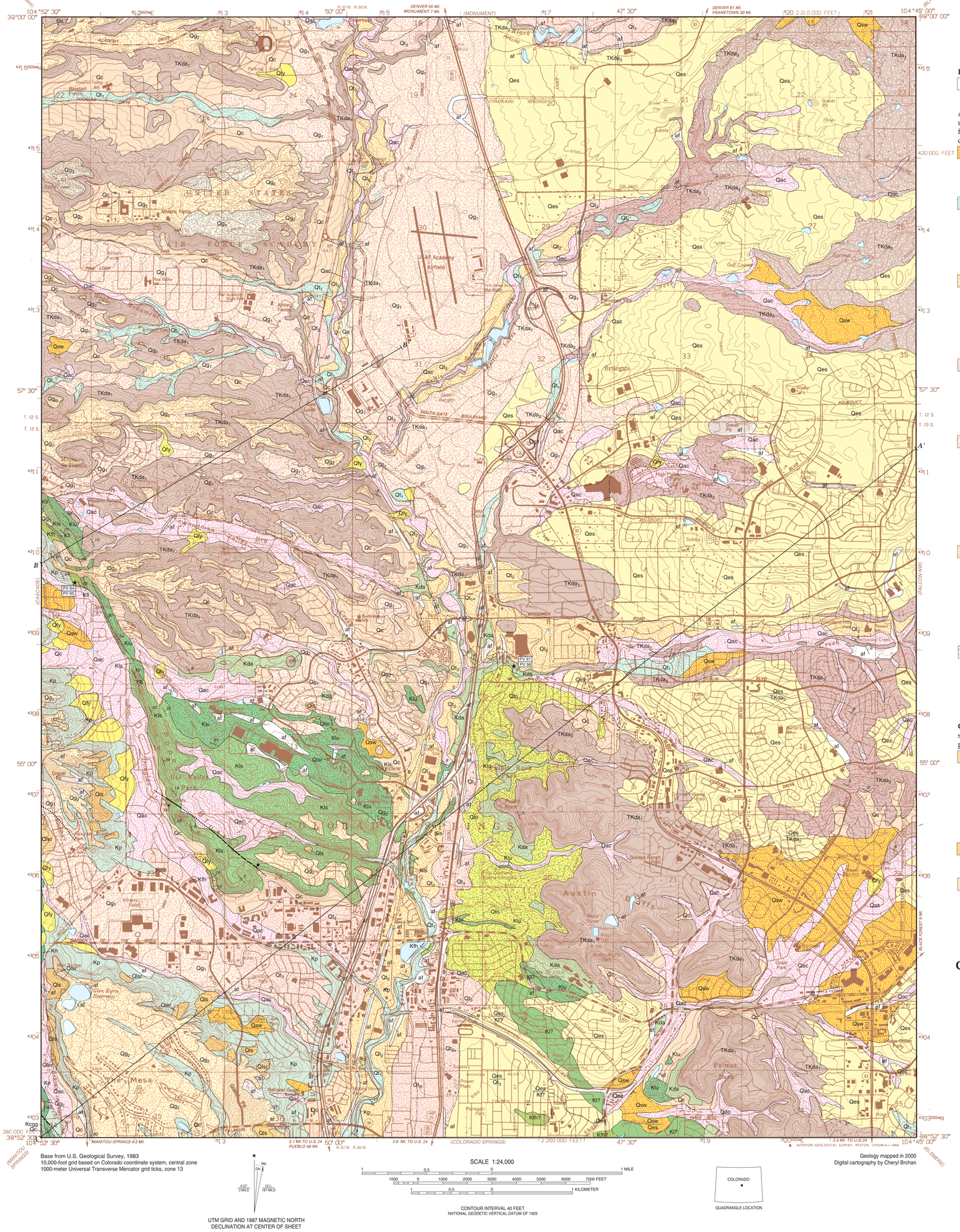
COLORADO GEOLOGICAL SURVEY
DIVISION OF MINERALS AND GEOLOGY
DEPARTMENT OF NATURAL RESOURCES
DENVER, COLORADO

OPEN-FILE MAP 01-3

GEOLOGIC MAP OF THE PIKEVIEW QUADRANGLE, EL PASO COUNTY, COLORADO

Booklet accompanies map



DESCRIPTION OF MAP UNITS

For complete descriptions, see pamphlet accompanying map.

SURFICIAL DEPOSITS

HUMANMADE DEPOSITS

af — **Artificial fill (latest Holocene)**—Fill and waste rock placed during construction of roads, railroads, buildings, dams, landfills, and reclamation projects

ALLUVIAL DEPOSITS—Sediments deposited along Monument Creek and its tributary drainages in stream channels, on flood plains, on pediments, and as sheetwash. Terrace alluvium deposited during late-glacial and early-interglacial stages

Qsw — **Sheetwash deposits (Holocene and late Pleistocene)**—Silty sand, clayey silt, and clay deposited in valleys of intermittent and ephemeral streams, on gentle hillslopes below terraces, landslides and alluvial fans, or in basinal areas. Locally derived from Pierre Shale and Dawson Formation

Qt_1 — **Terrace alluvium one (Holocene and late Pleistocene)**—Unconsolidated stream alluvium that underlies low terraces up to 12 ft above Monument Creek; distinct from stream-channel and flood-plain deposits. Poorly to moderately sorted, clast-supported, cobble gravel in a sandy, silty, or clayey matrix. Similar in appearance and height above stream level to the Piney Alluvium in the Denver area and the Husted Alluvium on the U.S. Air Force Academy

Qt_2 — **Terrace alluvium two (late Pleistocene)**—Unconsolidated stream alluvium that underlies terraces from 12 to 22 ft above Monument Creek. Unit is poorly sorted, clast-supported, locally bouldery, pebble and cobble gravel in a sandy or silty matrix. Lithology is similar to terrace alluvium one (Qt_1) but clasts are larger and unit contains more cobble gravel. Similar in appearance and height above stream level to the Broadway Alluvium in the Denver area; correlated to the Monument Creek Alluvium on the U.S. Air Force Academy

Qt_3 — **Terrace alluvium three (late-middle Pleistocene)**—Stream alluvium that underlies two terraces 25 and 45 ft above Monument Creek. Texture and lithology similar to terrace alluvium two (Qt_2), but clasts are much more weathered. Unit labeled Qt_{3u} is older and higher than unit labeled Qt_3. Similar in appearance and height above stream level to the Louviers Alluvium in the Denver area; correlated to the Kettle Creek Alluvium on the U.S. Air Force Academy

Qg_1 — **Older gravel one (middle Pleistocene)**—Gravel underlying gently sloping topographic surfaces about 35 to 100 ft above Monument Creek. Consists of pebble and cobble gravel in a partly matrix-supported and partly clast-supported sandy, clayey material. Clasts in deposits west of Monument Creek are moderately to highly weathered Pikes Peak Granite with minor carbonate coatings. Clasts in deposits east of Monument Creek are derived from weathered Dawson Formation sandstone. Unit is similar in appearance and height above stream level to the Slocum Alluvium in the Denver area; correlated to the Pine Valley Gravel on the U.S. Air Force Academy

Qg_2 — **Older gravel two (middle Pleistocene)**—Gravel underlying gently sloping topographic surfaces about 125 to 175 ft above Monument Creek. Texturally and lithologically similar to older gravel one (Qt_1) but clast-supported and composed of cobbles and boulders in a sandy matrix. Clasts are mostly Pikes Peak Granite, round to subround, and strongly weathered. Unit is well stratified and locally contains pedogenic carbonate in the soil profile. Similar in appearance and height above stream level to the Verdos Alluvium in the Denver area; correlated to the Douglas Mesa Gravel on the U.S. Air Force Academy

Qg_3 — **Older gravel three (middle to early Pleistocene)**—Gravel deposits about 200 to 300 ft above Monument Creek. Unit is similar in texture to pediment gravel two (Qg_2) but commonly contains larger boulder clasts. Thin carbonate soil profile is present in a few locations. Similar in appearance and height above stream level to the Rocky Flats Alluvium in the Denver area; correlated to the Lehman Ridge Gravel on the U.S. Air Force Academy

COLLUVIAL DEPOSITS—Sediments deposited on valley sides, valley floors, and hillslopes that were mobilized, transported, and deposited primarily by gravity

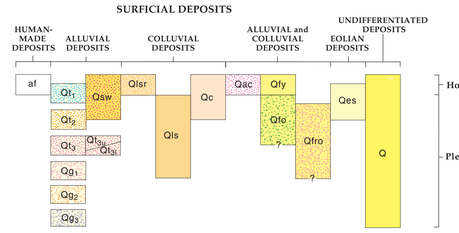
Qlsr — **Recent landslide deposits (Holocene)**—Landslides with fresh morphological features such as lateral shear zones, hummocky terrain, headscarps, and lateral spreading toes that indicate recent movement. Heterogeneous deposits of unsorted material consisting of clay, silt, sand,and rock fragments. Recent landslides involve failure of the underlying Pierre Shale or claystone layers in other rock formations and may include large blocks of displaced but intact bedrock. Several recent landslides occurred or were reactivated after large preeipitation events in April and August 1999

Qls — **Landslide deposits (Pleistocene)**—Similar in texture to recent landslide deposits (Qlsr) but lack evidence of recent movement. Ranges from slowly creeping landslides to long-inactive landslides

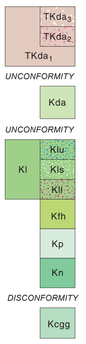
Qc — **Colluvium (Holocene and late Pleistocene)**—Mostly matrix-supported,gravelly sand, silty clay, and clayey silt; usually coarser grained on steeper slopes and finer grained on lower slopes. Map unit may also include minor thin landslide or sheetwash deposits

CORRELATION OF MAP UNITS

SURFICIAL DEPOSITS



BEDROCK



ALLUVIAL AND COLLUVIAL DEPOSITS—Sediments in debris fans, flood-plains,tributary stream channels, and adjacent hillslopes. Deposits in stream channels are primarily alluvial but interfinger with colluvial and sheetwash deposits

Qfy — **Younger fan deposits (Holocene)**—Sediments deposited by debris flows, hyperconcentrated flows, and sheetwash; range from poorly sorted, occasional clast-supported pebble, cobble, and boulder gravel in a sandy matrix to matrix-supported, clayey sand and gravel. Unit is frequently cobbly and bouldery, particularly near the heads of fans. Deposits tend to be finer grained in the distal ends of fans that include debris flow and sheetwash deposition

Qac — **Alluvium and colluvium, undivided (Holocene)**—Stream-channel alluvium in mainstem Monument Creek and in subsequent tributary drainages and hillslopes. Includes thin mainstem stream deposits lower than terrace alluvium one (Qt_1)

Qfo — **Older fan deposits (late and middle? Pleistocene)**—Unit is poorly sorted, clast-supported boulder gravel in a sandy, silty matrix. Texturally similar to younger fan deposits (Qfy) but has a thin, moderately developed soil horizon. Clasts consist of boulders, pebbles, and cobbles of sandstone derived from Dawson Formation parent material. Unit is deeply incised in Pulpit Rock Park and may contain small hyperconcentrated flows and debris flows in active channels

EOLIAN DEPOSITS—Sediments deposited by wind processes

Qes — **Eolian sand (Holocene to late Pleistocene)**—Fine- to coarse-grained silty sand deposited by wind and preserved on surfaces downwind (east) of Monument Creek. Sand is carried to Monument Creek by alluvial processes and then blown east of the creek. Coarse-grained sand is located nearest Monument Creek and Dawson Formation bedrock

UNDIFFERENTIATED SURFICIAL DEPOSITS

Q — **Surficial deposits, undifferentiated (Quaternary)**—Shown only on cross sections. May include any of the above surficial deposits

BEDROCK

Upper part of the Dawson Formation (Upper Cretaceous and Paleocene)—Divided into three informal members or lithofacies units. Facies one occurs as a very thick "basin-edge" deposit close to the mountain front and as a basal unit below finer grained facies unit two in the eastern part of the Pikeview quadrangle. The finer grained basinal facies units two and three may interfinger with the coarser "mountain front" facies. Contacts between facies in the basin are gradational

$TKda_3$ — **Facies unit three**—Sub-equal amounts of three lithologies: very thick-bedded, massive and crossbedded, white, tan, or light-gray, very coarse-grained arkose; thin to thick beds of light-green to olive-gray clay-rich, fine- to medium-grained micaceous and feldspathic sandstone; and thin to thick beds of dark-gray to greenish-gray sandy claystone. About 500 ft of this unit is exposed in the northeastern part of the Pikeview quadrangle; top not exposed

$TKda_2$ — **Facies unit two**—Light-gray to greenish-gray arkosic sandstone and olive-green to brownish-gray, pebbly, andesitic sandstone interbedded with dark-gray to grayish-green, fine micaceous sandstones and sandy claystone; about 400 to 500 ft thick

$TKda_1$ — **Facies unit one**—Cliff-forming, white to light-gray, crossbedded or massive, very coarse arkosic sandstone, pebbly arkose, or conglomerate; beds of massive, light-gray to light-brownish-gray, very thick-bedded, homogeneous clayey sandstone; and lesser amounts of white to light-tan,crossbedded, poorly-sorted, fine- to medium-grained feldspathic sandstone. Occasional interbeds of thin to very-thin bedded gray claystone and sandy claystone or dark-brown to brownish-gray organic-rich siltstone to coarse sandstone containing abundant plant fragments. The upper part, in the northwestern part of the quadrangle, contains numerous interbeds of 1- to 6-foot thick, light- to dark-red paleosol. Unoxidized outerops contain abundant iron sulfide as disseminations, nodules, and concretions. Weathering of the iron sulfides produces large slabs and layers of iron-oxide-cemented sandstone that protect columns and monument-like (hoodoo) erosion forms. Thickness varies from about 400 ft in the southeastern part of the quadrangle to about 1,200 ft in the western part

Kda — **Lower part of the Dawson Formation (Upper Cretaceous)**—Greenish-gray to olive-brown, crossbedded or massive, very thick beds of sandstone containing andesite pebbles up to 3 inches in diameter; interbedded with grayish-green to dark-green and brown to brownish-gray siltstone and sandy claystone. Local lenses of chert pebble conglomerate and medium- to coarse-grained, cross-bedded, white to light-gray sandstone at the base. Thickness varies from 0, where unit has been removed by erosion, to 240 ft

Kl — **Laramie Formation (Upper Cretaceous)**—Divided into three mapped informal members: upper member, middle sandstone member, and lower member. Areas of probable Laramie Formation mapped by earlier authors and visible on 1947 aerial photography but now obscured by urbanization are shown as Kl? on map

Klu — **Upper member**—Brownish-gray sandy shale and very fine-grained shaly sandstone, thin coal beds, and channel fillings of fine- to medium-grained,light-colored sandstone. About 400 ft thick

Kls — **Middle sandstone member**—Thick to very thick bedded, light-colored, crossbedded, fine- to coarse-grained sandstones interbedded with thin bedded gray and brown shale. About 200 ft thick

Kll — **Lower member**—Light-gray to light-brownish-gray, very fine-grained sandstone interbedded with gray sandy shale and minor brown organic-rich shale. About 115 ft thick. Coal beds in the lower Laramie Formation have been mined for sub-bituminous coal resources

Kfh — **Fox Hills Sandstone (Upper Cretaceous)**—Gray shale and light-olive-gray, very fine-grained sandstone in the upper part; about 140 ft thick. Greenish-gray to orange-brown micaceous, poorly sorted, fine- to medium-grained sandstone in thin to very thick massive beds in the lower part; about 150 ft thick. Lower part contains phosphate nodules and sandstone concretions. Areas of probable Fox Hills outcrop mapped by earlier authors and visible on 1947 aerial photography but now obscured by urbanization are marked with queries (?) on map

Kp — **Pierre Shale (Upper Cretaceous)**—Gray to dark-gray shale that weathers to brown and olive-green clay; sandy transition zone with phosphate nodules at the top, not mapped separately. About 4,500 ft thick. Formation is particularly susceptible to slope instability in steep areas

Kn — **Niobrara Formation (Upper Cretaceous)**—Divided into two members but not mapped separately. Upper part is the Smoky Hill Shale member, a yellowish-orange to brown shale interbedded with thin gray and white chalk beds and rare thin limestone. Lower part is the Fort Hayes Limestone Member, a gray limestone with lesser amounts of chalky limestone and shale. About 450 ft thick

Kcgg — **Carlile Shale, Greenhorn Limestone, and Graneros Shale, undifferentiated (Upper Cretaceous)**—Dark-gray shale interbedded with thin beds of dark-brown sandstone, yellowish-brown siltstone, and gray limestone. Mostly covered or poorly exposed in the extreme southwestern corner of the Pikeview quadrangle. Only the Codell Sandstone Member at the top of the Carlile Shale outcrops in the Pikeview quadrangle

SHADED-RELIEF MAP OF THE PIKEVIEW QUADRANGLE WITH GEOLOGY AND TOPOGRAPHY OVERLAY, OBLIQUE VIEW LOOKING NORTH

MAP SYMBOLS

Contact—Dashed where approximately located. Unit symbols shown as fractions indicate a thin veneer of one deposit (upper symbol) over another deposit (lower symbol)

Fault—Dashed where approximately located; dotted where concealed; ball and bar on the downthrown side; arrow shows direction of dip; angle of dip shown in degrees

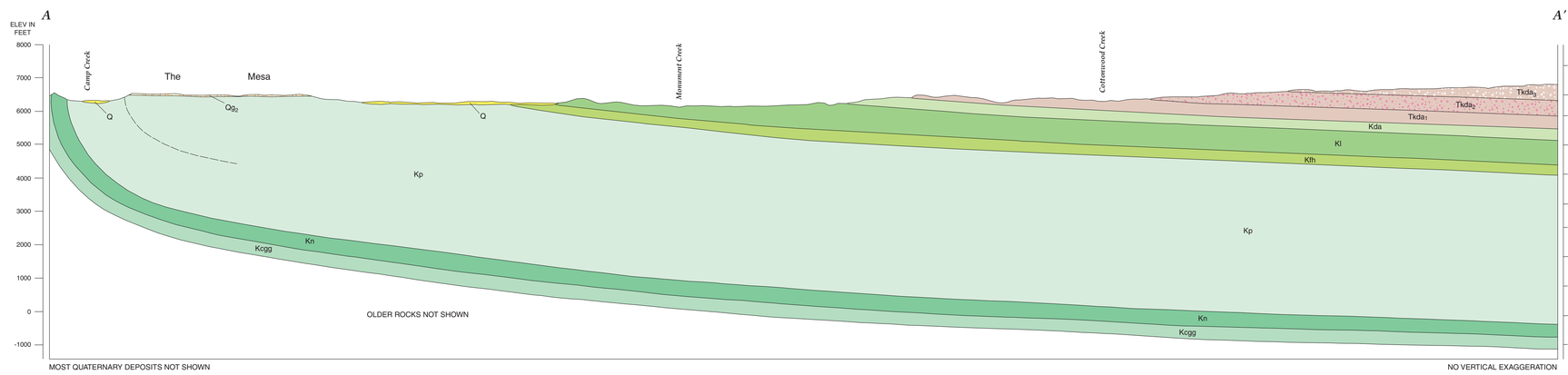
25 — **Strike and dip of inclined beds**—Angle of dip shown in degrees

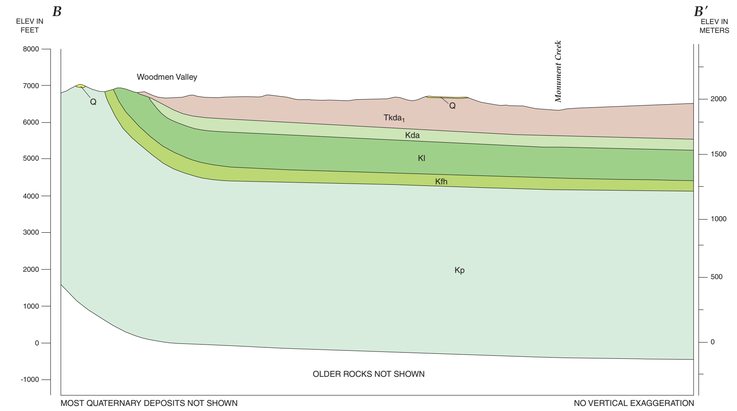
Strike and dip of vertical beds

c — **Abandoned coal mine adit and dump**

A——A′ — **Alignment of cross section**

★ PV 98 — **Sample location and sample number**





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By Jon P. Thorson, Christopher J. Carroll, and Matthew L. Morgan

2001