Geologic Map of the Belen Quadrangle, Valencia County, New Mexico

By

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New Mexico Bureau of Geology and Mineral Resources
Open-file Digital Geologic Map OF-GM 080

Scale 1:24,000

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Mapped and compiled by Geoffrey C. Rawling

EXPLANATION OF MAP UNITS

Rock colors are by comparison with Goddard et al. (1948). Mapping of surficial deposits on Llano de Albuquerque based largely on air photo interpretation and geomorphic position, and locally field checked.

Anthropogenic Deposits

af Artificial fill for highway and railroad grades.

Surficial Deposits

Qfw Historic floodway of the Rio Grande. Includes active channel and adjacent floodplain contained between manmade barriers such as levees and irrigation and drainage ditches. Channel consists of pebbly sand in ripple and small dune bedforms, and larger bars. Laminated sand, silt, and clay form waning-flow deposits. Less than 5 m thick. Correlative to the Los Padillas formation of latest Pleistocene-Holocene age, together with **Qfp** (Connell and Love, 2001).

Qfp Historic floodplain of the Rio Grande between valley margins and artificial barriers such as levees and irrigation ditches. Consist of sand, silt, and clay. Commonly disturbed by agricultural fields and housing developments. Up to 30 m thick. Interfingers with and is overlain by **Qae** at valley margins. Correlative to the Los Padillas formation of latest Pleistocene-Holocene age, together with **Qfw** (Connell and Love, 2001).

Qed Late Holocene eolian deposits with recent dune form development. Deposits are light brown (5YR 6/4) to grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), unconsolidated, very fine to medium grained, moderately well rounded to well rounded sand composed largely of quartz. Contains scattered pebbles. Forms dunes up to 2m in height. In the northern half of the map area, unit contains local areas of sand sheets (unit **Qe**).

Qedo Holocene eolian deposits with older dune form development. Composition is similar to **Qed**. Commonly buried by or reworked into **Qed**. Equivalent to unit **Qedi** of Love (2000).

Qe Holocene eolian deposits with subdued or no dune forms. Dominantly sand sheets. Deposit consists of light brown (5YR6/4 to 5YR 5/6), fine to very fine grained, rounded to subrounded sand composed largely of quartz. Locally pebbly due to bioturbation (?). Unit typically has one or more episodes of soil development beneath the surface. Up to 2 m thick. **Qe/** indicates where overlies subjacent unit.

Qe/lda sand sheets on the Llano de Albuquerque geomorphic surface (described below).

Qe/Qld sand sheets and subdued dunes on probable Los Duranes formation of middle Pleistocene age (Connell and Love, 2001), which consists of up to 40 m of fining-upward sequences of gravel, crossbedded sand, and parallel bedded sand, silt, and clay.

Qe/QTo discontinuous eolian mantle and local exposures of calcic soil at the top of the Arroyo Ojito Formation (described below) on fault scarps on the Llano de Albuquerque; isolated exposures along I-25 in the middle of the quadrangle are thin (≤ 1m) eolian mantle on probable Arroyo Ojito Formation.

Qae Holocene and late Pleistocene sandy and pebbly alluvium and local eolian sand sheets in generally low relief aprons and arroyo channels along valley margins. Sand is light brown (5YR 6/4) to grayish orange (10YR 7/4), unconsolidated, well sorted (eolian) to poorly sorted (alluvium), subangular to subrounded, and composed dominantly of quartz. Up to 8 m thick. Interfingers with and overlies **Qfp**.

Qgf Late Quaternary alluvial, eolian, and playa deposits along graben-floor drainages. Deposits are sand, silty clay, and clay. Up to 2 m (?) thick

Qag Late Quaternary sandy eolian (?) aprons downslope from faults on scarps cutting Llano de Albuquerque. Deposits generally similar to **Qe**. 1 to 2 m (?) thick.

Arroyo Ojito Formation

QTo Late Tertiary and early Quaternary (?) basin fill of Santa Fe Group deposited by ancestral Rio Puerco and inter-channel eolian and pedogenic processes. Sediments consists of gravel, pebbly sand, sand, silt, and clay. Sand, fine sand, and silt beds are thin to thick bedded, light brown (5YR 5/6) to grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), and composed of rounded to subangular grains. Clay beds are thin to thick bedded and light brown (5YR 6/4) to grayish orange (10YR 7/4) to moderate yellowish brown (10YR 5/4). Interchannel deposits commonly have laterally extensive soils characterized by rubification, clay concentrations, and carbonate nodules. Gravel beds have trough crossbedding, are typically scoured into underlying finer grained deposits, and generally weather into slopes where not cemented. Gravels are dominated by red and black chert, tan, brown, and red sandstone, and lesser amounts of Precambrian granite, multicolored Precambrian quartzite, and intermediate intrusive and extrusive volcanic rocks. Pedernal chert and petrified wood are typically present in sparse amounts. The gravel clast population and paleocurrent indicators indicate derivation from generally southeast flowing streams coming off of the Colorado plateau. The presence of Grants obsidian (indicated by the hachured lines) indicates sediment derived in part from the ancestral Rio San Jose drainage. At least 1500m thick based on oil test wells to east and west of the Belen quadrangle (as reported in Titus, 1963). Equivalent to units **QTui** of Love et al (1998) and **TQsp** of Love (2000). Top of unit is the Llano de Albuquerque (**lda**), a geomorphic surface of maximum basin aggradation that forms the mesa of the same name in the western half of the quadrangle. The Llano de Albuquerque surface underlies units **Qe/lda**, **Qed**, **Qedo**, and **Qgf**. In the Belen area, the Llano de

Albuquerque surface is between 1.2 and 2.7 Ma, but is most likely older than 1.6 Ma. (see discussion in Love et al., 2001). Beneath the surface is a white (N9) to bluish white (5B9/11), 2-3 m thick, stage III+ - V calcic soil (Machette, 1982; Birkeland, 1999), delineated by northeast-trending hachures on the map where exposed, and on the cross section.

MAP AND CROSS SECTION SYMBOLS

Approximately located contact, queried where uncertain

Normal fault, ball and bar on downthrown side, dashed where approximately located, dotted where buried

Bedding attitude (dip and dip direction)

Horizontal bedding

Paleocurrent direction, with type of indicator noted: t indicates axis of trough cross bed; i indicates imbricated gravel. Ball is at measurement point

Axis of elongate concretion. Ball is at measurement point.

Northeast-trending hachures: exposed calcic soil horizons developed at top of **QTo**

Approximate northward extent of clasts of Grants obsidian, indicating influence of Rio San Jose on gravel composition in **QTo**

Water well with NM State Engineer Office W.A.T.E.R.S. database reference number

Line of cross section

Water well projected into cross section, with depth to water table

Water table, queried where uncertain

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