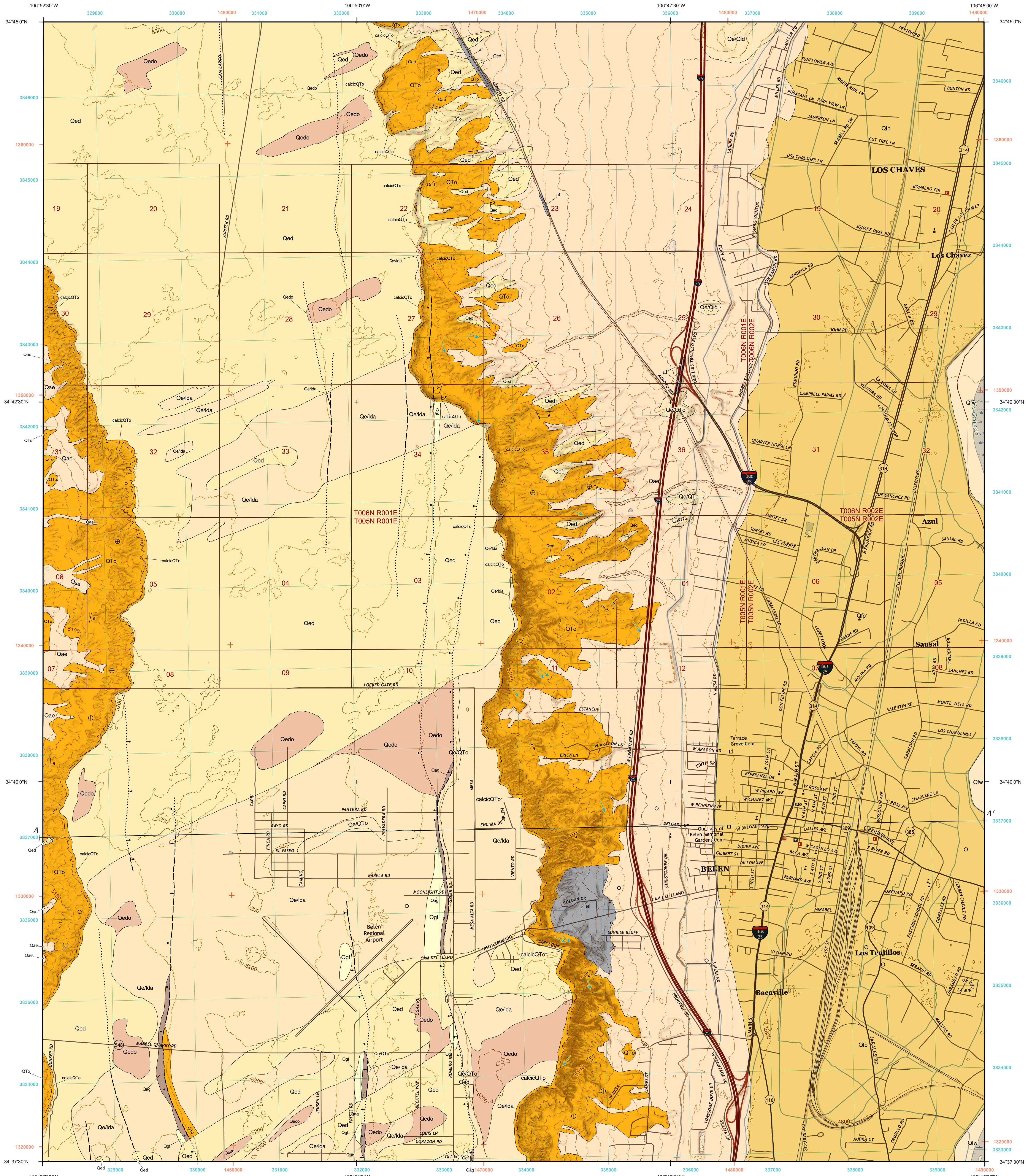
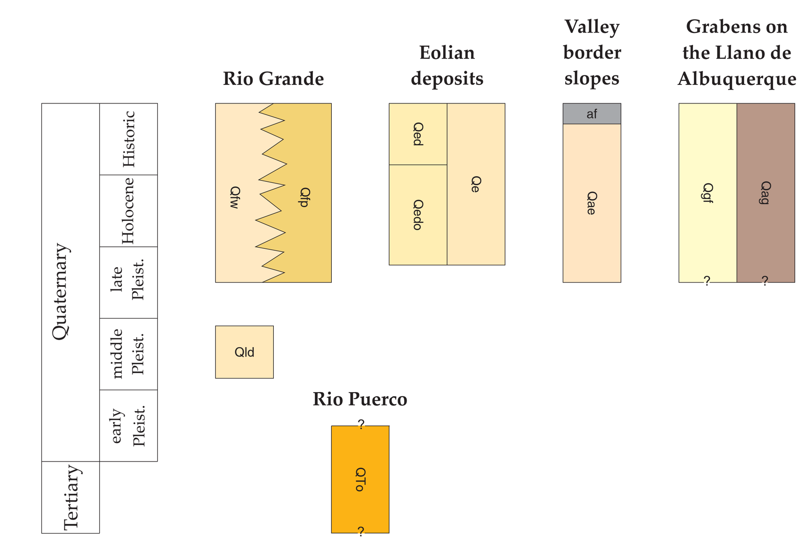


Correlation of Map Units



Explanation of Map Symbols

Contact—The identity and existence are certain or questionable where queried. Location is accurate where solid and approximate where dashed.

Internal contact—Identity and existence are certain. Location is accurate.

Fault (generic; vertical, subvertical, or high-angle; or unknown or unspecified orientation or sense of slip)—The identity and existence are certain. Location is approximate where dashed and concealed where dotted.

Normal fault—The identity and existence are certain. Location is approximate where dashed and concealed where dotted.. Ball and bar on downthrown block.

Well location (in cross section)—The location and depth of a well used to establish stratigraphy and geologic unit depth.

Water-table contour (in cross section), showing altitude of unconfined water table [1963]— The location is approximate where dashed and questionable where queried.

Fault in cross section showing local up/down offset—The arrows show the relative motion along the fault plane.

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

A A' Cross section line and label.

Horizontal bedding.

53 Inclined bedding—Showing strike and dip.

Fluvial transport direction.

Axis of elongate concretion.

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

Description of Map Units

ANTHROPOGENIC DEPOSITS

af **artificial fill (Holocene)**—Artificial fill for highway and railroad grades.

SURFICIAL DEPOSITS

Qfw **Historic floodway of the Rio Grande (Late Holocene)**—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 (Late Holocene)**—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 **eolian deposits with recent dune form development (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 **eolian deposits with older dune form development (Holocene)**—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 **eolian deposits with subdued or no dune forms. (Holocene)**—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:

> lda—sand sheets on the Llano de Albuquerque geomorphic surface (described in **QTo**).
>
> 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.
>
> **QTo**—discontinuous eolian mantle and local exposures of calcic soil at the top of the Arroyo Ojito Formation (described in **QTo**) 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 **sandy and pebbly alluvium and local eolian sand sheets (Holocene to late Pleistocene)**—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 alluvial, eolian, and playa deposits (Late Quaternary)—Late Quaternary alluvial, eolian, and playa deposits along graben-floor drainages. Deposits are sand, silty clay, and clay. Up to 2 m (?) thick.

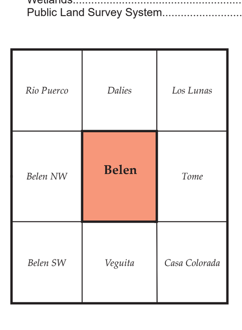
Qag sandy eolian (?) aprons (Late Quaternary)—Late Quaternary sandy eolian (?) aprons downslope from faults on scarps cutting Llano de Albuquerque. Deposits generally similar to **Qe**. 1 to 2 m (?) thick

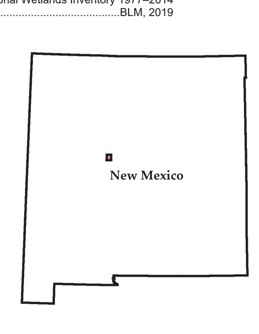
ARROYO OJITO FORMATION

QTo **basin fill of Santa Fe Group deposited by ancestral Rio Puerco and inter- channel eolian and pedogenic processes (Late Tertiary to early Quaternary (?))**—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.

Base map from U.S. Geological Survey 2020.
North American Datum of 1983 (NAD83)
Projection and 1,000-meter grid: Universal Transverse Mercator, Zone 13S, shown in blue.
10,000-foot ticks: New Mexico Coordinate System of 1983 (Central Zone), shown in red.

Roads	U.S. Census Bureau, 2015–2016
Names	GNIS, 2016
Hydrography	National Hydrography Dataset, 2014
Contours	IFSAR 4.5 m Digital Terrain Model, 2008
Wetlands	FWS National Wetlands Inventory 1977–2014
Public Land Survey System	BLM, 2019





Quadrangle Location

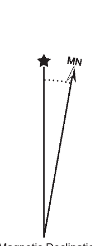
New Mexico Bureau of Geology and Mineral Resources
New Mexico Tech
801 Leroy Place
Socorro, New Mexico
87801-4796

[575] 835-5490

This and other STATEMAP quadrangles are available for free download in both PDF and ArcGIS formats at:

http://geoinfo.nmt.edu

Digital layout and cartography by the NMBGMR Map Production Group:
Phil L. Miller, Amy L. Dunn, Ann D. Knight, Tyler Askin, and Hannah N. Hunt



Magnetic Declination
June, 2003
10° 10' East
At Map Center

1:24,000

1 0.5 0 1 Mile

1000 0 1000 2000 3000 4000 5000 6000 7000 Feet

1 0.5 0 1 Kilometer

Contour Interval 20 Feet

North American Vertical Datum of 1988

New Mexico Bureau of Geology and Mineral Resources
Open-File Geologic Map 80

Mapping of this quadrangle was funded by a matching-funds grant from the STATEMAP program of the National Cooperative Geologic Mapping Act, administered by the U. S. Geological Survey, and by the New Mexico Bureau of Geology and Mineral Resources, (Dr. Nelia W. Dunbar, ; Dr. *Director and State Geologist* J. Michael Timmons,). *Assoc. Director for Mapping Programs*

Geologic Map of the Belen 7.5-Minute Quadrangle, Valencia County, New Mexico

June 2003

by
Geoffrey C. Rawling

[1] New Mexico Bureau of Geology and Mineral Resources, 801 Leroy Place, Socorro, NM 87801

Comments to Map Users

A geologic map displays information on the distribution, nature, orientation, and age relationships of rock and deposits and the occurrence of structural features. Geologic and fault contacts are irregular surfaces that form boundaries between different types or ages of units. Data depicted on this geologic quadrangle map may be based on any of the following: reconnaissance field geologic mapping, a compilation of published and unpublished work, and photogeologic interpretation. Locations of contacts are not surveyed but are plotted by interpretation of the position of a given contact onto a topographic base map; therefore, the accuracy of contact locations depends on the scale of mapping and the interpretation of the geologist(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site-specific conditions should be verified by detailed surface mapping or subsurface exploration. Topographic and cultural changes may not be shown due to recent development. Cross sections are constructed based upon the interpretations of the author made from geologic mapping and available geophysical and subsurface (drill hole) data.

Cross sections should be used as an aid to understanding the general geologic framework of the map area and not be the sole source of information for use in locating or designing wells, buildings, roads, or other human-made structures.

The New Mexico Bureau of Geology and Mineral Resources created the Open-File Geologic Map Series to expedite the dissemination of these geologic maps and map data to the public as rapidly as possible while allowing for map revision as geologists continued to work in map areas. Each map sheet carries the original date of publication below the map and the latest revision date in the upper right corner. In most cases, the original publication date coincides with the date of delivery of the map product to the National Cooperative Geologic Mapping Program (NCGMP) as part of New Mexico's STATEMAP agreement. While maps are produced, maintained, and updated in an ArcGIS geodatabase, at the time of the STATEMAP deliverable, each map goes through cartographic production and internal review before uploading to the Internet. Even if additional updates are carried out on the ArcGIS map data files, citations to these maps should reflect this original publication date and the original authors listed. The views and conclusions contained in these map documents are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the State of New Mexico or the U.S. Government.

Geologic Cross Section A–A'