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Description of map units—Loving Quadrangle Sediment color was estimated by comparing dry sediment to Munsell Color Chart (Munsell

Hd-human disturbed areas (Holocene)— Disturbance areas are mostly quarries and (or) dump areas that obscure the local geology.

Qal-alluvium (Holocene)--Brown (7.5 YR 6/4), silt to sand, well sorted, subangular to subrounded, dominantly quartz with rare lithics, occupies draws and river channels and associated active floodplains. Little to no vegetation. Overlies or inset into all older units. Thickness 0-2m.

Qp-playa lake deposit (Holocene)—Fine-grained deposits in playa lake along eastern central

Qes -eolian sand (Holocene)—Yellowish red (5 YR 5/8), very fine lower-fine upper, well sorted, subangular to subrounded, quartz sand derived from reworked TQg in NE part of map area. Forms coppice dunes, climbing dunes, and sand sheets. Typically east of Pecos River channel and extends ~ 1 mile eastward from river and also abundant in NE part of quadrangle where it overlies TQg. Thickness <10 m.

Qaes-alluvial and eolian deposits (Pleistocene (?) to Holocene)-Brown (7.5 YR 6/4), silty clay to silt to sand, well sorted, subangular to subrounded grains composed of 70% quartz and 30% carbonate and chert. Weak soil development in upper 1.25 m: upper 15 cm of soil is massive silty clay to clayey silt, brown (7.5 YR 5/4), slightly plastic, bioturbated, effervesces strongly, local organic film with granular soil structure; gypsiferous and calcareous concretions decrease in abundance downward to 40 cm; prismatic structure extends down to 1.25 m. Unit locally weathers into badlands and exhibits piping. Common veneer on nearly all Quaternary deposits in the map area and commonly overlies Qagp2, Qasp2, Prlu and Prv. Thickness • 10 m.

Qasm1-alluvial sand mainstem (Pleistocene (?) to Holocene)- Light brown (7.5 YR 6/4), silt o fine-lower sand, subrounded to subangular, well sorted, massive, quartzose and lithic grains, scattered pebbles and rare cobbles dispersed within matrix, rare calcic nodules and laminated drapes of dark red mud. Surface nearly always reworked into coppice dunes. Top of unit forms a terraces(T1) five meters above modern Pecos River and deposit is equivalent to flume sand in Carlsbad. May overlie or be inset into Qagm2. Thickness • 10 m.

Qasp1 alluvial sand piedmont (Pleistocene (?) to Holocene)- White to pink (5 Y 8/1-5 YR 7/4), tuffaceous sand and silt with mainstem pebbles, poorly exposed, not capped by calcrete, includes <20 cm thick lense of reworked white (5 Y 8/1) tephra. Inset into or capping Qa2 deposits and caps the fill-cut T2. Laterally equivalent to Qasm1. Thickness 0-2 m.

Qaspm1 alluvial sand piedmont (Pleistocene (?) to Holocene)- Transitional deposit of Qasm1

Qagm2-alluvial gravel mainstem (Pleiostocene) Pink (5 YR 7/4) to red to tan, medium sand to pebble and small cobbles (<12 cm dia.) in sand and gravel lenses, subangular to well rounded, poorly to well sorted. Pebbles of chert, gray and maroon quartzite, metamorphic clast (?), smaller cobbles are carbonates, chert, quartzite, dolomite, limestone, metamorphic, schist, bull quartz, and basalt, and large pebbles and small cobbles are carbonate lithics. Gravel becomes sandy conglomerate where well cemented by calcite. Local potholes. Associated with a med-light gray (2.5 Y) tephra (?) that is finely crystalline. Fine-grained facies locally laminated. Crossbedded sand and gravel, with some imbrication. Paleocurrent data indicate south-southeasterly flow. Capped by calcrete layer (0-< 2 m thick). Cemented mainstem gravels make riffles/restrictions along river channel in southeast corner of quadrangle. Top of Qagm2 with potholes could be a fill-cut equivalent to T2. Low-angle unconformity between Qagm2 and underlying TQg. Deposit associated with big irregular chunks of gypsum (from underlying clastic Rustler Fm) and commonly overlies Permian units. Thickness 0-75 m.

Qasgm2-alluvial sand and gravel mainstem (Pleiostocene) Pink (5 YR 7/4) to red to tan, nedium sand with lesser pebble and small cobbles (<12 cm dia.), subangular to well rounded, poorly to well sorted. Pebbles of chert, gray and maroon quartzite, metamorphic clast (?), smaller cobbles are carbonates, chert, quartzite, dolomite, limestone, metamorphic, schist, bull quartz, and basalt, large pebbles and small cobbles are carbonate lithics. Local potholes. Associated with a med-light gray (2.5 Y) tephra (?) that is finely crystalline. Locally laminated to trough-crossbedded, and imbrication. Paleocurrent data indicate south-southeasterly flow. Capped by calcrete layer (0-< 2 m thick). Cemented mainstem sands and gravels make riffles/ restrictions along river channel in SE corner of quadrangle. Top of Qasgm2 with potholes could be a fill-cut equivalent to T2. Low-angle unconformity between Qasgm2 and underlying TQg. Deposit associated with big irregular chunks of gypsum (from underlying clastic Rustler Fm) and commonly overlies Permian units. Thickness 0-75 m.

Qasgp2-alluvial sand and gravel piedmont (Pleistocene) Pink to red sand and gray to white gravel, poorly sorted, angular to subrounded. Sand composed of quartz and locally-derived limestone, dolomite, and chert. Gravels are composed of locally-derived limestone, dolomite, and chert. Calcrete (1-2 m thick). Piedmont deposit in northeast area of map. Thickness 0-

Qasgpm2-alluvial sand and gravel piedmont and mainstem (Pleistocene) Transitional Qasgpm2 deposit of Qasgp2 and Qasgm2.

TQg Gatuna Formation (late Tertiary to early Pleistocene?) Moderate orange pink (5 YR 8/4) to reddish orange (10 R 6/6) to red (2.5 YR 5/6), well sorted, subrounded to well rounded siltstone to sandstone (silt to fine upper sand), calcite cemented, bluish hue in places, locally gypsiferous, local well rounded granules and pebbles of chert, interbedded with non-calcareous mudstone (weathers blocky). Sandstone and siltstone beds are medium to thick with horizontal planar laminations, low-angle crossbeds, and cut-and-fill structures. Mudstones are in lenticular to tabular thin beds and also in m-scale-thick intervals. Slope former with badland weathering. Capped by mudstone- and gravel-bearing calcrete: plug is 0.5-1.0 m thick, pillar structures penetrate down into bedrock about 2 m. Varying bedding orientations in area indicate local warping (salt tectonics). Forms prominent redbeds in southeast and east part of quadrangle. Overlies Permian bedrock units. Highly variable thickness 0->~130 m (from cross section).

Prm—Rustler Formation, Magenta Dolomite (Ochoan) Pinkish gray fresh, light pink weathered (2.5 YR 6/4 to 2.5 YR 7/2), gypsiferous, sugary limestone, medium crystals (0.25-0.35 mm dia), poorly to moderately indurated. Very finely laminated to massive in thin beds, laminations are planar to crinkly. Microbial buildups present in equant to elongate heads (cmscale to decimeter scale, maximum of 30 cm) with synoptic relief of mms to cms. Locally vesicular and chicken wire weathering common. Varying bedding orientations indicate local warping (salt tectonics). Exposed in eastern part of quadrangle and shown in cross section. Contacts with other units were not observed. Thickness ~• 3 m.

Prc-Permian Rustler Formation, Culebra Dolomite Member (Ochoan), Cream-weathered and fresh (7.5 YR 8/1), sugary, finely crystalline, locally yellow to red to pink(10 YR 8/2), sandy limestone. Low-angle crossbeds, planar horizontal laminations to massive in thin to thick tabular beds (< 0.75 m thick). Vesicles follow bedding, hematite present near vesicles and along laminations, auto-brecciated locally, some recessive interbeds where gypsum and (or) mudstone has locally been removed. Vertical and horizontal joints filled with gypsum and calcite, gypsum crystals in vugs, chicken-wire weathering in cm, decimeter, and meter scales. Capped by 1-2 m of calcrete. Exposed in Culebra bluffs area where it is folded into broad synclines and anticlines. Riffles and channel restrictions associated with bedrock exposures of this unit in the area of Herradura Bend and Culebra Bluffs. Thickness ~• 20 m (from cross

Prv-Rustler Formation Virginia Draw Member (Ochoan): Deep orange-red weathered and fresh (10R 4/6) and locally green to gray (GLEY 7/10 Y), siltstone to very fine lower to medium lower sandstone, with rare coarse grains, moderately well sorted, subangular to round, interbedded with gypsiferous green-red claystones and mudstones. Medium beds of silty sandstones interbedded with very thin beds of greenish gypsiferous claystone and mudstone, massive, finely laminated to medium bedded, wavy bedding and ripples crossbeds. Highly contorted into micro- and mesoscale folds, highly fractured with gypsum veins, and fractured into intraclastic breccia. Capped by 1-2 m thick calcrete. Weathers into badlands. Exposed in irrigation ditches in southwest part of quadrangle—good area to characterize lower siliciclastic Vdraw member(?) of Rustler Member. Base of unit not exposed. Thickness ~130 m (from cross

Pru-Rustler Formation undifferentiated (Ochoan)- Irregular masses of gypsum, dolomite (Prc and Prm), and salt in large blocks scattered on surface and outcrops with chaotic bedding orientations. Exposed in eastern part of quadrangle. Highly contorted with overlying TQg by railroad cut east of factory. May include upper Salado Formation. Thickness unknown.

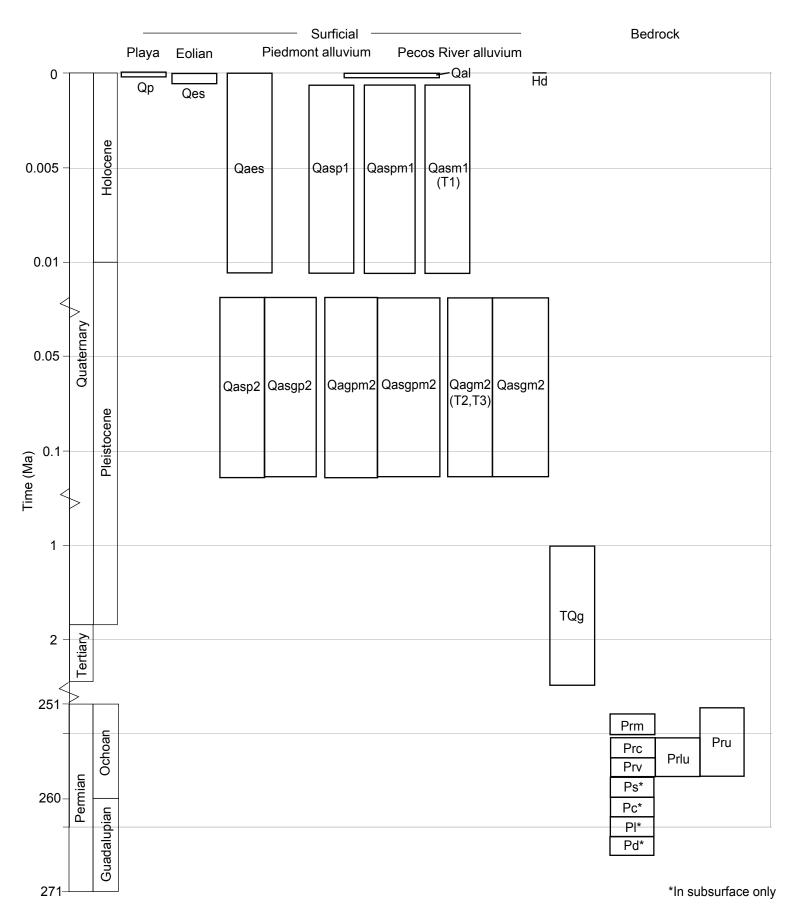
Ps-Permian Salado Formation (Ochoan)—In cross section only. Halite and anhydrite with subordinate potash salts, dolmite to silty-sandy dolomite, and claystone to siltstone. Thins to southwest. (550-650 m thick).

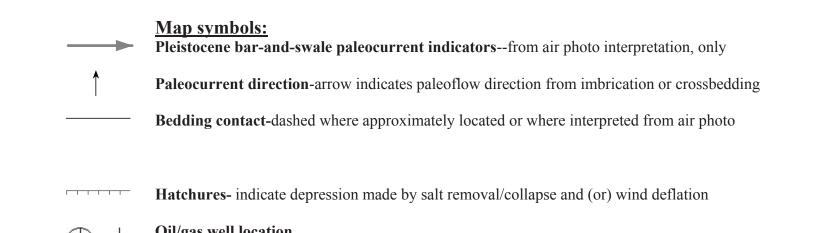
Pc-Permian Castille Formation (Ochoan)—In cross section only. Anhydrite and interbedded halite. Thickness ~60-100 m.

Pl- Permian Delaware Mountain Group, Bell Canyon Formation, Lamar Limestone Member (Ochoan- Guadalupian)—In cross section only. Limestone, siltstone, and possibly sandstone and shale. Thickness • 0-15 m.

Pd-Permian Delaware Mountain Group, undifferentiated (Guadalupian)—In cross section only. Sandstone, siltstone, and shale with subordinate limestone. Thickness >350 m.







(suggested type logs for subsurface stratigraphic picks are logfile numbers 47113 or 24319)

Water well location

