

10: Sandy gravel (sG); granules to very large pebbles with very fine to very coarse sand; very poorly sorted; very angular to subrounded; olive brown (2.5Y 4/4); *micaceous*.



80: Gravel (G); granules to large pebbles with minor fine to very coarse sand, and clay; moderately sorted; very angular to subangular; light yellowish brown (2.5Y 6/3); *calcareous*.

Depth (feet) and description



20: Slightly gravelly sand ((g)S); medium to very coarse sand with granules to small pebbles; moderately to well sorted; subangular to well rounded; light olive brown (2.5Y 5/3).



90: Sandy gravel (sG); granules to very large pebbles with very fine to very coarse sand and minor clay; very poorly sorted; angular to subangular; light yellowish brown (2.5Y 6/3); *calcareous*.



30: Sandy gravel (sG); granules to medium pebbles with medium to very coarse sand; poorly to moderately sorted; angular to subrounded; light olive brown (2.5Y 5/4).



100: Sandy gravelly clay (gM); clay with granules to large pebbles and very fine to very coarse sand; very poorly sorted; light yellowish brown (2.5Y 6/3); *calcareous*.



40: Sandy gravel (sG); granules to large pebbles with medium to very coarse sand; poorly sorted; very angular to subrounded; light olive brown (2.5Y 5/3).



110: Sandy gravelly clay (gM); clay with granules to small pebbles and very fine to very coarse sand; very poorly sorted; light yellowish brown (2.5Y 6/3); *calcareous*.



50: Sandy gravel (sG); granules to large pebbles with medium to very coarse sand; poorly sorted; angular to subrounded; light olive brown (2.5Y 5/3).



120: Sandy clay (sC); clay with very fine to very coarse sand and minor granules; very poorly sorted; light brownish gray (2.5Y 6/2); *calcareous*.



60: Sandy gravel (sG); granules to large pebbles with medium to very coarse sand; poorly sorted; angular to subrounded; olive brown (2.5 Y 4/4).



130: Clayey gravelly sand (gmS); very fine to very coarse sand with granules to large pebbles and clay; very poorly sorted; angular to subrounded; light olive brown (2.5Y 5/3); *slightly calcareous*.



70: Sandy gravel (sG); granules to large pebbles with medium to very coarse sand; poorly sorted; angular to subrounded; light olive brown (2.5Y 5/3).



140: Sandy clayey gravel (mG); granules to large pebbles with clay and very fine to very coarse sand; very poorly sorted; angular to subrounded; gray (2.5Y 6/1); *calcareous*.

Figure 17E. Lithologic descriptions and photographs of **shaker** drill cuttings collected from the borehole at 16 USGS multiple-depth, monitoring-well sites in San Diego County, California, 2003–2017: (A) SDCD; (B) SDSY; (C) SDLH; (D) SDAQ; (E) SDCP; (F) SDBP; (G) SDHF; (H) SDEP; (I) SDNB; (J) SDSW; (K) SDMC; (L) SDLD; (M) SDCC; (N) SDOR; (O) SDOT; and (P) SDBW.



150: Sandy clayey gravel (mG); granules to large pebbles with clay and very fine to very coarse sand; very poorly sorted; angular to rounded; olive gray (5Y 5/2).



157: Gravel (G); cobbles; moderately to well sorted; very angular; dark yellowish brown (10YR 3/4); *core 1*.



200: Gravelly clayey sand (gmS); very fine to very coarse sand with clay and granules to medium pebbles; very poorly sorted; angular to subangular; light brownish gray (2.5Y 6/2); calcareous.

Depth (feet) and description



210: Sandy clayey gravel (mG); granules to large pebbles with clay and very fine to very coarse sand; very poorly sorted; angular to subrounded; olive (5Y 5/3); *calcareous*.



157.75: Clayey gravel (mG); granules to large pebbles with clay and minor silt; very poorly sorted; very angular; light greenish gray (5GY 7/1); *slightly calcareous; core 2*.



220: Clayey sandy gravel (msG); granules to medium pebbles with very fine to very coarse sand, and clay; very poorly sorted; angular to subrounded; olive (5Y 5/3); *calcareous*.



160: Clayey sandy gravel (msG); granules to large pebbles with very fine to very coarse sand, and clay; very poorly sorted; subangular to rounded; light yellowish brown (2.5Y 6/3); trace wood fragments, ~15 mm.



230: Clayey silty sandy gravel (msG); granules to medium pebbles with very fine to very coarse sand and silt with clay; very poorly sorted; angular to subrounded; light olive brown (2.5Y 5/3); calcareous.



170: Clayey sandy gravel (msG); granules to large pebbles with very fine to very coarse sand, and clay; very poorly sorted; very angular to subangular; olive gray (5Y5/2).



240: Slightly gravelly clayey sand ((g)mS); fine to very coarse sand with clay and granules to small pebbles; very poorly sorted; angular to subrounded; light yellowish brown (2.5Y 6/3); slightly calcareous.



180: Clayey sandy gravel (msG); granules to small pebbles with very fine to very coarse sand and clay; very poorly sorted; very angular; light olive gray (5Y 6/2); *calcareous*.



245: Silty sand (zS); very fine to fine sand with silt; well sorted; angular; grayish brown (10YR 5/2); *micaceous; core 3*.



190: Gravelly clayey sand (gmS); very fine to very coarse sand with clay and granules to large pebbles; very poorly sorted; very angular to subangular; olive (5Y 5/3); *calcareous*.



250: Silty sand (zS); very fine to medium sand with silt; moderately to well sorted; angular to subrounded; dark yellowish brown (10YR 4/4); *minor mica; oxidized; core 4.* 



260: Clayey silty sand (mS); very fine to coarse sand and silt with clay and trace granules to medium pebbles; very poorly sorted; angular to subangular; brown (10YR 5/3); *calcareous*.



330: Silty clayey sand (mS); very fine to very coarse sand with clay and silt; very poorly sorted; subangular to rounded; grayish brown (2.5Y 5/2); *calcareous*.

Depth (feet) and description



270: Silty clayey sand (mS); very fine to coarse sand with clay and silt; poorly sorted; angular to subrounded; olive brown (2.5Y 4/4); *calcareous*.



340: Sand (S); very fine to coarse sand with clay and minor granules to medium pebbles; poorly to moderately sorted; subangular to subrounded; light brownish gray (2.5Y 6/2).



280: Slightly gravelly silty sandy clay ((g)sM); clay with very fine to coarse sand and silt with granules to small pebbles; poorly sorted; light olive brown (2.5Y 5/3); slightly calcareous.



350: Clayey sand (cS); very fine to coarse sand with clay and minor granules to medium pebbles; poorly to moderately sorted; subangular to subrounded; light brownish gray (2.5Y 6/2); calcareous.



290: Silty clay (zC); Clay with silt and minor very fine to coarse sand with trace granules; well sorted; greenish gray (10Y 5/1); *calcareous*.



360: Sandy clay (sC); clay with very fine to coarse sand and trace granules; poorly sorted; light brownish gray (2.5Y 6/2); *calcareous*.



300: Sandy clay (sC); clay with very fine to medium sand; moderately sorted; greenish gray (10Y 5/1); *calcareous*.



370: Clayey sand (cS); very fine to coarse sand with clay and trace granules; poorly sorted; subangular to rounded; light olive brown (2.5Y 5/3); *calcareous*.



310: Sandy clay (sC); clay with very fine to coarse sand; poorly to moderately sorted; olive (5Y 5/3); *calcareous*.



380: Clayey sand (cS); very fine to coarse sand with clay and trace granules; poorly sorted; subangular to rounded; light olive brown (2.5Y 5/3); *calcareous*.



320: Gravelly clayey sand (gmS); very fine to very coarse sand with clay and granules to medium pebbles; very poorly sorted; angular to subrounded; olive (5Y 5/3); *calcareous*.



390: Sand (S); very fine to coarse sand; moderately sorted; angular to subrounded; light olive brown (2.5Y 5/3); *slightly calcareous*.



400: Sandy clay (sC); clay and very fine to medium sand with minor very coarse sand to small pebbles; poorly to moderately sorted; light olive brown (2.5Y 5/3); *calcareous*.



460: Sandy gravel (sG); granules to large pebbles with very fine to very coarse sand; very poorly sorted; very angular; olive brown (2.5Y 4/3).

Depth (feet) and description



410: Slightly gravelly sandy clay ((g)sM); clay with very fine to very coarse sand and granules to medium pebbles; very poorly sorted; dark gray (2.5Y 4/1); *minor biotite*.



470: Gravelly clayey sand (gmS); very fine to very coarse sand with clay and granules to medium pebbles; very poorly sorted; angular to subrounded; light olive brown (2.5Y 5/3).



415: Silty clay (M); clay with silt; well sorted; black (2.5Y 2.5/1); *micaceous;* core 5.



480: Gravelly sandy clay (gM); clay with very fine to medium sand and granules to medium pebbles; very poorly sorted; light olive gray (5Y 6/2).



420: Clayey sandy gravel (msG); granules to large pebbles with very fine to very coarse sand and clay; very poorly sorted; very angular; gray (5Y 5/1); extremely calcareous; micaceous; core 6.



490: Slightly gravelly clayey sand ((g)mS); very fine to very coarse sand with clay and granules to small pebbles; very poorly sorted; angular to subrounded; light olive brown (2.5Y 5/4); calcareous.



430: Gravelly clayey sand (gmS); very fine to very coarse sand with clay and granules to medium pebbles; very poorly sorted; very angular to subangular; light olive gray (5Y 6/2).



500: Gravelly sand (gS); very fine to very coarse sand with granules to large pebbles; poorly sorted; subangular to subrounded; light olive brown (2.5Y 5/4); *slightly calcareous*.



440: Gravelly sand (gS); very fine to very coarse sand with granules to medium pebbles and minor clay; very poorly sorted; subangular to rounded; olive gray (5Y 5/2); *calcareous*.



510: Sandy clayey gravel (mG); granules to large pebbles with clay and very fine to medium with minor very coarse sand; very poorly sorted; angular to subrounded; light olive brown (2.5Y 5/3); *calcareous*.



450: Sandy gravel (sG); granules to large pebbles with very fine to very coarse sand; very poorly sorted; very angular; light olive brown (2.5Y 5/3); minor mica.



520: Clayey sandy gravel (msG); granules to large pebbles with very fine to very coarse sand, and clay; very poorly sorted; very angular to subrounded; light olive brown (2.5Y 5/3).



530: Sandy gravel (sG); granules to small pebbles with very fine to very coarse sand; poorly to moderately sorted; very angular; olive brown (2.5Y 5/4); *slightly calcareous*.



590: Gravel (G); large pebbles to cobbles; moderately sorted; angular to rounded; various colors; *core* 8.

Depth (feet) and description



540: Sandy gravel (sG); granules to large pebbles with very fine to very coarse sand; poorly to moderately sorted; very angular to subrounded; grayish brown (2.5Y 5/2); calcareous.



600: Silty clayey sandy gravel (msG); granules to medium pebbles with very fine to very coarse sand and clay with silt; very poorly sorted; angular to subrounded; grayish brown (2.5Y 5/2); calcareous.



550: Sandy clayey silty gravel (mG); granules to large pebbles with silt and clay with very fine to coarse sand; very poorly sorted; very angular to subrounded; grayish brown (2.5Y 5/2); calcareous.



610: Gravelly sandy clay (gM); clay with very fine to coarse sand with granules to medium pebbles; very poorly sorted; pale olive (5Y 6/3); *calcareous*.



560: Sandy gravel (sG); granules to large pebbles with very fine to coarse sand and minor clay; poorly sorted; angular to subrounded; grayish brown (2.5Y 5/2).



620: Sandy clayey gravel (mG); granules to medium pebbles with clay and very fine to very coarse sand; very poorly sorted; angular to subrounded; light olive gray (5Y 6/2); *calcareous*.



570: Silty clayey gravel (mG); granules to large pebbles with clay and silt with minor very fine to medium sand; very poorly sorted; angular to subrounded; grayish brown (2.5Y 5/2); *calcareous*.



630: Sandy gravelly clay (gM); clay with granules to medium pebbles and very fine to very coarse sand; very poorly sorted; olive gray (5Y 5/2); calcareous.



580: Sandy gravel (sG); granules to medium pebbles with fine to very coarse sand and minor clay; poorly sorted; very angular; grayish brown (2.5Y 5/2); *slightly* calcareous.



640: Sandy clayey gravel (mG); granules to large pebbles with clay and fine to very coarse sand; very poorly sorted; angular to subrounded; dark grayish brown (2.5Y 4/2); *calcareous*.



585: Gravel (G); cobbles; moderately to well sorted; angular to rounded; various colors; *core* 7.



650: Sandy clayey gravel (mG); granules to medium pebbles with clay and fine to very coarse sand; very poorly sorted; subangular to subrounded; dark gray (2.5Y 4/1); calcareous.



660: Sandy clayey gravel (mG); granules to medium pebbles with clay and very fine to very coarse sand; very poorly sorted; subangular to rounded; very dark gray (5Y 3/1); *calcareous*.



665: Gravelly clay (gM); clay with granules to large pebbles; very poorly sorted; very dark gray (5Y 3/1); *calcareous*.



720: Gravelly clayey sand (gmS); very fine to very coarse sand with clay and granules to medium pebbles; very poorly sorted; subangular to subrounded; light olive gray (5Y 6/2);

Depth (feet) and description

(5Y 5/3); calcareous.

calcareous.

710: Clayey sandy gravel (msG); granules to medium pebbles with very

fine to very coarse sand and clay; very

poorly sorted; angular to rounded; olive



667.5: Silty clay (M); clay with silt and minor very fine to medium sand; moderately to very well sorted; dark greenish gray (10Y 4/1); *minor mica*; *core 9.* 



730: Gravelly clayey sand (gmS); very fine to very coarse sand with clay and granules to medium pebbles; very poorly sorted; angular to subrounded; light olive gray (5Y 6/2); *calcareous*.



675: Silty clayey sand (mS); very fine to medium sand and clay with silt and trace granules; moderately sorted; subangular to subrounded; greenish black (10Y 2.5/1); biotite rich with minor chlorite; core 10.



740: Clayey silt (M); silt and clay with minor very fine to medium sand and trace granules to large pebbles; moderately to very well sorted; greenish gray (5GY 6/1); calcareous; minor dark greenish gray (10GY 4/1); waxy clay.



680: Sandy silt (sZ); silt with very fine to fine sand; moderately to well sorted; greenish gray (10Y 5/1); calcareous; minor mica; core 11.



750: Sandy clayey silt (sM); silt with clay and very fine to coarse sand; poorly to moderately sorted; greenish gray (10Y 5/1); *calcareous*.



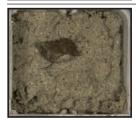
690: Sandy silt (sZ); silt with very fine to medium sand and trace granules to large pebbles; moderately to well sorted; greenish gray (10Y 5/1); calcareous.



760: Sandy clayey silt (sM); silt and clay with very fine to coarse sand and trace granules to medium pebbles; poorly to moderately sorted; greenish gray (5GY 6/1); *calcareous*.



700: Sandy silt (sZ); silt with very fine to very coarse sand and trace granules to small pebbles; poorly to moderately sorted; greenish gray (10Y 6/1); *calcareous*.



770: Sandy clay (sC); clay with very fine to very coarse sand and trace granules to large pebbles; very poorly sorted; greenish gray (5GY 6/1); *calcareous*.



780: Clayey sand (cS); very fine to very coarse sand with clay; very poorly sorted; angular to subrounded; greenish gray (10Y 6/1); *calcareous*.



840: Sandy silty clay (sM); clay with silt and very fine to medium sand with trace granules; poorly to moderately sorted; olive (5Y 5/4); *angular mafic gravel*.

Depth (feet) and description



790: Clayey silty sand (mS); very fine to very coarse sand with silt and clay; very poorly sorted; subangular to subrounded; greenish gray (10Y 6/1); slightly calcareous.



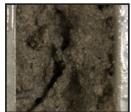
850: Slightly gravelly sandy clayey silt ((g)sM); silt and clay with very fine to very coarse sand and granules to small pebbles; very poorly to poorly sorted; light yellowish brown (2.5Y 6/3); angular mafic gravel.



800: Clayey silty sand (mS); very fine to very coarse sand with silt and clay; very poorly sorted; subangular to rounded; greenish gray (10Y 6/1); calcareous.



860: Slightly gravelly sandy clayey silt ((g)sM); silt and clay with very fine to very coarse sand and granules; very poorly sorted; light olive gray (5Y 6/2); angular mafic gravel.



805: Silty sand (zS); very fine to very coarse sand with silt; poorly sorted; subangular to subrounded; olive gray (5Y 5/2); *core 12*.



870: Slightly gravelly sandy clayey silt ((g)sM); silt and clay with very fine to very coarse sand and granules to small pebbles; very poorly sorted; light olive gray (5Y 6/2).



810: Silty sand (zS); very fine to medium sand with silt; moderately sorted; subangular to subrounded; light olive gray (5Y 6/2); *core 13*.



880: Clayey sandy gravel (msG); granules to large pebbles with very fine to very coarse sand and clay with minor silt; very poorly sorted; very angular to subrounded; olive gray (5Y 5/2); low-grade metavolcanic.



820: Sandy clay (sC); clay with very fine to medium sand; moderately sorted; pale olive (5Y 6/3); *calcareous*.



885: Low-grade metavolcanic (N/ 2.5); *core 14*.



830: Sandy clay (sC); clay with very fine to very coarse sand and trace granules; very poorly sorted; olive (5Y 5/3); calcareous; angular mafic gravel.



890: Low-grade metavolcanic (N/ 2.5); core 15.



900: Sandy gravel (sG); granules to large pebbles with very fine to very coarse sand; very poorly sorted; very angular; greenish black (10Y 2.5/1); low-grade metavolcanic.

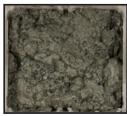


970: Clayey sandy gravel (msG); granules to medium pebbles with very fine to very coarse sand and clay; very poorly sorted; very angular to subrounded; greenish gray (5GY 5/1); calcareous; low-grade metavolcanic.

Depth (feet) and description



910: Clayey sandy gravel (msG); granules to small pebbles with very fine to very coarse sand and clay; very poorly sorted; very angular; dark greenish gray (10Y 4/1); calcareous; low-grade metavolcanic.



980: Sandy clayey gravel (mG); granules to medium pebbles with clay and very fine to very coarse sand; very poorly sorted; very angular to subrounded; dark greenish gray (5GY 4/1); calcareous; low-grade metavolcanic.



920: Clayey sandy gravel (msG); granules to small pebbles with very fine to very coarse sand, and clay; very poorly sorted; very angular; dark greenish gray (10Y4/1); slightly calcareous; low-grade metavolcanic.



990: Sandy clayey gravel (mG); granules to small pebbles with clay and very fine to very coarse sand; very poorly sorted; angular to subrounded; dark greenish gray (5GY 4/1); calcareous; low-grade metavolcanic.



930: Sandy clayey gravel (mG); granules to medium pebbles with clay and very fine to very coarse sand; very poorly sorted; very angular to subangular; greenish gray (5GY 5/1); calcareous; low-grade metavolcanic.



1,000: Sandy gravel (sG); granules to small pebbles with very fine to very coarse sand and minor clay; poorly sorted; angular to subrounded; dark greenish gray (10Y 4/1); calcareous; low-grade metavolcanic.



940: Sandy clayey gravel (mG); granules to medium pebbles with clay and very fine to very coarse sand with minor silt; very poorly sorted; very angular; dark greenish gray (10Y 4/1); slightly calcareous; low-grade metavolcanic.



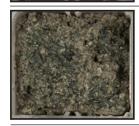
1,010: Sandy gravel (sG); granules to small pebbles with very fine to very coarse sand and minor clay; poorly sorted; angular to subrounded; dark greenish gray (10Y 4/1); *calcareous; low-grade metavolcanic*.



950: Sandy clayey gravel (mG); granules to medium pebbles with clay and very fine to very coarse sand; very poorly sorted; very angular; greenish gray (10Y 5/1); calcareous; low-grade metavolcanic



1,020: Sandy gravel (sG); granules to medium pebbles with very fine to very coarse sand and minor clay; poorly sorted; very angular to subangular; dark greenish gray (5GY 4/1); calcareous; low-grade metavolcanic.



960: Clayey sandy gravel (msG); granules to medium pebbles with very fine to very coarse sand, and clay; very poorly sorted; very angular to subangular; greenish gray (10Y 5/1); calcareous; low-grade metavolcanic.



1,030: Sandy gravel (sG); granules to medium pebbles with very fine to very coarse sand; poorly sorted; very angular to subangular; dark greenish gray (5GY 4/1); calcareous; low-grade metavolcanic.

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1,040: Sandy gravel (sG); granules to medium pebbles with very fine to very coarse sand and minor clay; poorly sorted; very angular; dark greenish gray (10Y 4/1); calcareous; low-grade metavolcanic.



1,050: Sandy gravel (sG); granules to small pebbles with very fine to very coarse sand and minor clay with silt; poorly sorted; very angular; dark greenish gray (10Y 4/1); calcareous; low-grade metavolcanic.



1,060: Sandy gravel (sG); granules to small pebbles with very fine to very coarse sand and minor clay; poorly sorted; very angular; greenish black (10G 2.5/1); calcareous; low-grade metavolcanic.



1,070: Clayey sandy gravel (msG); granules to medium pebbles with very fine to very coarse sand and clay; very poorly sorted; very angular; greenish black (5GY 2.5/1); calcareous; low-grade metavolcanic.



1,080: Sandy gravel (sG); granules to small pebbles with very fine to very coarse sand; poorly sorted; very angular; dark greenish gray (5GY 4/1); calcareous; low-grade metavolcanic.



1,090: Sandy gravel (sG); granules to medium pebbles with fine to very coarse sand; poorly sorted; very angular; dark greenish gray (10Y 4/1); calcareous; low-grade metavolcanic.



1,100: Sandy gravel (sG); granules to medium pebbles with medium to very coarse sand; poorly to moderately sorted; very angular; dark greenish gray (5GY 4/1); calcareous; low-grade metavolcanic.

Figure 17E. Lithologic descriptions and photographs of shaker drill cuttings collected from the borehole at 16 USGS multiple-depth, monitoring-well sites in San Diego County, California, 2003–2017: (A) SDCD; (B) SDSY; (C) SDLH; (D) SDAQ; (E) SDCP; (F) SDBP; (G) SDHF; (H) SDEP; (I) SDNB; (J) SDSW; (K) SDMC; (L) SDLD; (M) SDCC; (N) SDOR; (O) SDOT; and (P) SDBW.—Continued.