TABLE 1. GENERAL CHARACTERISTICS AND ENGINEERING PROPERTIES OF GEOLOGICAL UNITS, AUSTIN WEST QUADRANGLE.

GEOLOGIC UNIT	MAP SYMBOL	THICKNESS (feet)	GENERAL CHARACTERISTICS	ENVIRONMENTAL GEOLOGIC CHARACTERISTICS: SLOPE STABILITY	EXCAVATION CHARACTERISTICS	FOUNDATION CHARACTERISTICS	INFILTRATION CAPACITY	ROCK AND MINERAL RESOURCES	ENGINEERING TEST DATA: UNIT WEIGHT (lbs./cu. ft.)	MOISTURE (% by weight)	SEISMIC VELOCITY (feet/second)	TRIAXAL COMPRESSION (tons/sq. ft.)[1]	UNCONFINED COMPRESSION (tons/sq. ft.)	PLASTICITY INDEX (Atterberg Limits)	ABSORPTION SWELL (%)	ABSORPTION PRESSURE (lbs./sq. ft.)
Alluvium	Qal	0-20	Unconsolidated gravel, sand, silt, and clay of tributary streams; includes flood-deposited material immediately below Tom Miller Dam.	Moderate to low--commonly water saturated	Readily excavated by light machinery	Bearing capacity moderate to low; shrink-swell low to high	Generally high with adequate absorption of septic tank effluent; may be saturated seasonally and have low fluid acceptance	Minor source of sand and gravel. Yields small variable supplies of water; supply subject to drought	81 to 107	3 to 70	1,000 to 2,500	0.5 to 2.5	0.1 to 5.16 (mostly under 3.0)	4 to 60 (mostly 20 to 60)	0.5 to 6.75	600 to 8,400
Colorado River Terrace Deposits Sand Beach Riverview First Street Sixth Street Capitol Asylum	 Qsb Qrv Qfs Qss Qca Qas	 0-40 0-40 0-40 0-25 0-30 0-25	Mostly unconsolidated, yellow- to orange-brown gravel, sand, silt, and clay; consists mostly of Cretaceous limestone and chert fragments with minor amounts of older igneous, sedimentary, and metamorphic rocks. Gravel more common in higher (older) units, and more abundant near base of each unit. Upper surface of First Street terrace is level of maximum recorded flood (1869, 1935). Lower three units partly or completely flooded above Tom Miller Dam. Lower two units were frequently flooded prior to regulation of flow by Colorado River dams. Terrace deposits above flood level support growths of live oak and post oak.	Moderate to low	Readily excavated by light machinery	Bearing capacity moderate to low; large structures may require special design; shrink-swell low to moderate	Generally high with adequate absorption of septic tank effluent; lower units may be saturated and have low fluid acceptance	In the past supplied much sand and gravel; now mostly urbanized. May yield substantial supplies of water, more in lower terrace deposits	82 to 123	2 to 35	1,000 to 2,500	0.1 to 3.5	0.5 to 7.3 (mostly under 4.0)	8 to 66 (mostly 10 to 40)	0.03 to 3.5	400 to 8,400
Tributary Terrace Deposits	Qt	0-20	Mostly unconsolidated, light gray to tan, gravel, sand, silt, and clay; consists of locally derived limestone and chert gravel and calcareous silt and clay. Forms terraces along Barton Creek, Bull Creek, Shoal Creek, and other smaller creeks; includes minor, topographically high, alluvial deposits not directly related to modern streams.	Moderate to low	Readily excavated by light machinery	Bearing capacity moderate to low; shrink-swell low to moderate	High; adequate absorption of septic tank effluent	Potential source of sand and gravel; some previous operations now urbanized. May yield minor supplies of water	82 to 120	3 to 40	1,000 to 2,500	0.7 to 5.0	1.0 to 4.0	7 to 55 (mostly 20 to 40)	0.0 to 7.5	200 to 6,400
Austin Group Vinson Formation	Kvs	50	Gray to white, thin- to thick-bedded, massive chalk. Forms light-colored, moderately dissected slopes with live oak and juniper. Thickness incomplete; only lower part of each unit exposed.	High	Difficult to excavate with light equipment; generally can be ripped with heavy equipment	Bearing capacity high; shrink-swell generally low	Low to moderate; marginal to adequate absorption of septic tank effluent	None in this area; potential cement raw material elsewhere in Austin area	87 to 123	10 to 30	4,000 to 6,000	*	10 to 250 (mostly over 40)	10 to 40 (marly units)	0.1 to 0.8	400 to 1,400
Atco Formation	Kat	80	Gray to white, thin- to thick-bedded, massive to slightly nodular, fine-grained limestone, marly limestone, and chalk.													
Eagle Ford Formation	Kef	40	Upper part is dark gray clay; middle part consists of thin interbeds of sandy and flaggy limestone, chalk, clay, and bentonite; lower part is mostly dark gray calcareous clay. Includes Pepper Shale at base--soft, laminated, noncalcareous, three feet thick. Generally forms grassy, low relief areas with few native trees.	Low to moderate; decreases with increasing moisture content	Moderately easy to excavate; limestone and sandstone beds may require ripping	Bearing capacity generally low; may need special foundation design or excavation down to Buda Limestone; high shrink-swell	Low; generally inadequate absorption of septic tank effluent	None in this area	80 to 115	10 to 45	2,000 to 8,000	0.7 to 8.0	1 to 300 (clays mostly under 10; thin limestone and sandstone beds mostly over 60)	8 to 70 (mostly 20 to 50)	0.1 to 3.8	800 to 2,600
Buda Formation	Kbu	35	Gray to tan, hard, fine-grained, glauconitic, shell fragment limestone. Lower part less resistant and slightly nodular weathering. In outcrop fresh surfaces yellowish to pink. Commonly forms steep slopes above the Del Rio Clay. Live oak, juniper, elm, and hackberry are common on this unit.	Generally high but may fail at edges of steep slopes above weak Del Rio Clay	Excavation difficult; generally requires blasting	Bearing capacity generally high, but may be low at outcrop edge above slopes of Del Rio Clay	Low	None	*[2]	*	8,000 to 11,000	*	60 to 420	*	*	*
Del Rio Clay	Kdr	75	Dark gray to olive brown, pyritic, gypsiferous, calcareous clay containing abundant Exogyra arietina (ram's horn oyster). Poorly exposed in steep to shallow slopes below Buda limestone. Del Rio slopes readily fail by slide and creep; slopes commonly covered with a thin layer of Buda limestone rubble which supports typically limestone vegetation of live oak and juniper. Elsewhere the Del Rio supports only a cover of grass and scattered mesquite trees.	Low; decreases with increasing moisture content; fails when wet on shallow slopes	Moderately easy to excavate with light machinery	Bearing capacity low; structures need special support; high shrink-swell	Low; inadequate absorption of septic tank effluent	None	100 to 123	10 to 30	2,000 to 4,500	1.5 to 2.5	3 to 20 (mostly under 10)	20 to 56 (mostly 30 to 50)	4.7 to 8.4	4,400 to 6,600
Georgetown Formation	Kgt	55	Thin interbeds of gray to tan, nodular weathering, hard, fine-grained limestone, marly limestone, and marl, containing abundant fossil shells. Forms moderate to shallow slopes above more resistant Edwards limestone. Supports a limestone vegetation with juniper especially abundant.	High	Excavation difficult; blasting generally required	Bearing capacity high; no special support needed	Low	None	*	*	7,000 to 9,000	*	40 to 300 (mostly over 100)	*	*	*
Edwards Formation Member 4	Ked_4	40	Mostly hard, dense, gray to tan, thick- to thin-bedded, fine-grained limestone; soft, dolomitic rear middle; lower part flaggy bedded. Forms weakly to deeply dissected topography mostly east of Mount Bonnell fault. Members 1, 2, and 4 generally support growths of oak, juniper, hackberry, persimmon, and other plants.	High	Excavation difficult to moderate; blasting generally required	Bearing capacity high; no special support needed	Low in fine-grained dense limestones, moderate to high in coarse-grained limestones, dolomites, and cavernous zones	Source of high-grade crushed stone; large quarry in northeast map area recently urbanized. Lower Ked_4 was source of dimension stone (Austin Marble and paving flags). Ked_1 is important aquifer; source of Barton Springs and other springs	*	*	7,000 to 11,000	*	95 to 300 (mostly over 200)	*	*	*
Member 3	Ked_3	10	Mostly soft, nodular weathering, gray to tan, marly limestone, with abundant growth of juniper.													
Member 2	Ked_2	40	Mostly hard, light gray to tan, fine- to medium-grained, thin- to thick-bedded limestone; thin beds mostly fine grained, flaggy; thicker beds coarser grained with abundant rudist fragments and miliolid foraminifers. Chert nodules in lower third.													
Member 1	Ked_1	200	Mostly thin- to medium-bedded, gray-brown, porous dolomite and dolomitic limestone, and gray to tan, fine- to medium-grained rudist limestone. Nodular chert common. Top of unit is a 20-foot cavernous, solution-collapse zone. Total thickness estimated; complete section not exposed.													
Walnut Formation Bee Cave Member	Kbc	30	Soft, gray to tan, nodular weathering, fine-grained limestone, marly limestone, and marl with abundant fossil shells. Forms steep, light-colored, juniper-covered slopes on high topography west of Mount Bonnell fault.	Moderate to high	Excavation moderate to difficult, probably rippable in part	Bearing capacity moderate to high; special support generally not needed	Low to moderate; absorption of septic tank effluent probably marginal	Minor source of road material	*	*	3,000 to 7,000 (estimated)	*	50 to 200 (estimated)	*	*	*
Bull Creek Member	Kbk	35	Hard, dense, gray to tan, fine- to medium-grained, thin- to thick-bedded limestone; shell fragments and miliolid foraminifers common. Forms prominent bench on high topography west of main fault. Limestone vegetation of live oak, juniper, hackberry, and other plants.	High	Excavation difficult; blasting required	Bearing capacity high; no special support needed	Low to moderate	Minor source of road material	*	*	7,000 to 11,000 (estimated)	*	100 to 300 (estimated)	*	*	*
Glen Rose Formation Member 5	Kgr_5	100	Mostly thin-bedded, gray-brown, fine-grained, porous dolomite; upper 10 to 20 feet pulverulent. Forms moderately to deeply dissected hill country west of main fault. Typified by stair-step topography with oak-juniper vegetation.	High to moderate	Excavation difficult to moderate; blasting commonly needed	Bearing capacity generally high to moderate; thin, weak marl beds can be excavated down to harder, more stable limestone beds	High in dolomitic units; moderate to low in other units	Minor source of road material; dolomitic members are minor aquifers	*	*	3,000 to 10,000 (estimated)	*	90 to 250 (estimated)	*	*	*
Member 4	Kgr_4	120	Gray to tan, mostly thin- to thick-bedded, fine- to medium-grained limestone and marly limestone. Many beds with fossil shells.													
Member 3	Kgr_3	70	Gray brown to tan, thin interbeds of dolomite, dolomitic limestone, limestone, and marly limestone.													
Member 2	Kgr_2	120	Gray to tan, thin to thick interbeds of fine- to medium-grained limestone, marly limestone, and marl. Many beds with fossil shells.													
Member 1	Kgr_1	30	Gray to tan, thin- to thick-bedded limestone, marly limestone, and marl. At top is thin, orange-brown limestone ledge with abundant small fossil clams (Corbula harveyi); underlying marly limestone abundantly fossiliferous. Thickness is minimum; lower contact not exposed.													

1/ Derived partly from penetrometer correlation bearing curves of the Texas Highway Department

2/ *Test not applicable or test data not available