DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

QUATERNARY GEOLOGIC MAP OF THE SAN JOSE WEST QUADRANGLE, SANTA CLARA COUNTY, CALIFORNIA

by

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INTRODUCTION

The San Jose West 7.5 minute quadrangle is situated within the northern part of the Santa Clara Valley, south of San Francisco Bay and covers the western half, more or less, of the City of San Jose, the largest and most populated of all bay area cities as well as the third largest in the State of California (McLeod, 1989). The Santa Clara Valley is part of a long, northwest-southeast structural depression within the central Coast Ranges of California located between the San Andreas fault to the west and the Hayward and Calaveras faults to the east. The quadrangle lies between 37°15' and 37°22'30" north latitude and 121°52'30" and 122°00' west longitude and is one of the northwestern most quadrangles in the San Jose 100,000 scale quadrangle. This part of northern Santa Clara Valley is known as "Silicon Valley" owing to the presence of an extensive and world-famous semi-conductor industry. Urbanization, suburbanization and vast tracts of high technology industrial park typify the land use of the entire quadrangle.

Virtually all of the San Jose West quadrangle is underlain by Pleistocene and Holocene alluvial fan sediments which were deposited by streams and rivers issuing from the Coast Ranges immediately south of the quadrangle. All watercourses drain from south to north and eventually enter San Francisco Bay in the adjoining Milpitas quadrangle to the north (Helley and Wesling, 1989). The largest drainage basin with the largest drainage area in the San Jose West quadrangle is the Guadalupe River which flows northward along the eastern edge of the quadrangle. Although Guadalupe River is the largest drainage its major tributary, Los Gatos Creek, is undoubtedly responsible for deposition of the majority of sediment in the San Jose West quadrangle. Los Gatos Creek flows from the southern border of the quadrangle to the northeast where it joins Guadalupe River just west of downtown San Jose. Inspection of

topographic maps made in 1895 shows that the main flow of Los Gatos Creek was down what is now known as Dry Creek. Since 1895 the main flow has been diverted to the channel of Los Gatos Creek. Both Los Gatos Creek and Dry Creek have shifted their courses during the Holocene as evidenced by prominent channel ridges on the alluvial fan surface. The channel ridges, shown by thick arrows, form when streams change their channels rapidly leaving behind the former channel and attendant levees (Meinzer and Kelton, 1913; Byran, 1923). Our mapping indicates that Los Gatos and Dry Creek have deposited their sediments over more than one half of the San Jose West quadrangle. The remaining area mostly includes the western quarter of the quadrangle and is underlain by sediments deposited by Aquinas and Saratoga creeks. Coyote Creek, a major water course in the Santa Clara Valley, enters the northeast corner of the San Jose West quadrangle.

MAPPING METHODS

Geologic mapping of urbanized terranes such as the San Jose West quadrangle is difficult, because much of the land has been covered over by buildings, pavement, and fill. Therefore, alternative mapping techniques are required. We mapped geologic units wsing black and white aerial photographs that were taken in 1939 before much development had taken place in this area. Additionally, the mapping was supplemented with 1:12,000 and 1:24,000 scale color aerial photographs made in 1965 and 1974, respectively. Mapping units were delineated by 1) landform morphology, 2) relative topographic position, 3) relative preservation of surface morphology, 4) tonal contrasts on aerial photographs, 5) relative soil profile development (complied from U.S. Soil Conservation Service 1958) and 6) other features such as differences in vegetation density and type.

Landform morphology refers to the shape of a particular landscape element, such as the distinctive conical shape of alluvial fans. Other criteria listed in the description of geologic map units also are used to distinguish one landscape element from another, but they are particularly useful for delineating units within a specific landscape element. A surface on an alluvial fan, for example, might be differentiated from another because of the higher topographic position, greater drainage density, and stronger soil profile development. Geologic units defined this way are called allostratigraphic units (American Association of Petroleum Geologists Bulletin, 1983). Attempts were made to check units and contacts in the field. Because of the significant amount of urban development in this area (buildings, pavement, channeled drainages, quarries and land fill) many geologic units and the contacts between them are presently covered or obscured. The geologic map units shown on this map represent both texture and environments of depositions. The contacts between units are, in most cases, not sharp and are diffuse and may span tens of feet (a few meters).

The index map shows the sources of data used to construct this map.

DESCRIPTION OF MAP UNITS

pp PERCOLATION PONDS (HISTORIC)--Excavations made in Holocene alluvial fans (Qhaf) filled with surface waters for the purpose of increasing recharge to ground-water storage.

Qhsc STREAM CHANNELS DEPOSITS (HOLOCENE)--Poorly- to well-sorted sandy silt, silty sand, sand, or sandy gravel with minor cobbles. Cobbles appear to be most common in the southern one-third of the quadrangle. Many stream channels are presently lined with concrete or riprap. Engineering works such as diversion dams, drop structures, energy dissipators, and percolation ponds also modify the original water course. Therefore, observation of alluvial sediments may be very difficult. Debris as coarse as boulders were observed in channels at the southern border of the quadrangle.

Qhl NATURAL LEVEE DEPOSITS (HOLOCENE)--Loose, moderate- to well-sorted sandy or clayey silt grading to sandy or silty clay. Levee deposits border the channels of Guadalupe River, Coyote Creek, and the lower course of Saratoga Creek. Textures of Qhl deposits along Coyote Creek tend to be coarser (sandy or clayey silt) than those along the Guadalupe River (sandy or silty clay).

Qhfp FLOODPLAIN DEPOSITS (HOLOCENE)--Medium to dark-gray, dense, sandy to silty clay. Lenses of coarser material (silt, sand, and pebbles) may be locally present. Floodplain deposits are found between levee deposits of Coyote Creek and Guadalupe River.

$Qhfp_1$ and $Qhfp_2$ ALLUVIAL TERRANCE DEPOSITS (HOLOCENE)--$Qhfp_1$ and $Qhfp_2$ are the first and second erosional terraces, respectively, cut into Qhfp deposits. Deposits are generally less than 75 cm thick and consist of rounded gravel and historic artifacts in a clayey silt matrix. In several areas, these terraces have been used for landfills. The largest and most extensive terraces of these terraces are found along Coyote Creek.

Qhb FLOODBASIN DEPOSITS (HOLOCENE)--Organic-rich clay to very fine silty-clay deposits occupying the lowest topographic positions between Holocene levee deposits. In the San Jose West quadrangle these deposits are found west of Guadalupe River and border the levees of Aquinas and Saratoga Creeks at the northern edge of the quadrangle.

Qhaf ALLUVIAL FAN DEPOSITS (HOLOCENE)--By far the greatest amount of surface area of the San Jose West quadrangle is covered by Holocene alluvial fan deposits. Deposits are brown or tan, medium dense to dense gravelly sand or sandy gravel that grades upward to sandy or silty clay. Near the distal fan edges, deposits are typically brown, medium dense gravelly sand or clayey gravel that grade upward to sandy or silty clay. Alluvial fan surfaces typically have slopes (toward the basin) of about 0.005 to 0.009 (5 to 9 m/km) but may be as high as 0.010 (10 m/km). The Qhaf surface displays striking channel ridges shown on the map by heavy dashed arrows. These former channels are related to the late Holocene history of the courses of Los Gatos and Dry Creek. The location of these channel ridges indicate that

Los Gatos Creek flowed further west than present and Dry Creek flowed further to the east than present. Aquinas and Saratoga Creeks display no channel ridges.

$Qhaf_1$ ALLUVIAL FAN DEPOSITS (HOLOCENE)--Brown, poorly-sorted, dense, sandy or gravelly clay. Small fans at mountain fronts have a probable debris flow origin. Larger $Qhaf_1$ fans away from mountain fronts (along Saratoga and San Tomas Aquinas Creeks) may represent the modern loci of deposition for Qhaf.

Qpaf ALLUVIAL FAN DEPOSITS (PLEISTOCENE)--Brown, dense, gravelly and clayey sand or clayey gravel that fines upward to a sandy clay. Qpaf deposits are restricted to the southern part of the quadrangle, extending only a few kilometers from the southern border. Alluvial fan surfaces typically have slopes (toward the basin) of about 0.0075 to 0.010 (7.5 to 10 m/km) but may be as high as 0.015 (15 m/km).

$Qpaf_1$ ALLUVIAL TERRACE DEPOSITS (PLEISTOCENE)--Crudely-bedded, clast-supported, gravels, cobbles, and boulders with a sandy matrix. Clasts up to 35 cm intermediate diameter are present in $Qpaf_1$ deposits. Coarse sand lenses may be locally present. $Qpaf_1$ terraces are cut into Qpaf alluvial fan deposits a few meters and lie up to several meters above Holocene deposits.

QTsc SANTA CLARA FORMATION (PLIOCENE AND PLEISTOCENE) (Sorg and McLaughlin, 1975)--The Santa Clara Formation is exposed in the southwest corner of the San Jose West quadrangle. Here the Santa Clara is thrust over the Pleistocene alluvial fan

deposits (Qpaf). It consists of poorly sorted poorly consolidated boulder-gravel conglomerate with poorly sorted beds of sandstone, siltstone and clay. These sediments are highly eroded displaying more than 100 feet (30m) of local relief as well as being highly weathered. The Santa Clara Formation here has conspicuous flat, accordant surfaces which may be related to the Pleistocene alluvial fan surface upon which they rest.

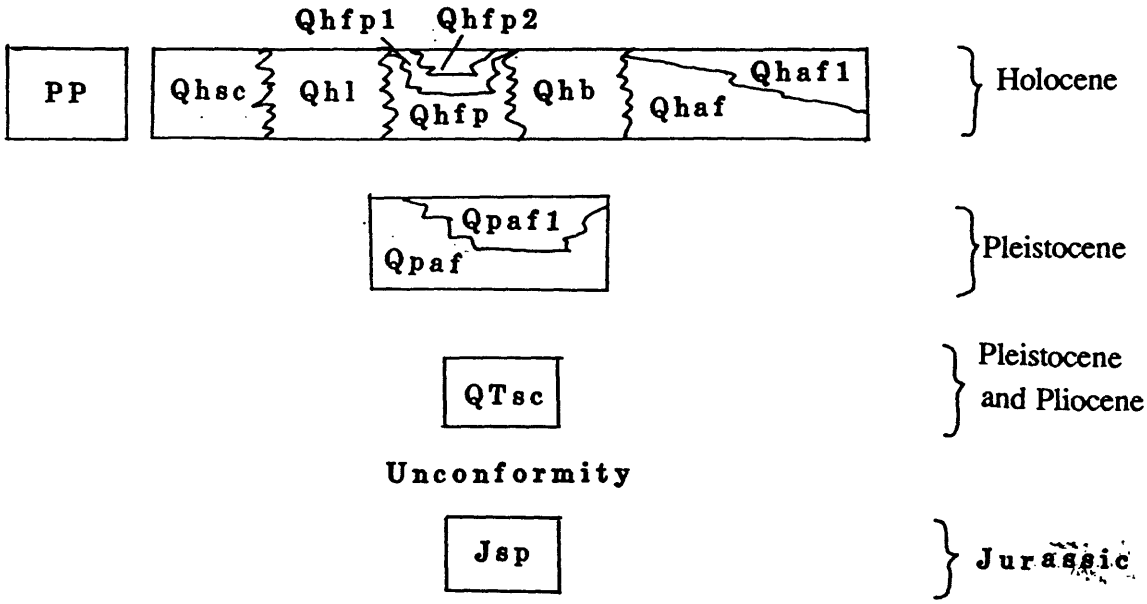
Jsp SERPENTINE (JURASSIC)--Two very small outcrops, 75 to 100 m-long, of serpentinized ultra basic rocks located just east of the Guadalupe River near the eastern margin of the quadrangle.

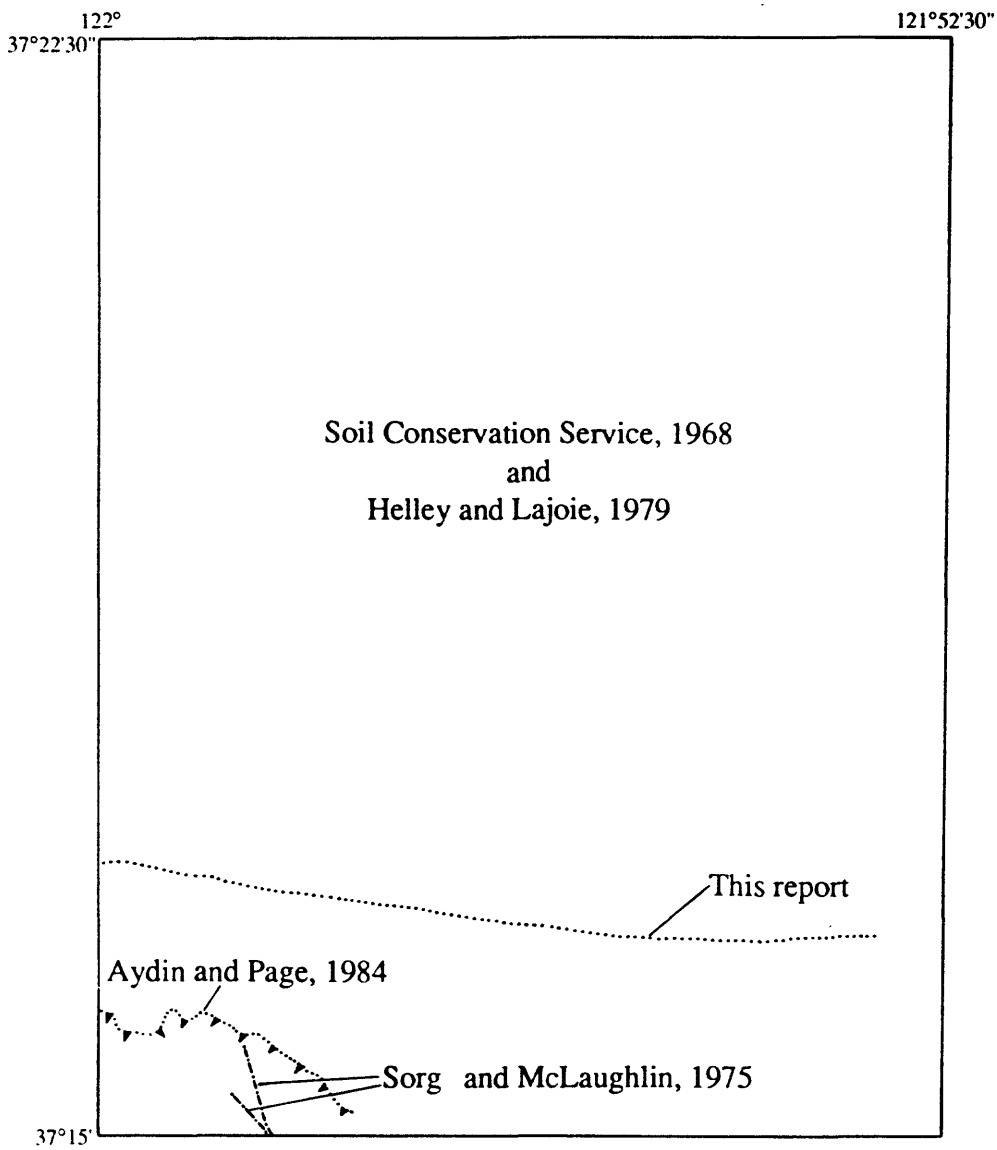
MAP SYMBOLS

pp--	Percolation Ponds
Qhsc--	Stream Channel Deposits
Qhl--	Holocene Levee Deposits
Qhfp--	Holocene Flood Plain Deposits
$Qhfp_1$, $Qhfp_2$--	Holocene Alluvial Terrace Deposits
Qhb--	Holocene Basin Deposits
Qhaf--	Holocene Alluvial Fan Deposits
$Qhaf_1$--	Latest Holocene Alluvial Fan Deposits
Qpaf--	Pleistocene Alluvial Fan Deposits
Qpsc--	Plio-Pleistocene Santa Clara Formation
Jsp--	Jurassic serpentine

.....	Inferred Fault
	Thrust fault, teeth on Upper Plate (Aydin and Page, 1984)
	Inferred fault (Sorg and McLaughlyn, 1975)
	Geologic contact - Approximately located
	Trace of Late Holocene Channel Ridge

CORRELATION OF MAP UNITS





Index map showing sources of geologic data

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