Section 5.1 General

These guidelines for mainline HOV signs and markings follow the general principles in the Manual on Uniform Traffic Control Devices (MUTCD) and California Supplement to the MUTCD, which replaces the Caltrans' Traffic Manual. Should a particular situation occur where neither the MUTCD, California Supplement to the MUTCD nor these HOV guidelines are sufficient, the District is advised to consult the Headquarters' Traffic Liaisons or Headquarters Traffic Operations, HOV Systems Branch personnel, for guidance.

The need for specific HOV sign and marking guidelines arises from the fact that most HOV facilities are retrofitted into existing mixed-flow facilities where the two types of facilities have very distinctive operating characteristics. That one system is superimposed onto another often means that space for signs and markings is very restrictive, which varies by different geometric configurations and modes of operation among districts. These include geometric variations for contiguous, buffer-separated or barrier-separated HOV facilities and differences such as varying operational hours and occupancy requirements. Therefore, it is essential that the design and placement of HOV signs and markings clearly indicate whether they are intended for motorists in the HOV or the mixed-flow lanes. They should convey a message that HOV lanes are restricted to HOV's, provide clear directions for ingress/egress areas, define vehicle occupancy requirements, the hours of operation, and violation fines. See the following Chapter 5, HOV Details and Sign Specifications, as well as Chapter 5 Appendices A and B, which include HOV Sign Policy Statements.

Much of HOV signs and markings relate to enhancing safety for the motorists. Geometric standards may be impacted due to the lack of right of way. Also, operational characteristics such as the differential speed between the HOV lane and the adjacent mixed-flow traffic, the lack of passing opportunities in the HOV lane, and the necessity for frequent merging and weaving actions, mean that messages must be clear and succinct wherever possible. Special situations, such as inclement weather and lower visibility conditions during hours of darkness, also need to be considered since heavy HOV lane usage may occur in early morning and late afternoon periods. The signs and markings must not only consider the typical commuter but also the occasional user of the facility who may be unfamiliar with the HOV facility and its operation.

Maintenance and update of the HOV signs and markings after initial implementation are also essential. When operational conditions change for a HOV facility, it is important to revise the signs and markings to reflect that change. For maintenance purposes, the geometric impacts often mean narrow lanes, shoulders and buffers, reduced access for maintenance vehicles and an increased need to maintain stripes and markers, particularly where there is heavy bus usage. Consideration should be given to replacing worn out signs and markings in conformance with updated guidelines.

As used by Caltrans, the diamond symbol is used only to designate HOV facilities. While the symbol is sometimes used elsewhere in the nation for other applications, it is the intent of Caltrans to use this symbol only for HOV purposes. For signs, whether regulatory, guide or

warning in nature, it is typically a white symbol on a black background to convey the restrictive nature of the HOV lane and to make it more readily recognizable. The use of the symbol with all HOV signs also informs drivers, whether they are in the mixed-flow lane or HOV lanes that the messages conveyed are only intended for HOV's.

Where HOV corridors overlap district boundaries, regional consistency in signs and markings must be maintained to minimize motorist confusion. While these guidelines contribute toward a statewide consistency in HOV signs and markings, specific situations may occur where the guidelines may not be applicable. In those situations, the Districts are advised to work with one another to ensure regional consistency in signs and markings. Also, consult with Headquarters Traffic Operations personnel if the matter has policy or statewide implications. It may also be appropriate to consult with outside agencies, such as the California Highway Patrol, as enforcement of HOV violations and signs and markings are related issues.

Section 5.2 HOV Signs

The signs and markings details, Details M-1 to M-11, provide guidance for the most common HOV geometric configurations used by Caltrans, such as the contiguous, buffer-separated and barrier-separated HOV facilities, and direct HOV connectors to and from arterials.

Signs for other types of HOV facilities, such as those used for reversible-flow and contra-flow operations, direct HOV connectors between freeways and temporary HOV lanes used during construction, should be designed using the MUTCD and California Supplement to the MUTCD, and by consultation with the appropriate Headquarters and District Traffic personnel.

In general, signs for direct HOV connectors between freeways will need HOV guide signs, both advance and action, in addition to the normal regulatory signs. Signs for reversible-flow HOV facilities are done on a case-by-case basis. However, it will typically require overhead changeable message signs at both ends of the facility and general HOV regulatory signs (R86-2, R93-2), mounted back to back, between the entrance and exit. When changeable message signs are used to convey lane use restriction, other signs to convey the same message are not mandatory but may be used as supplemental controls.

Frequently, it is necessary to place ground-mounted signs on top of median barriers. If so, it is essential that no portion of the sign panel project beyond the barrier base, particularly in narrow medians. For example, for a 900-mm wide panel and a barrier base 610 mm wide, the maximum angle between the sign panel and the axis of the barrier is 42 degrees. A 900-mm wide sign panel is the maximum width unless the median barrier has been retrofitted to accommodate a wider sign panel. Wider panel signs may be used where the median is wide enough to place ground mounted signs off the barrier.

Regulatory signs for HOV facilities follow the standard regulatory signing principles; black legend with a white reflective background on a rectangular panel. These include the following:

R82-1 CARPOOL LANE AHEAD, ½ MILE
R82B ___AM - ___AM, ___PM - ___PM, MON - FRI
R84-1 END CARPOOL LANE
R84-2 CARPOOL LANE ENDS, ½ MILE
R86 LEFT LANE, CARPOOLS ONLY, ___AM - ___AM or ___PM - ___PM, MON - FRI
R86-2 LEFT LANE, CARPOOLS ONLY
R86-3 LEFT LANE, CARPOOLS ONLY, ___AM - ___AM, ___PM - ___PM, MON - FRI
R87-1 CARPOOLS ONLY, ___ OR MORE PERSONS PER VEHICLE
R87-2 CARPOOLS ONLY, ___ OR MORE PERSONS PER VEHICLE (for HOV Drop Ramps)
R91-2 NO TRUCKS OVER 5 TONS OR VEHICLES WITH TRAILERS
R93A VEHICLES WITH DMV CLEAN AIR DECAL OK
R93-2 CARPOOL IS ___ OR MORE PERSONS PER VEHICLE

SR50-1 CARPOOL VIOLATION $ ___ MINIMUM FINE (for heightened enforcement)
SR50-2 CARPOOL VIOLATION $ ___ MINIMUM FINE

Note that the sign layout plans, Details M-1 to M-11, do not include instructions on using the overhead sign SR50-1 (CARPOOL VIOLATION $ ___ MINIMUM FINE). However, the use of SR50-1 is beneficial where high violation rates are experienced. The SR50-1 overhead can be installed on its own structure or "piggybacked" onto an existing sign structure provided the latter is structurally adequate. Keep in mind that messages conveyed by the HOV signs, such as violation fines and the beginning of a HOV lane downstream, are not necessarily intended only for the HOV vehicle but also for single-occupant vehicles as well.

Guide signs for the HOV facilities are generally used at intermediate ingress/egress locations to inform HOV motorists of upcoming freeway exits and the appropriate location to exit the HOV lane. For direct HOV connectors to and from arterials, guide signs are used in a fashion similar to the standard arterial interchange signing practice. Guide signs follow the standard guide-signing format; white reflective legend on green opaque background and rectangular shape. The exception is the diamond where the white symbol is on a black background. For overhead signs the diamond is placed on the left side and is the full height of the sign panel.

Illumination for overhead signs shall follow the current Caltrans policy for standard guide signs.

Section 5.3 HOV Markings

HOV markings, supplemental to signs, are used primarily to differentiate the HOV lane from the adjacent mixed-flow lane and to convey a message that the lane is restricted to HOV's. Weather and time-of-day variations, particularly during the winter months, are essential considerations in the design of HOV signs and markings since commute hours are the busiest periods for the HOV facilities.

Details M-1 to M-11 provide placement schemes for HOV markings for most HOV scenarios. These schemes are based on applications from the MUTCD and California Supplement to the MUTCD. In some applications, variations are used to address special situations or to enhance safety. In some retrofit situations, which result in a narrow median, the closer spacing of the reflective markers may be more appropriate.

The most simple pavement markings are those associated with the contiguous HOV facility. Because the HOV lane may be reverted to mixed-flow use after the HOV operation, the marking separating the HOV lane and the mixed-flow lane is the lane line pattern used on the majority of freeways. For HOV facilities separated by barriers, the pavement marking also tends to coincide with details from the MUTCD and California Supplement to the MUTCD.

The most complex in terms of markings are those for buffered HOV facilities, mainly used for full-time HOV operation. A combination of reflective markers and solid yellow and white stripes are used to delineate the HOV lane from the adjacent mixed-flow lane, the white stripe is necessary because the California Vehicle Code, Section 21655.8, prohibits driving to the left of double parallel solid lines. To prevent the accidental crossing into the HOV lanes, reflective pavement markers 7.5 meters apart are used to warn errant motorists. All of these combined with the diamond symbol and "carpool only" pavement markings, serve to prevent violations and to inform and warn motorists that the HOV facility is restrictive in nature and should only be used by those who qualify.