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List of Resources
ANALYSIS OF THE CARRYING CAPACITY
FOR THE CENTRAL MESA OF
BALBOA PARK

PREPARED FOR
ESTRADA LAND PLANNING, INC.

JUNE 1991

PROJECT NO. 10146
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EXECUTIVE SUMMARY

Economics Research Associates (ERA) has analyzed the carrying capacity of Balboa Park's Central Mesa after the proposed precise plan has been mostly implemented. We conducted this analysis by modeling the current distribution of attendance in the Central Mesa on a typical busy day (called "design day"), given existing public space capacities, to estimate current crowding levels. We compared this current capacity to future capacity given attendance patterns anticipated and improvements proposed under the precise plan.

The following are the major findings of this report. Please read the body of the report for a more thorough understanding of the issues and assumptions.

- As a whole, the Central Mesa currently has sufficient capacity to accommodate a typical busy day's attendance (not including special events). However, there is overcrowding in select public areas, especially the Prado, the North Prado lawns, and the Prado East and Botanical Gardens.

- As visitation grows over time, these bottlenecks will only get worse if the status quo is sustained.

- The proposed precise plan improvements will help mitigate future crowding by redistributing attendance throughout the Central Mesa. Although some popular areas will remain crowded, the most problematic areas such as the Prado will experience relief caused by expansion of visitor space on the western portion of the Prado axis, and the development of other anchor attractions elsewhere on the Central Mesa, such as the Palisades Mall, the Japanese Garden, and the Spanish Village expansion. If programmed as activity areas, these new or expanded public attractions will draw some people away from the Prado, mitigating congestion on the Prado. The Prado will still be crowded, but not nearly as crowded as it would be without these other activity areas.
• The precise plan improvements should attract more people to the park and keep them at the park for longer periods.

• Overall, the Central Mesa will have sufficient capacity after the precise plan is implemented, but crowds will not be distributed evenly.

• Overcrowding would be diminished at the North Prado lawns, but still exist at the Prado East and Botanical lawns, and may be a new phenomenon at the South and Central Palisade’s lawns as the precise plan is implemented. Again, overcrowding would be expected and possibly worse without the precise plan improvements due to normal visitation growth over time as San Diego grows.

• Crowding at certain museums, such as the Reuben H. Fleet Space Theater during a design day, and other museums during peak days would probably be alleviated by their expansion under the precise plan, although each museum would need to be analyzed in more detail. The Botanical Building and the Municipal Gym might continue to be overcrowded.

• Finally, parking currently and in the 10-year period analyzed, with or without the precise plan’s implementation, appears adequate for design-day attendance if parking at Inspiration Point is included. Future parking supply would probably be deficient during peak special event days. Alternative modes of public and private transportation, which the precise plan proposes, will be needed to accommodate peak-day visitors.
INTRODUCTION

The City of San Diego has commissioned Estrada Land Planning, Inc. (ELP), to develop a precise plan for the Central Mesa area of Balboa Park. ELP completed a general master plan for Balboa Park in 1989. As part of the precise plan effort, ELP has retained Economics Research Associates (ERA) to analyze the current and future carrying capacity of the Central Mesa area, and to examine constraints to expansion such as parking. This study is based on the draft Precise Plan as of May 1, 1991. Future revisions to the precise plan may require new analysis.

ERA's work has included the following tasks:

- Administration and analysis of surveys of Balboa Park institutions to determine attendance levels and peaking characteristics, length of stay, and approximate sizing of visitor areas.

- Working with ELP, a review of the planned additions, expansions, and other changes to various elements of the Central Mesa area under the new precise plan.

- A utilization analysis for various areas of the Central Mesa given typical visitation patterns and tolerable visitor density levels for the different land uses within the Central Mesa.

- The running of our proprietary Attendance Flow Simulation Model to determine carrying capacities, analyze crowd flows, evaluate land use sizing, and assess the impact of the precise plan on the distribution and magnitude of visitors in the Central Mesa area.

It should be noted that it is not ERA's intent to judge the aesthetic value of the mix between built and open space in Balboa Park. Such judgment must rely on public park policy as well as qualitative analysis and is beyond the scope of this report. The focus of this study is on the high-use areas in the park so that careful planning of these areas can help preserve natural areas in the park. ERA has attempted to evaluate the
before and after precise plan capacity of the Central Mesa’s high-use areas based on reasonable and consistent assumptions of visitor densities. These density levels represent typical levels considered acceptable and safe for comparable public spaces.

Other Qualifications

The findings in this report should be considered with the following qualifications:

- Existing and future public space within buildings, plazas and pedestrian areas, and landscaped activity areas were estimated by staff at the respective institutions, Balboa Park staff, and ELP. Some of these estimates were more precise than others, particularly the estimates for plazas and pedestrian areas and landscaped activity areas which ELP calculated. The focus of this study was these outdoor public areas; however, visitation in buildings had to be estimated to analyze visitation and capacity at the outdoor public areas. Conclusions regarding holding capacity in individual buildings and institutions are preliminary and would require more in-depth analysis of each building and institution’s potential attendance, which was beyond the scope of this study.

- The tolerable density assumed for different types of public space were based on the National Recreation and Parks Association’s standards and ERA’s experience with large commercial recreation parks, different types of museums, and public recreation facilities. Density standards, however, vary by each locality’s aesthetic values and the recreation, artistic, architectural, or educational programs envisioned for the space in question. We believe our assumptions are reasonable, but recognize that they are changeable if public values regarding acceptable density differ or evolve as the precise plan is implemented.
STUDY AREA DESCRIPTION AND ANALYSIS ORGANIZATION

The Central Mesa is the hub of Balboa Park’s visitor and cultural areas. This area of the park consisting of approximately 290 acres (including the zoo) accounts for over 90 percent of the park’s annual attendance.

For the purposes of our analysis, we have organized the components of the Central Mesa by location and type of land use. This organization is generally consistent with ELP’s organization of the Central Mesa for the precise plan. The Central Mesa has been divided into three areas; "Central Mesa - North" which includes all areas within the precise plan north of the Prado area (except for the Veteran’s Building and lawn), "Central Mesa - Prado" which includes the Prado institutions and surrounding area, and "Central Mesa - South" which includes the Palisades area and the remaining southern portion of the Central Mesa within the precise plan.

Each geographic area has also been subdivided by type of land use. The land use categories employed are; "Buildings" which include the public space within all museums, meeting rooms, and other institutions, "Plazas and Pedestrian Areas" which include hardscaped outdoor visitor areas, and "Landscaped Activity Areas" which includes high-use or destination open space within the various locations. Our analysis does not include support, administrative, maintenance, or low-use outdoor areas of the Central Mesa.

ATTENDANCE FLOW SIMULATION MODEL DESCRIPTION AND ANALYSIS APPROACH

Model Description

ERA developed the Attendance Flow Simulation Model as a design and operational planning tool for mass attendance attractions and public visitor areas. The model’s objective is to optimize the flow of attendance through a multi-component facility. The model simulates a "snap shot" of an attraction at a given point in time showing where all visitors will be located within the attraction. It highlights bottleneck areas and underutilized spaces, and analyzes the impact on visitor distribution of different levels of attendance, various designs, and operating policies.
The model in essence is a probabilistic queuing theory model. Unlike normal queuing theory models which assume random arrivals at visitor elements, the Attendance Flow Simulation Model takes into account the varying popularity of different components within a multi-facility public space. By so doing the model can account for expansions or changes to different facilities which will affect the propensity of visitors to attend the facility.

The model can and should be used on an iterative basis as design for public spaces proceeds. In this way the model can be refined to better represent actual attendance characteristics as the nature of attendance to existing facilities is better understood, as the facility design itself becomes more sophisticated and responsive to visitor needs, and as park operating policies evolve. The model is very dynamic and can be used to simulate a variety of design, operational, and attendance characteristics of a given facility.

The model contains various input and output items which are explained below.

1. **Attendance Parameters** — These figures represent the projected attendance patterns at the facility. Peak in-Park attendance is the key factor. This is the total number of persons in the park at a peak hour on the day of attendance being modeled. In this case, an early afternoon hour on an August weekend day.

2. **Design Day** — Design day is a typical busy day, such as an August weekend day, for which the park is planned. Design-day level of visitation is normally less than the busiest days of the year, such as special event days, since designing for these busiest days would over-commit capital resources and could result in extreme over-capacity during most days of the year.

3. **Visitation Probability** — This represents the probability of a visitor attending the given component during his stay at the park. This factor can be determined at existing facilities based on known attendance parameters,
or can be estimated for planned facilities based on their assumed popularity and other factors. Visitation probability can alternatively be viewed as level of service. For example a facility with a visitation probability of 20 percent would indicate that given the other assumptions of the model the facility should be capable of servicing 20 percent of overall visitors to the entire attraction.

4. **Element Length of Stay** — Element length of stay is the amount of time spent by a visitor at a specific facility, on average.

5. **Probable Length of Stay** — This is an average or weighted value for individual components of an attraction which when added indicate the average length of stay at the entire attraction.

6. **Instantaneous Probability** — Represents the probability at one point in time of a visitor being at a particular facility.

7. **Carrying Capacity** — Carrying capacity indicates the holding capacity of the particular space given the other assumptions.

8. **Tolerable Density** — Tolerable density is the acceptable level of crowding which generally would produce a comfortable and safe experience for a visitor in the given space.

9. **Sizing Factors** — The attraction size requirements indicates the size of the area required to accommodate its particular carrying capacity, while current design and variance show the difference between required and actual space.

**Analysis Approach**

Although this model can be applied in numerous ways to a particular attraction, ERA has confined the present analysis to two basic simulations. The first, Balboa1, evaluates the Central Mesa in its current condition. In this simulation we have chosen to model peak in-park attendance on design day. Although the model can also simulate
peak days, ERA felt it was more valuable to model design day. Design day is the level of attendance for which a facility should be planned. Facilities should not be planned for peak days due to capital constraints, and because they will appear empty and lose some of their dynamism on other days. In the case of the Central Mesa, design day represents an average crowded August weekend day. Design day usually is the equivalent to the average of the 10th to 15th busiest days of the year, and excludes special events. Peak in-park on design day occurs between 2:00 and 3:00 in the afternoon in the Central Mesa.

Although special events can be modeled, we have assumed in this simulation that no special events are occurring at any of the outdoor venues, or lawn areas. A more typical daytime utilization of these areas is assumed, with sitting, strolling, and picnicking being the primary assumed uses. Special events would have to be modeled separately since their attendance flow varies considerably depending on the special event.

The second simulation, Balboa2, analyzes the Central Mesa after the implementation of the precise plan. In this model the same approach is used as in Balboa1, although modifications have been made to reflect increased attendance and physical changes to the park. The detailed assumptions of the visitor models are discussed below.

ANALYSIS ASSUMPTIONS

The assumptions and other analyses used as input into Balboa1, the model of existing conditions at Balboa Park, are discussed below. Adjustments made to Balboa2, the post precise plan model are discussed later.

1. **Attendance Parameters** — Current attendance was calculated using actual attendance figures supplied by the various Balboa park facilities. These figures were adjusted to reflect nonattraction visits (such as general surolling in the park) and multiple-attraction visits (to account for attendees who visit more than one attraction during their stay) in the following manner.
Visits to Central Mesa Attractions*  & Design Day  & Peak Hour  
Nonattraction Visits (@33% total)  & 40,000  & 18,000  
Total Visits (including visits to more than one attraction)  & 20,000  & 9,000  
Number of People or Non-Duplicated Attendance (total visits divided by 1.5)  & 60,000  & 27,000  

*Total attendance recorded or estimated at attractions. Visits are greater than the actual number of people in the park since some people visit more than one attraction.

The adjustment factors were derived from the Balboa Park visitor surveys conducted during Easter 1989 and June 1988 by the City Parks and Recreation Department. *The 1982 Balboa Park Visitor Study* prepared by the Pekarek Group was also reviewed, though our estimates are not directly comparable since we analyzed a design day (assumed to be an August weekend day) in this study while the Pekarek Group analyzed average daily attendance during peak months, which included weekdays. Also, the Pekarek Group study analyzed visitation at picnic areas but did not provide an estimate of nonattraction visits, such as strolling through the Prado. Actual attendance figures for the various facilities are shown in appendix Tables A-1 through A-3.

2. **Visitation Probability** — In the case where actual data were available, visitation probability approximates daily, or peak hour facility attendance divided by total nonduplicated attendance. In some cases adjustments were made to reflect various factors such as uncertainty of reported data, aberrational peaking characteristics for certain spaces, and other factors. Where specific data were not available, a variety of methodologies were employed to arrive at visitation probability. These include: using parkwide ratios of
peak hour and design day to monthly and annual attendance where these figures were available; applying survey data percentages of visitor utilization of specific areas; analyzing visitor circulation patterns; evaluating actual attraction holding capacities and design features; assessing attraction popularity; reviewing comments from personal observations of crowding by ERA and ELP staff; and combinations of the above.

3. **Length of Stay** — Length of stay for various areas was determined based on survey data, evaluation of the type of space, analysis of visitor circulation patterns, and the relationship between various visitor destination points. Most length of stay estimates were provided by staff at the Balboa Park institutions.

4. **Density** — The density figures used in the model under the caption "Tolerable Density" indicate typical density planning factors for public spaces. Table 1 illustrates density planning factors for a variety of public spaces. As shown, density planning factors can range from 3 to more than 20,000 square feet per person depending on the land use. For indoor spaces, and outdoor commercial facilities (theme parks, worlds fairs, and also zoos) density planning factors have fairly narrow ranges and have been well established by economic planners and architects. For large outdoor public spaces, density planning factors become more subject to taste and public policy than absolute necessity. However, the National Recreation and Park Association compiles sizing, market, and attendance factors for many of the nation’s parks. Using urban park standards developed in major U.S. cities provides a range of acceptable crowding levels for planning purposes. These figures combined with ERA figures developed in previous studies for public parks provide the basis for the ranges shown in the table and used in the model. These ranges represent generally acceptable and safe levels of visitor crowding in park green areas, but are not absolute and can be modified based on the desired aesthetic appeal of the park, the various needs
Table 1

TYPICAL DENSITY PLANNING FACTORS IN PUBLIC SPACES

<table>
<thead>
<tr>
<th>Space</th>
<th>Square Feet per Person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevator¹</td>
<td>3- 4</td>
</tr>
<tr>
<td>Queuing Area</td>
<td>5- 10</td>
</tr>
<tr>
<td>Movie Theater</td>
<td>15- 20</td>
</tr>
<tr>
<td>Restaurant</td>
<td>25- 30</td>
</tr>
<tr>
<td>Museum Exhibit Area</td>
<td>35- 45</td>
</tr>
<tr>
<td>Public Beach²</td>
<td>40- 50</td>
</tr>
<tr>
<td>State/Local Fairgrounds</td>
<td>50- 60</td>
</tr>
<tr>
<td>Theme Park</td>
<td>70- 90</td>
</tr>
<tr>
<td>Zoo</td>
<td>150- 300</td>
</tr>
<tr>
<td>Public Picnic Areas²</td>
<td>400- 800</td>
</tr>
<tr>
<td>Neighborhood Playgrounds²</td>
<td>500- 600</td>
</tr>
<tr>
<td>Community Parks—Overall²</td>
<td>300- 1,000</td>
</tr>
<tr>
<td>Multipurpose Playfield²</td>
<td>1,000- 1,100</td>
</tr>
<tr>
<td>Baseball/Softball Field²</td>
<td>3,000- 4,000</td>
</tr>
<tr>
<td>Golf Course</td>
<td>20,000-40,000</td>
</tr>
</tbody>
</table>

¹ Maximum utilization.  
² NRPA standards.  

Source: The National Recreation and Parks Association (NRPA) and Economics Research Associates.
of particular visitor groups, individual park's physical characteristics, and the overall visitor experience desired.

5. **Sizing** — Sizing is based on actual sizing provided by the various facilities and ELP.

It should be noted that ERA has been retained to perform one key task: assess the pre and post precise plan carrying capacity of the Central Mesa’s public areas. ERA’s Attendance Flow Simulation Model is a very detailed and complex tool to use in undertaking this task. The model can and has been used over years of planning on a variety of projects to refine design and the model itself as it applies to a particular project. Within the time and fee constraints of this assignment, ERA has used the model to its utmost in answering the questions posed to us. However, a more thorough and sophisticated model of the Central Mesa could be developed with a more detailed visitor survey (preferably during an August weekend), including a further assessment of multiple visitations, length of stay, and attendance characteristics in the pedestrian and green areas of the park, further interaction with the planning firm on the details of the specific plan, and interfacing with the city to discuss and establish appropriate and desired levels of visitor density.

**MODEL RESULTS AND CONCLUSIONS**

The results and conclusions of the two models are discussed below.

**Base Case Model Balboa1 - Central Mesa Current Conditions**

A summary of the results of Balboa1 is shown in Table 2, followed by the detailed results of the model in Table 3. Figures 1 and 2 present a graphic representation of the activity areas analyzed under current conditions. The following are the major conclusions of this analysis:

- Design day is estimated at 40,000 persons presently with a peak in-park attendance of approximately 18,000 persons, including the zoo.
<table>
<thead>
<tr>
<th>Element</th>
<th>L.O.S. (min.)</th>
<th>Probable L.O.S. (min.)</th>
<th>Instantaneous Probability</th>
<th>Carrying Capacity (persons)</th>
<th>Tolerable Density (sqft/parcel)</th>
<th>Attraction Size (sqft)</th>
<th>Current Design (sqft)</th>
<th>Variance (sqft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Mesa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td>1,150</td>
<td>39</td>
<td>23.14%</td>
<td>4,219</td>
<td>45</td>
<td>189,422</td>
<td>499,800</td>
<td>310,378</td>
</tr>
<tr>
<td>Parking and Pedestrian Areas</td>
<td>152</td>
<td>12</td>
<td>7.10%</td>
<td>1,278</td>
<td>139</td>
<td>177,691</td>
<td>436,000</td>
<td>256,000</td>
</tr>
<tr>
<td>Landscaped Activity Areas</td>
<td>240</td>
<td>9</td>
<td>5.33%</td>
<td>959</td>
<td>908</td>
<td>871,000</td>
<td>1,909,000</td>
<td>1,037,012</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal Central Mesa (excl. zoo)</td>
<td>1,350</td>
<td>60</td>
<td>35.87%</td>
<td>6,457</td>
<td>1,230,201</td>
<td>2,844,800</td>
<td>1,606,599</td>
<td></td>
</tr>
<tr>
<td>Zoo</td>
<td>240</td>
<td>106</td>
<td>64.13%</td>
<td>11,543</td>
<td>300</td>
<td>3,462,977</td>
<td>3,485,000</td>
<td>22,023</td>
</tr>
<tr>
<td>Total Central Mesa</td>
<td>1,790</td>
<td>168</td>
<td>100.00%</td>
<td>18,000</td>
<td>261</td>
<td>4,701,179</td>
<td>6,329,800</td>
<td>1,628,621</td>
</tr>
</tbody>
</table>

1/ Tolerable density estimated could vary depending on activity, program, or exhibit design considerations.

Source: Economica Research Associates
# Table 3

**BALBOA PARK**

**ATTENDANCE FLOW SIMULATION**

**EXISTING CONDITIONS**

<table>
<thead>
<tr>
<th>Attendance Parameters</th>
<th>40,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak In-Park on Design Day</td>
<td>18,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Areas</th>
<th>Visitation prob.</th>
<th>Element L.O.S (min.)</th>
<th>Probable L.O.S (min.)</th>
<th>Instantaneous Probability</th>
<th>Carrying Capacity (persons)</th>
<th>Tolerable Density (sqft/pers)</th>
<th>Attraction Size Requests (sq.ft)</th>
<th>Current Design (sq.ft)</th>
<th>Variance (sq.ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Central Mall - North</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Buildings</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish Village</td>
<td>5.00%</td>
<td>15</td>
<td>1</td>
<td>0.45%</td>
<td>80</td>
<td>40</td>
<td>3,206</td>
<td>4,000</td>
<td>794</td>
</tr>
<tr>
<td>Subtotal Buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Plazas and Pedestrian Areas</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Diego Zoo</td>
<td>45.00%</td>
<td>240</td>
<td>108</td>
<td>64.13%</td>
<td>300</td>
<td>3,462,877</td>
<td>3,485,000</td>
<td>22,023</td>
<td></td>
</tr>
<tr>
<td>Carousel</td>
<td>2.00%</td>
<td>15</td>
<td>0</td>
<td>0.16%</td>
<td>32</td>
<td>300</td>
<td>9,619</td>
<td>26,000</td>
<td>16,381</td>
</tr>
<tr>
<td>Spanish Village/Prado North</td>
<td>7.00%</td>
<td>15</td>
<td>1</td>
<td>0.62%</td>
<td>112</td>
<td>125</td>
<td>14,028</td>
<td>48,000</td>
<td><strong>33,972</strong></td>
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<tr>
<td>Subtotal Plazas and Pedestrian Areas</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>270</td>
<td>109</td>
<td>64.93%</td>
<td>11,688</td>
<td>3,486,625</td>
<td>3,559,000</td>
<td>72,377</td>
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<td></td>
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<tr>
<td><strong>Landscaped Activity Areas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoo Walk Area 4/</td>
<td>5.00%</td>
<td>3</td>
<td>0</td>
<td>0.09%</td>
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<td>L.O.S.</td>
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<tr>
<td></td>
<td>(min)</td>
<td>(min)</td>
<td></td>
<td>(people/person)</td>
</tr>
<tr>
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<td></td>
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<tr>
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</tr>
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<td>0.20%</td>
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<td>4</td>
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<td>Museum of Man</td>
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<td>Plazas and Pedestrian Areas</td>
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<td></td>
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<td>Plaza Panama</td>
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<td>0</td>
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<td>Zoro Garden</td>
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<td>0</td>
<td>0.18%</td>
</tr>
<tr>
<td>Prado East and Botanical Garden</td>
<td>20.00%</td>
<td>19</td>
<td>2</td>
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<tr>
<td>Alcazar Garden S/</td>
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<td>Subtotal Landscaped Activity Areas</td>
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<tr>
<td>Total Central Mesa - Prado</td>
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<th>Probable L.O.S (min)</th>
<th>Low - annuity</th>
<th>Probability</th>
<th>Carrying Capacity (persons)</th>
<th>Tolerable Density (sqft/2)</th>
<th>Attraction Size Required (sqft)</th>
<th>Current Design (sqft)</th>
<th>Variance (sqft)</th>
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</tr>
<tr>
<td><strong>Buildings</strong></td>
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<td></td>
<td></td>
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<td>3</td>
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<td>50</td>
<td>16,032</td>
<td>53,000</td>
<td>36,960</td>
<td>28,858</td>
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<td>0.53%</td>
<td>96</td>
<td>300</td>
<td>28,858</td>
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<td>14,735</td>
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<td>0.36%</td>
<td>64</td>
<td>35</td>
<td>2,245</td>
<td>17,000</td>
<td>17,755</td>
<td>20,000</td>
<td>(938)</td>
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<td>0.27%</td>
<td>48</td>
<td>40</td>
<td>1,924</td>
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<td>35</td>
<td>2,245</td>
<td>20,000</td>
<td>17,755</td>
<td>17,755</td>
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<td>9,965</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fallasadas Mall</td>
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<td>0</td>
<td>0.09%</td>
<td>16</td>
<td>125</td>
<td>2,004</td>
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<td>10,996</td>
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<tr>
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<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>125</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
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<td>321</td>
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<td>44,000</td>
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<tr>
<td>Central and South Fallasadas</td>
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<td>0</td>
<td>0.24%</td>
<td>43</td>
<td>750</td>
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<td>15,935</td>
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<td>20,000</td>
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<td>750</td>
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<td>167</td>
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<td>32</td>
<td>1000</td>
<td>32,065</td>
<td>63,000</td>
<td>30,935</td>
<td>63,000</td>
<td>63,000</td>
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<td>183</td>
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<td></td>
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<td>319,714</td>
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<td>13</td>
<td>7.62%</td>
<td>1,371</td>
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<td>581,973</td>
<td>1,777,000</td>
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</tbody>
</table>

Total Balboa Park Central Mesa: 1,790,168, 100.00%, 10,000, 261, 4,701,620, 6,329,800, 1,628,621

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3/ Tolerable density estimated for museums could vary depending on exhibit design considerations.
2/ Public Space
3/ Destination, high use green space modeled for average week-end day use, does not reflect special event use of particular area.
4/ Includes pedestrian walkway.
5/ Includes Cafe del Rey Micro Garden.
6/ Does not include sculpture garden.
7/ Includes seating and lobby space of all three theaters, including the amphitheater.
8/ Typical use, does not reflect theater load and use. West Prado includes Old Globe Plaza and West Prado lawns.
9/ Includes planters.
10/ Average use, does not reflect special event/concert use. Organ Pavilion includes mall lawn.

Source: Economics Research Associates
ERA Report:
Existing Plazas and Pedestrian Areas

April 30, 1991
ERA Report:
Existing Landscaped Activity Areas

April 30, 1991
- The overall average length of stay for a Central Mesa visitor not including zoo visitors is about one hour. The average length of stay when accounting for zoo visitors is about two hours and 48 minutes.

- Carrying capacity of the Central Mesa (design day, peak in-park) not including the zoo is almost 6,500 persons; with 4,200 being indoors, 1,200 in plazas and pedestrian areas, and almost 1,000 in landscaped activity areas.

- The zoo, which accounts for over 64 percent of peak in-park visitation has a design day peak in-park carrying capacity of over 11,500 persons, and is the key attendance component of the Central Mesa.

- Overall, a surplus of building space is indicated. This is primarily due to low usage of meeting spaces relative to their size, and underutilization of some museums.

- Some individual institutions indicate deficiencies of space on design day such as the Fleet Museum, the Botanical Building, and the Municipal Gym. On peak days other museums such as the Natural History Museum and others may also experience unacceptable crowding levels.

- Overall, the plazas, pedestrian areas, and landscaped activity areas show acceptable levels of visitor density on design day.

- Some individual pedestrian and landscaped activity areas, however, indicate crowding. These include the Prado, which is roughly 19 percent undersized given the density assumptions, the Prado East and Botanical Garden and the North Prado lawns.

The model indicates that overall the Central Mesa has more than sufficient building, pedestrian and landscaped activity areas to accommodate design-day attendance. However, the concentration of visitors in the Prado and immediately surrounding areas creates visitor density levels in these areas on busy days which may be
unacceptable. Almost 80 percent of the Central Mesa’s visitors in pedestrian and plaza areas are in the Prado and environs at any one time, while this area only accounts for 59 percent of total pedestrian and plaza area acreage (excluding the starlight Bowl). ERA would recommend that coordinated operational actions be taken to flatten visitor peaking in the day (early bird and late afternoon discounts, nighttime activities and group events, etc.) and that design action be taken to spread visitation throughout the Central Mesa, and away from high crowd concentrations in the central Prado area.

Balboa2 - Central Mesa Post Precise Plan

In the second model, adjustments were made to reflect the increased attendance at Balboa Park from general market growth and facility expansions, and to account for the planned physical changes to the park. Parking constraints to growth were also analyzed. Figures 3 and 4 present a graphic representation of the activity areas analyzed under the precise plan scenario.

Parking Constraints to Growth

As part of the post Precise Plan model, ERA analyzed constraints to attendance growth caused by parking limitations. This analysis is shown in Table 4.

As shown, ERA analyzed current and post precise plan demand and supply for parking in the Central Mesa, as well as future demand and supply without the precise plan improvements. In commercial visitor attractions parking is designed for peak days because if there is insufficient parking the facility loses potential visitors and their revenues. For public facilities, parking should also be planned for peaks, land and budget permitting, so that the facilities can best service public demand.

Our analysis indicates that design day peak hour demand for parking in the Central Mesa is currently some 5,300 spaces. Demand on peak days (we have calculated peak day demand at 30 percent higher then design day although absolute peaks such as Christmas on the Prado may be even higher) is estimated at some 6,400 spaces. The Central Mesa presently has a parking inventory of roughly 7,400 spaces including on-street parking and Inspiration Point (see Appendix Table A-5 for Central
ERA Report:
Proposed Plazas and Pedestrian Areas

April 30, 1991
ERA Report:
Proposed Landscaped Activity Areas

April 30, 1991
## Table 4

**CENTRAL MESA PARKING DEMAND AND SUPPLY**

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<td>Design Day</td>
<td>40,000</td>
<td>46,000</td>
<td>49,000</td>
</tr>
<tr>
<td>Peak In-Park Design Day</td>
<td>18,000</td>
<td>21,000</td>
<td>22,000*</td>
</tr>
<tr>
<td>Automobile Arrivals (@82%)</td>
<td>14,800</td>
<td>17,130</td>
<td>18,040</td>
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</table>

**Parking Space Demand**

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<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
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<td>Design Day (@2.8 persons/car)</td>
<td>5,271</td>
<td>6,118</td>
<td>6,442</td>
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<td>Peak Day (design day plus 30%)</td>
<td>6,852</td>
<td>7,953</td>
<td>8,374</td>
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<td>Central Mesa Parking Inventory (spaces)</td>
<td>7,399</td>
<td>7,399</td>
<td>7,520</td>
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**Parking Surplus(+) / Shortage (-)**

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</thead>
<tbody>
<tr>
<td>Design Day</td>
<td>+2,128</td>
<td>+1,281</td>
<td>+1,078</td>
</tr>
<tr>
<td>Peak Day</td>
<td>+ 547</td>
<td>- 554</td>
<td>- 854</td>
</tr>
</tbody>
</table>

---

1 From August 1989 and Easter 1988 visitor surveys. Assumes same percentage automobile arrivals post precise plan.

2 Including Inspiration Point and on-street parking.

Mesa parking areas and capacities). Thus, at present, Central Mesa parking is sufficient for design day (71 percent occupancy) and on peak days (93 percent occupancy). Inspiration Point's parking is critical, especially in peak days.

Future parking demand without the precise plan improvements, based on an assumed 1.5 percent annual growth rate in demand (we assumed a lower annual growth rate without the precise plan improvements since these improvements would induce additional growth and visitation), would result in adequate parking supply on design day (83 percent occupancy), but a deficit on peak days (7 percent deficit).

To calculate post precise plan parking demand, ERA projected attendance for the Central Mesa to 2001 assuming attendance can grow unrestrained by parking (discussed in more detail below) at a greater 2 percent annual rate due to induced growth caused by expanded attractions. We then compared the increased demand caused by higher attendance to the planned increase in parking inventory under the new precise plan. As indicated, parking space demand would expand to some 6,440 spaces on design day, and 8,370 spaces on peak days, such as special event days. Planned Central Mesa parking under the precise plan is approximately 7,520 spaces. This analysis indicates that post precise plan there will be an adequate supply on design day (86 percent occupancy), but a shortage on peak days of over 850 spaces for a 10 percent deficit.

In sum, our parking analysis indicates that attendance growth in the Central Mesa will be constrained by parking on peak days unless the percent of arrivals by automobile can be reduced or additional parking spaces built. If not addressed, the parking shortage on the Central Mesa will level peak days at the park, and thus constrain total annual attendance growth.

For the purposes of our analysis we have modeled post precise plan attendance assuming there will be sufficient parking to accommodate design day crowds. We have taken this approach for several reasons. First, although there are clear shortages of parking projected on peak days, there is generally sufficient, albeit fully utilized, parking for design day attendance both currently and post precise plan. This would imply that although peak days and annual attendance may be constrained, the park may still be able to achieve design day attendance on the order of that projected. Secondly,
the precise plan calls for transportation measures to mitigate the acknowledged parking problem, and we have assumed that these will be implemented to the degree that design day parking needs will be fully and comfortably accommodated. These measures include a park tram system to move people throughout the Central Mesa, joint use of parking facilities outside the park with free public shuttle service to the park, and enhanced bicycle facilities at the park. These steps will encourage nonautomotive trips to the park which will relieve parking demand in the future. Without these public and alternative transit measures, peak days could experience unacceptable parking shortages which would constrain visitation.

**Adjustments to Base Case Model**

To reflect the changes in the Central Mesa after the precise plan implementation, ERA has made several adjustments to the base case model. These are discussed below.

1. **Attendance Increase** — Annual attendance at the Central Mesa will increase over the implementation period of the precise plan. This will occur due to resident and tourist market growth in San Diego, and from increased popularity of Central Mesa attractions resulting from expansion and improvements. ERA has projected attendance growth ten years to 2001. At this point in time most of the precise plan's major improvements will be complete. The text table below shows pertinent measures for Balboa Park and San Diego growth.

   A. **Annual Attendance Growth Balboa Park**
      
      
      | Year Period | Growth |
      |-------------|--------|
      | 1957-1981   | 1.8%   |
      | 1986-1990   | 2.8%   |

   B. **Tourism to San Diego**
      
      
      Number of Visits 1980-1989
      
      (Source: Conv. and Visitors Bureau) 3.3%
C. Attractions Growth

Zoo - 1980-1989 1.2%
Fleet Museum:
  1973-1989 3.0%
  1989-2010 (Source: EIR) 2.0%
Sea World 1980-1989 2.7%

D. Population

1986-2010
(Source: SourcePoint) 1.6%

Based on the above information we estimate that attendance will increase in the Central Mesa at an average annual growth rate of 2 percent. This yields a design-day attendance of 49,000 by the year 2001. Attendance for various attractions and the park as a whole will fluctuate from year to year during this period, with some attractions experiencing significant short-term growth immediately after improvements. However, over the long term, attendance is expected to stabilize at a moderate annual growth level. For the purposes of the model ERA has assumed that attendance peaking characteristics will remain essentially the same after the precise plan.

2. Visitation Probability — Visitation probability has been adjusted for various attractions to reflect expansions to individual facilities and the opening of new visitor areas in the park. Visitation probability has also been adjusted to reflect the creation of strong visitor magnet areas such as the expanded Japanese Gardens, new plazas and pedestrian areas such as the Palisades Mall, and expansions to facilities such as the Spanish Village and Miniature Train area.

3. Length of Stay — Length of stay has been increased to areas which have been significantly improved, and also applied to new areas created under the precise plan.
4. **Sizing** — Changes in sizing under the precise plan were made.

**Balboa2 Post Precise Plan Model Results and Conclusions**

A summary of the post precise plan model is shown in Table 5, while the detailed model is shown in Table 6. The results and our conclusions relative to the carrying capacity of the Central Mesa after the precise plan are highlighted below.

- Design day attendance is projected at 49,000 persons after the precise plan with peak in-park attendance of 22,000 persons.

- Length of stay in the Central Mesa is projected to expand to one hour and 19 minutes from the current one hour, excluding the zoo. Including zoo visitors, total length of stay is projected at slightly over three hours.

- Design day peak in-park carrying capacity is projected to expand by about 44 percent to 9,300 persons under the precise plan not including the zoo. The distribution of visitors in the Central Mesa is projected to shift towards outdoor areas under the precise plan with 4,000 persons in plazas, pedestrian, and landscaped activity areas compared with 2,200 persons presently. After the precise plan it is estimated that about 43 percent of Central Mesa visitation will be in outdoor areas whereas currently about 35 percent of visitors are in outdoor areas, not including the zoo.

- Zoo carrying capacity is projected to expand, although expansion beyond the 12,700 persons shown would be restricted by parking and possibly public transportation limitations.

- The model indicates that the precise plan successfully eliminates overcrowding in certain museums on design and peak day by the planned museum expansion programs. No significant shortages in built space are indicated under the precise plan during design day, except for the Botanical Building and Municipal Gym.
<table>
<thead>
<tr>
<th>Areas</th>
<th>Element L.O.S. (min.)</th>
<th>Probable L.O.S. (min.)</th>
<th>Incert- Density</th>
<th>Carrying Capacity (persons)</th>
<th>Tolerable Size Requests (sq.ft.)</th>
<th>Attraction Design (sq.ft.)</th>
<th>Current Design (sq.ft.)</th>
<th>Variance (sq.ft.)</th>
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</thead>
<tbody>
<tr>
<td>Central Mesa</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td>1.220</td>
<td>45</td>
<td>24.04%</td>
<td>5,289</td>
<td>46</td>
<td>243,419</td>
<td>636,000</td>
<td>400,437</td>
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<tr>
<td>Other Plazas and Pedestrian Areas</td>
<td>277</td>
<td>21</td>
<td>11.39%</td>
<td>2,419</td>
<td>120</td>
<td>320,002</td>
<td>800,000</td>
<td>571,998</td>
</tr>
<tr>
<td>Landscaped Activity Areas</td>
<td>230</td>
<td>13</td>
<td>7.06%</td>
<td>1,352</td>
<td>1,062</td>
<td>1,647,780</td>
<td>1,923,000</td>
<td>277,220</td>
</tr>
<tr>
<td>Subtotal Central Mesa (excl. zoo)</td>
<td>1,635</td>
<td>79</td>
<td>42.27%</td>
<td>9,900</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoo</td>
<td>249</td>
<td>108</td>
<td>57.73%</td>
<td>12,700</td>
<td>300</td>
<td>3,010,033</td>
<td>3,485,000</td>
<td>(325,933)</td>
</tr>
<tr>
<td>Total Central Mesa</td>
<td>1,883</td>
<td>187</td>
<td>100.00%</td>
<td>22,600</td>
<td>274</td>
<td>6,021,234</td>
<td>6,942,800</td>
<td>920,622</td>
</tr>
</tbody>
</table>

1/ Tolerable density estimated could vary depending on activity, program, or exhibit design considerations.

Source: Economics Research Associates
Table 6
BALBOA PARK
ATTENDANCE FLOW SIMULATION
POST PRECISE PLAN

<table>
<thead>
<tr>
<th>Attendance Parameters</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Design day</td>
<td>49,000</td>
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<tr>
<td>Peak in-Park on Design Day</td>
<td>22,000</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Areas</th>
<th>Visitation prob.</th>
<th>Element L.O.S.</th>
<th>Probable L.O.S.</th>
<th>Instantaneous Probability</th>
<th>Carrying Capacity (persons)</th>
<th>Tolerable Density (sq ft/pers) 1/</th>
<th>Attraction Size Reques (sq ft.)</th>
<th>Current Design (sq ft.)</th>
<th>Variance (sq ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total day</td>
<td>(min.)</td>
<td>(min.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Central Mesa - North</td>
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<tr>
<td>Buildings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish Village</td>
<td>5.60%</td>
<td>20</td>
<td>1</td>
<td>0.33%</td>
<td>118</td>
<td>40</td>
<td>4,704</td>
<td>9,000</td>
<td>4,296</td>
</tr>
<tr>
<td>Subtotal Buildings</td>
<td>20</td>
<td>1</td>
<td>0.33%</td>
<td>118</td>
<td>40</td>
<td>4,704</td>
<td>9,000</td>
<td>4,296</td>
<td></td>
</tr>
<tr>
<td>Plaza and Pedestrian Areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Diego Zoo</td>
<td>45.06%</td>
<td>240</td>
<td>198</td>
<td>57.73%</td>
<td>12,700</td>
<td>300</td>
<td>3,810,033</td>
<td>3,465,000</td>
<td>(325,033)</td>
</tr>
<tr>
<td>Carousel</td>
<td>2.06%</td>
<td>13</td>
<td>0</td>
<td>0.16%</td>
<td>35</td>
<td>300</td>
<td>10,583</td>
<td>30,000</td>
<td>19,417</td>
</tr>
<tr>
<td>Spanish Village/Prado North</td>
<td>8.06%</td>
<td>20</td>
<td>2</td>
<td>0.86%</td>
<td>188</td>
<td>125</td>
<td>23,519</td>
<td>91,000</td>
<td>67,481</td>
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<tr>
<td>Subtotal Plaza and Pedestrian Areas</td>
<td>275</td>
<td>110</td>
<td>58.74%</td>
<td>12,924</td>
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<tr>
<td>Landscaped Activity Areas 3/</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoo Walk Area 4/</td>
<td>5.00%</td>
<td>3</td>
<td>0</td>
<td>0.00%</td>
<td>18</td>
<td>750</td>
<td>13,229</td>
<td>57,000</td>
<td>43,771</td>
</tr>
<tr>
<td>Miniature Trains</td>
<td>3.00%</td>
<td>20</td>
<td>1</td>
<td>0.32%</td>
<td>71</td>
<td>1090</td>
<td>70,356</td>
<td>135,000</td>
<td>64,444</td>
</tr>
<tr>
<td>North Prado Lavaa</td>
<td>4.00%</td>
<td>20</td>
<td>1</td>
<td>0.83%</td>
<td>94</td>
<td>750</td>
<td>70,556</td>
<td>78,000</td>
<td>7,444</td>
</tr>
<tr>
<td>Subtotal Landscaped Activity Area 3/</td>
<td>43</td>
<td>2</td>
<td>0.83%</td>
<td>182</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>115,656</td>
</tr>
<tr>
<td>Total Central Mesa - North</td>
<td>938</td>
<td>112</td>
<td>60.11%</td>
<td>13,223</td>
<td></td>
<td></td>
<td></td>
<td>4,003,180</td>
<td>3,885,000</td>
</tr>
</tbody>
</table>

Source: Economics Research Associates
<table>
<thead>
<tr>
<th>Areas</th>
<th>Visitation prob.</th>
<th>Element L.O.S.</th>
<th>Probable L.O.S.</th>
<th>Instantaneous Probability</th>
<th>Carrying Capacity (persons)</th>
<th>Tolerable Density (sqft/person)</th>
<th>Attraction Size Requests (sqft.)</th>
<th>Current Design (sqft.)</th>
<th>Variance (sqft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Mesa - Prado</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Buildings</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botanical Building</td>
<td>5.00%</td>
<td>10</td>
<td>1</td>
<td>0.27%</td>
<td>59</td>
<td>300</td>
<td>12,690</td>
<td>14,000</td>
<td>(1,639)</td>
</tr>
<tr>
<td>Casa del Prado</td>
<td>3.00%</td>
<td>30</td>
<td>1</td>
<td>0.48%</td>
<td>106</td>
<td>35</td>
<td>3,704</td>
<td>55,000</td>
<td>51,296</td>
</tr>
<tr>
<td>Casa del Prado Theater</td>
<td>4.00%</td>
<td>90</td>
<td>4</td>
<td>1.92%</td>
<td>423</td>
<td>20</td>
<td>8,667</td>
<td>10,000</td>
<td>1,533</td>
</tr>
<tr>
<td>Hall of Champions</td>
<td>1.00%</td>
<td>30</td>
<td>0</td>
<td>0.16%</td>
<td>35</td>
<td>40</td>
<td>1,411</td>
<td>14,000</td>
<td>12,589</td>
</tr>
<tr>
<td>House of Hospitality M</td>
<td>4.00%</td>
<td>40</td>
<td>2</td>
<td>0.86%</td>
<td>188</td>
<td>45</td>
<td>8,447</td>
<td>20,000</td>
<td>11,533</td>
</tr>
<tr>
<td>Museum of Art 1/2</td>
<td>5.00%</td>
<td>60</td>
<td>3</td>
<td>1.60%</td>
<td>353</td>
<td>40</td>
<td>14,131</td>
<td>31,000</td>
<td>18,889</td>
</tr>
<tr>
<td>Museum of Man</td>
<td>3.00%</td>
<td>50</td>
<td>2</td>
<td>0.80%</td>
<td>176</td>
<td>40</td>
<td>7,066</td>
<td>37,000</td>
<td>37,000</td>
</tr>
<tr>
<td>Museum of Photographic Arts</td>
<td>1.00%</td>
<td>25</td>
<td>0</td>
<td>0.13%</td>
<td>29</td>
<td>40</td>
<td>1,176</td>
<td>3,800</td>
<td>2,624</td>
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<tr>
<td>Natural History Museum</td>
<td>6.00%</td>
<td>100</td>
<td>4</td>
<td>3.21%</td>
<td>706</td>
<td>45</td>
<td>31,750</td>
<td>80,000</td>
<td>48,250</td>
</tr>
<tr>
<td>Old Globe Theater 1/2</td>
<td>5.00%</td>
<td>120</td>
<td>6</td>
<td>3.21%</td>
<td>706</td>
<td>20</td>
<td>14,111</td>
<td>57,000</td>
<td>42,889</td>
</tr>
<tr>
<td>Reuben H. Fleet Space Theater</td>
<td>8.00%</td>
<td>130</td>
<td>10</td>
<td>5.56%</td>
<td>1,223</td>
<td>40</td>
<td>48,919</td>
<td>63,000</td>
<td>14,081</td>
</tr>
<tr>
<td>San Diego Art Institute</td>
<td>1.00%</td>
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<td>0.14%</td>
<td>35</td>
<td>40</td>
<td>1,411</td>
<td>5,000</td>
<td>3,589</td>
</tr>
<tr>
<td>San Diego Historical Society</td>
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<td>30</td>
<td>0</td>
<td>0.08%</td>
<td>18</td>
<td>35</td>
<td>617</td>
<td>22,000</td>
<td>21,383</td>
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<tr>
<td>San Diego Model Railroad Museum</td>
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<td>30</td>
<td>2</td>
<td>0.80%</td>
<td>176</td>
<td>60</td>
<td>10,583</td>
<td>11,000</td>
<td>417</td>
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<tr>
<td>Timken Art Gallery</td>
<td>1.50%</td>
<td>25</td>
<td>1</td>
<td>0.20%</td>
<td>44</td>
<td>40</td>
<td>1,764</td>
<td>4,000</td>
<td>4,236</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>800</td>
<td>36</td>
<td></td>
<td>19.44%</td>
<td>4,277</td>
<td></td>
<td>171,187</td>
<td>428,800</td>
<td>264,669</td>
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<td>Plazas and Pedestrian Areas</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>The Prado</td>
<td>35.00%</td>
<td>15</td>
<td>5</td>
<td>2.81%</td>
<td>417</td>
<td>125</td>
<td>77,171</td>
<td>74,000</td>
<td>(3,171)</td>
</tr>
<tr>
<td>Plaza Balboa</td>
<td>20.00%</td>
<td>10</td>
<td>2</td>
<td>1.07%</td>
<td>235</td>
<td>125</td>
<td>29,398</td>
<td>65,000</td>
<td>35,602</td>
</tr>
<tr>
<td>Plaza Panama</td>
<td>20.00%</td>
<td>10</td>
<td>2</td>
<td>1.07%</td>
<td>235</td>
<td>125</td>
<td>29,398</td>
<td>91,000</td>
<td>63,602</td>
</tr>
<tr>
<td>West Prado 1/2</td>
<td>8.00%</td>
<td>7</td>
<td>1</td>
<td>0.30%</td>
<td>66</td>
<td>125</td>
<td>8,032</td>
<td>57,000</td>
<td>48,768</td>
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<tr>
<td>Subtotal Plazas and Pedestrian Areas</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>10</td>
<td></td>
<td>5.24%</td>
<td>1,154</td>
<td></td>
<td>144,199</td>
<td>287,000</td>
<td>142,801</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoro Garden</td>
<td>3.00%</td>
<td>10</td>
<td>0</td>
<td>0.16%</td>
<td>35</td>
<td>750</td>
<td>26,419</td>
<td>21,000</td>
<td>(5,459)</td>
</tr>
<tr>
<td>Prado East and Botanical Lawn</td>
<td>18.00%</td>
<td>10</td>
<td>2</td>
<td>0.96%</td>
<td>212</td>
<td>750</td>
<td>158,751</td>
<td>100,000</td>
<td>(58,751)</td>
</tr>
<tr>
<td>Alcazar Garden 1/2</td>
<td>5.00%</td>
<td>5</td>
<td>0</td>
<td>0.13%</td>
<td>29</td>
<td>1000</td>
<td>29,398</td>
<td>30,000</td>
<td>602</td>
</tr>
<tr>
<td>Subtotal Landscaped Activity Areas</td>
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<td></td>
<td>25</td>
<td>2</td>
<td></td>
<td>1.26%</td>
<td>276</td>
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<td>214,600</td>
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<td>Total Central Mesa - Prado</td>
<td>867</td>
<td>49</td>
<td></td>
<td>25.94%</td>
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<td>529,994</td>
<td>866,800</td>
<td>343,841</td>
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Source: Economics Research Associates
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<th>Areas</th>
<th>Visitation Prob.</th>
<th>Element L.O.S. (min.)</th>
<th>Probable L.O.S. (min.)</th>
<th>Instantaneous Probability</th>
<th>Carrying Capacity (persons)</th>
<th>Tolerable Density (sqft/pers)</th>
<th>Attraction Size (req.) (sqft)</th>
<th>Current Design (sqft)</th>
<th>Variance (sqft)</th>
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<td>0.60%</td>
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<td>3.60%</td>
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<td>50</td>
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<td>0.40%</td>
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<td>300</td>
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<td>(3,750)</td>
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<td>0.32%</td>
<td>1</td>
<td>0.32%</td>
<td>71</td>
<td>35</td>
<td>2,469</td>
<td>17,000</td>
<td>14,531</td>
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<tr>
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<td>0</td>
<td>0.24%</td>
<td>53</td>
<td>40</td>
<td>2,117</td>
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<td>0.24%</td>
<td>1</td>
<td>0.24%</td>
<td>71</td>
<td>35</td>
<td>2,469</td>
<td>6,000</td>
<td>3,883</td>
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<tr>
<td>Federal Building</td>
<td>0.32%</td>
<td>1</td>
<td>0.32%</td>
<td>71</td>
<td>35</td>
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<td>400</td>
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<td>3</td>
<td>4.06%</td>
<td>894</td>
<td></td>
<td>67,528</td>
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<td><strong>Plazas and Pedestrian Areas</strong></td>
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<tr>
<td>Paliades Mall</td>
<td>3.74%</td>
<td>7</td>
<td>3.74%</td>
<td>823</td>
<td>123</td>
<td>102,944</td>
<td>296,000</td>
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<td>0.40%</td>
<td>1</td>
<td>0.40%</td>
<td>106</td>
<td>30</td>
<td>3,175</td>
<td>96,000</td>
<td>92,823</td>
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<td>Starlight Bowl 10th</td>
<td>0.05%</td>
<td>0</td>
<td>0.05%</td>
<td>12</td>
<td>30</td>
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<td><strong>Subtotal Plazas and Pedestrian Areas</strong></td>
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<td>100</td>
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<td>9</td>
<td>0.92%</td>
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<td>141,700</td>
<td>480,000</td>
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<tr>
<td>South and Central Paliades</td>
<td>1.28%</td>
<td>2</td>
<td>1.28%</td>
<td>363</td>
<td>750</td>
<td>190,409</td>
<td>131,000</td>
<td>(67,499)</td>
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<td>Palm Canyon</td>
<td>0.36%</td>
<td>0</td>
<td>0.36%</td>
<td>33</td>
<td>750</td>
<td>264,506</td>
<td>227,000</td>
<td>62,414</td>
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<tr>
<td>North Paliades</td>
<td>0.37%</td>
<td>1</td>
<td>0.37%</td>
<td>82</td>
<td>750</td>
<td>61,737</td>
<td>70,000</td>
<td>8,263</td>
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<tr>
<td>Federal Building</td>
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<td>0.40%</td>
<td>88</td>
<td>750</td>
<td>66,146</td>
<td>70,000</td>
<td>3,854</td>
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<td>Presidents Way/Park Blvd. Lawn</td>
<td>0.53%</td>
<td>1</td>
<td>0.53%</td>
<td>118</td>
<td>750</td>
<td>80,195</td>
<td>87,000</td>
<td>(3,195)</td>
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<tr>
<td>Pepper Grove</td>
<td>0.96%</td>
<td>2</td>
<td>0.96%</td>
<td>212</td>
<td>750</td>
<td>158,751</td>
<td>296,000</td>
<td>137,249</td>
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<tr>
<td>Japanese Garden</td>
<td>1.34%</td>
<td>3</td>
<td>1.34%</td>
<td>294</td>
<td>1500</td>
<td>440,976</td>
<td>523,000</td>
<td>82,024</td>
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<tr>
<td><strong>Subtotal Landscape Activity Areas</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>170</td>
<td></td>
<td>9</td>
<td>0.97%</td>
<td>1,094</td>
<td></td>
<td>1,370,030</td>
<td>1,504,000</td>
<td>225,170</td>
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<tr>
<td>Total Central Mesa - South</td>
<td>13.95%</td>
<td>26</td>
<td>13.95%</td>
<td>3,069</td>
<td></td>
<td>1,480,059</td>
<td>2,191,000</td>
<td>702,941</td>
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<tr>
<td>Total Balboa Park Central Mesa</td>
<td>1,073</td>
<td>187</td>
<td>100.00%</td>
<td>22,000</td>
<td>274</td>
<td>6,013,234</td>
<td>6,942,800</td>
<td>926,622</td>
<td></td>
</tr>
</tbody>
</table>

1/ Tolerable density estimated for museums could vary depending on exhibit design considerations.  
2/ Public Space  
3/ Destination, high use green space modeled for average weekend day use, does not reflect special event use of particular areas.  
4/ Includes pedestrian walkway.  
5/ Includes Cafe del Rey Moor garden.  
6/ Does not include sculpture gardens.  
7/ Includes seating and lobby space of all three theaters, including the amphitheater.  
8/ Typical use, does not reflect theater load and unload. West Plaza includes Old Globe Plaza and West Parklawns.  
9/ Includes planters.  
10/ Average use, does not reflect special event/concert use.  

Source: Economics Research Associates
The model shows that new expansions to the museums will create additional crowding in some of the adjacent pedestrian and landscaped activity areas. However, the key problem area, the Prado (which still shows under-capacity), shows less crowding due to the expansion of other adjacent areas which can serve as "relief valves" to the Prado. One area which appears to remain crowded is the Prado East and Botanical Lawn which is "building locked", and can not be expanded significantly. The South and Central Palisades lawns may be undersized for design day crowds as well since they will become more popular activity areas under the precise plan. Operational techniques to ease crowding in these two areas should be considered, such as encouraging more activity on the Palisades Mall to draw people away from the lawns.

In sum, the post precise plan model indicates a positive redistribution of design day attendance throughout the Central Mesa. Although some popular areas will remain crowded, the most problematic areas such as the Prado will experience relief caused by an expansion of visitor space on the western portion of the Prado axis, and the provision and expansion of other anchor uses on the perimeter of the Central Mesa core area such as the Plaza de Panama, the Palisades Mall, the Japanese Garden and the Spanish Village expansion. Prior to the precise plan, almost 80 percent of Central Mesa visitors were contained in 59 percent of its plazas and pedestrian space in the Prado area (excluding the Starlight Bowl). After the precise plan the percentage of total Central Mesa visitors in the Prado pedestrian area drops to 47 percent, while the Prado area comprises 34 percent of the plazas and pedestrian areas (excluding the Starlight Bowl). ERA feels that the precise plan proposes positive solutions to key issues facing the Central Mesa relative to carrying capacity and, with the exception of possible parking shortages during peak days and crowding on the South and Central Palisades' lawns and the Prado East and Botanical lawns, alleviates the majority of the crowd density issues which were raised in our analysis. Although popular areas will still be crowded during average busy days, most will still be within capacity, and they will not be as crowded as they would be without the precise plan improvements.
APPENDIX
Table A-1

ANNUAL ATTENDANCE AT BALBOA PARK

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Museum</td>
<td>201,159</td>
<td>260,150</td>
<td>230,795</td>
<td>231,296</td>
<td>237,896</td>
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<tr>
<td>Centro Cultural de la Raza</td>
<td>47,054</td>
<td>39,242</td>
<td>13,697</td>
<td>19,803</td>
<td>22,350</td>
</tr>
<tr>
<td>Hall of Champions</td>
<td>118,288</td>
<td>147,207</td>
<td>85,404</td>
<td>79,388</td>
<td>57,127</td>
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<td>Historical Society</td>
<td>5,616</td>
<td>32,418</td>
<td>53,647</td>
<td>60,847</td>
<td>44,066</td>
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<td>Japanese Gardens¹</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>21,637</td>
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<tr>
<td>Museum of Art</td>
<td>442,844</td>
<td>347,840</td>
<td>416,404</td>
<td>651,359</td>
<td>474,268</td>
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<tr>
<td>Museum of Man</td>
<td>263,405</td>
<td>247,510</td>
<td>194,343</td>
<td>191,030</td>
<td>199,226</td>
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<tr>
<td>Museum of Photographic Arts</td>
<td>45,059</td>
<td>87,449</td>
<td>77,886</td>
<td>73,976</td>
<td>62,143</td>
</tr>
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<td>Natural History Museum</td>
<td>248,526</td>
<td>277,078</td>
<td>317,248</td>
<td>317,930</td>
<td>305,094</td>
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<tr>
<td>Old Globe Theatre</td>
<td>237,826</td>
<td>255,377</td>
<td>243,550</td>
<td>244,806</td>
<td>195,892</td>
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<td>Reuben H. Fleet Space Theatre</td>
<td>475,472</td>
<td>682,807</td>
<td>577,357</td>
<td>646,830</td>
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<td>n/a</td>
<td>75,068</td>
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<td>San Diego Model Railroad</td>
<td>177,647</td>
<td>160,924</td>
<td>160,715</td>
<td>197,889</td>
<td>210,303</td>
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<td>77,000</td>
<td>91,255</td>
<td>117,441</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>2,418,308</strong></td>
<td><strong>2,658,767</strong></td>
<td><strong>2,491,284</strong></td>
<td><strong>2,935,963</strong></td>
<td><strong>2,697,056</strong></td>
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</tbody>
</table>

1. The attendance figures for the Japanese Garden reflect the last quarter (10/90-12/90) of the year. The figures for the Automotive Museum reflect June through December of 1989, and all of 1990.

Source: Respective Museum Curators and Public Relations Staff, Balboa Park Management Office, Economics Research Associates
### Monthly Attendance at Balboa Park

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<tr>
<td>Aerospace Museum</td>
<td>59,956</td>
<td>20,994</td>
<td>70,747</td>
<td>25,730</td>
<td>27,291</td>
<td>26,511</td>
<td>26,155</td>
<td>27,529</td>
<td>28,342</td>
<td>16,970</td>
<td>20,479</td>
<td>18,725</td>
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<td>5,600</td>
<td>5,000</td>
<td>5,300</td>
<td>22,225</td>
<td>7,600</td>
<td>15,013</td>
<td>23,260</td>
<td>8,500</td>
<td>14,880</td>
<td>3,500</td>
<td>11,500</td>
<td>7,700</td>
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<td>Casa Del Prado</td>
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<td>36,975</td>
<td>23,566</td>
<td>11,390</td>
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<td>22,740</td>
<td>18,950</td>
<td>32,205</td>
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<td>750</td>
<td>1,800</td>
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<td>2,200</td>
<td>1,475</td>
<td>1,500</td>
<td>1,750</td>
<td>1,625</td>
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<td>Hall of Champions</td>
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<td>4,222</td>
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<td>3,377</td>
<td>13,419</td>
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<td>9,895</td>
<td>19,033</td>
<td>12,172</td>
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<td>47,737</td>
<td>51,717</td>
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<td>52,318</td>
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<td>53,101</td>
<td>52,316</td>
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<td>n/a</td>
<td>n/a</td>
<td>0</td>
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<td>0</td>
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<td>44,791</td>
<td>25,246</td>
<td>56,684</td>
<td>45,965</td>
<td>150,056</td>
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<td>90,231</td>
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<td>35,000</td>
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<td>13,627</td>
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<td>6,365</td>
<td>5,701</td>
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<td>6,820</td>
<td>6,528</td>
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<td>24,811</td>
<td>33,901</td>
<td>24,000</td>
<td>28,931</td>
<td>33,594</td>
<td>23,642</td>
<td>28,618</td>
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<td>24,016</td>
<td>38,675</td>
<td>21,000</td>
<td>29,383</td>
<td>18,914</td>
<td>17,036</td>
<td>17,975</td>
<td>7,328</td>
<td>2,574</td>
<td>4,951</td>
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<td>Organ Pavilion</td>
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<td>31,000</td>
<td>36,000</td>
<td>33,500</td>
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<td>28,650</td>
<td>15,000</td>
<td>25,000</td>
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<tr>
<td>Outdoor Special Events in the Park</td>
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<td>17,250</td>
<td>26,000</td>
<td>16,000</td>
<td>21,000</td>
<td>26,000</td>
<td>18,500</td>
<td>22,250</td>
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<td>8,750</td>
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<td>9,400</td>
<td>14,475</td>
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<td>11,160</td>
<td>11,638</td>
<td>19,100</td>
<td>10,600</td>
<td>14,850</td>
<td>11,160</td>
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<td>10,641</td>
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<td>4,550</td>
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<td>8,107</td>
<td>6,554</td>
<td>6</td>
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<td>4,353</td>
<td>14,222</td>
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<td>San Diego Model Railroad</td>
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<td>18,093</td>
<td>16,570</td>
<td>14,983</td>
<td>20,401</td>
<td>17,692</td>
<td>4,950</td>
<td>16,657</td>
<td>15,804</td>
<td>27,714</td>
<td>19,207</td>
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<td>San Diego Zoo</td>
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<td>270,000</td>
<td>285,000</td>
<td>436,442</td>
<td>399,916</td>
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<td>409,912</td>
<td>129,056</td>
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<td>7,437</td>
<td>8,666</td>
<td>10,211</td>
<td>9,454</td>
<td>10,438</td>
<td>10,281</td>
<td>10,350</td>
<td>17,890</td>
<td>11,551</td>
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<td>60,500</td>
<td>35,500</td>
<td>7,000</td>
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<td><strong>TOTAL</strong></td>
<td>570,182</td>
<td>738,312</td>
<td>654,247</td>
<td>823,029</td>
<td>782,870</td>
<td>808,966</td>
<td>870,050</td>
<td>888,890</td>
<td>881,970</td>
<td>704,759</td>
<td>732,298</td>
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<th>MONTH/YEAR</th>
<th>1989</th>
<th>1990</th>
<th>Average</th>
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<td>January</td>
<td>192,751</td>
<td>169,074</td>
<td>180,913</td>
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<tr>
<td>February</td>
<td>201,956</td>
<td>194,580</td>
<td>198,268</td>
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<tr>
<td>March</td>
<td>297,160</td>
<td>237,776</td>
<td>267,468</td>
</tr>
<tr>
<td>April</td>
<td>252,542</td>
<td>270,984</td>
<td>261,763</td>
</tr>
<tr>
<td>May</td>
<td>262,993</td>
<td>281,087</td>
<td>272,040</td>
</tr>
<tr>
<td>June</td>
<td>300,000</td>
<td>270,000</td>
<td>285,000</td>
</tr>
<tr>
<td>July</td>
<td>436,442</td>
<td>349,916</td>
<td>393,179</td>
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<tr>
<td>August</td>
<td>432,632</td>
<td>387,192</td>
<td>409,912</td>
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<tr>
<td>September</td>
<td>244,788</td>
<td>223,787</td>
<td>234,288</td>
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<tr>
<td>October</td>
<td>290,376</td>
<td>327,108</td>
<td>308,742</td>
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<tr>
<td>November</td>
<td>219,194</td>
<td>181,379</td>
<td>200,287</td>
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<tr>
<td>December</td>
<td>129,058</td>
<td>250,000</td>
<td>189,529</td>
</tr>
<tr>
<td></td>
<td>3,259,892</td>
<td>3,142,883</td>
<td>3,201,388</td>
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</tbody>
</table>

Source: San Diego Zoo Public Relations Staff, Economics Research Associates
### Table A-4

**PUBLIC SPACE USAGE**

<table>
<thead>
<tr>
<th>Location</th>
<th>Size (sq.ft.)</th>
<th>Percent Public</th>
<th>Proposed Size (sq.ft.)</th>
<th>Percent Public</th>
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<tbody>
<tr>
<td>Centro C.R.</td>
<td>9,000</td>
<td>68%</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Hall of Champions</td>
<td>21,000</td>
<td>67</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>House of Hospitality</td>
<td>11,000</td>
<td>100</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>House of Pacific Relations</td>
<td>10,700</td>
<td>98</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Hall of Nations</td>
<td>22,100</td>
<td>50</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Model Railroad</td>
<td>7,600</td>
<td>50</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Photographic</td>
<td>60,000</td>
<td>75</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Reuben H. Fleet</td>
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<td>44</td>
<td>115,787</td>
<td>--</td>
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<tr>
<td>Aerospace</td>
<td>77,000</td>
<td>69</td>
<td>--</td>
<td>--</td>
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<tr>
<td>Art Institute</td>
<td>6,000</td>
<td>80</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Automotive</td>
<td>35,000</td>
<td>71</td>
<td>75,000</td>
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<tr>
<td>Historical Society</td>
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<td>92</td>
<td>44,000</td>
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<tr>
<td>Museum of Art</td>
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<td>36</td>
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<tr>
<td>Museum of Man</td>
<td>52,000</td>
<td>56</td>
<td>--</td>
<td>--</td>
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<tr>
<td>Spanish Village</td>
<td>5,008</td>
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<td>--</td>
<td>--</td>
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<td>Starlight</td>
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<td>Timken Art Gallery</td>
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<td>73</td>
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Source: Curators and Staff from the respective institutions, April 1991.
<table>
<thead>
<tr>
<th></th>
<th>Existing Spaces</th>
<th>Proposed Spaces</th>
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<tbody>
<tr>
<td><strong>On-Site Lots</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerospace Museum/Federal Building</td>
<td>533</td>
<td>497</td>
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<tr>
<td>Alcazar Gardens</td>
<td>141</td>
<td>128</td>
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<td>Botanical Building</td>
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<td>0</td>
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<tr>
<td>Carousel North</td>
<td>99</td>
<td>74</td>
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<tr>
<td>Carousel South</td>
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<td>221</td>
</tr>
<tr>
<td>Casa de Balboa</td>
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<td>116</td>
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<tr>
<td>Centro/Worldbeat</td>
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<td>11</td>
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<tr>
<td>Gold Gulch</td>
<td>54</td>
<td>38</td>
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<tr>
<td>Natural History Museum</td>
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<td>99</td>
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<tr>
<td>Organ Pavilion²</td>
<td>323</td>
<td>1,000</td>
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<tr>
<td>Pan American Plaza</td>
<td>294</td>
<td>0</td>
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<tr>
<td>Pepper Grove</td>
<td>118</td>
<td>121</td>
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<tr>
<td>Reuben H. Fleet Space Museum</td>
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<td>162</td>
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<tr>
<td>San Diego Zoo</td>
<td>3,361</td>
<td>3,361</td>
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<tr>
<td><strong>Subtotal</strong></td>
<td>5,607</td>
<td>5,828</td>
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<tr>
<td><strong>On-Street Spaces</strong></td>
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<tr>
<td>Zoo Place</td>
<td>120±</td>
<td>120±</td>
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<tr>
<td>Park Boulevard</td>
<td>360±</td>
<td>340±</td>
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<tr>
<td>Village Place</td>
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</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>560±</td>
<td>460±</td>
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<tr>
<td><strong>Off Site</strong></td>
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<td></td>
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<tr>
<td>Inspiration Point¹</td>
<td>1,232</td>
<td>1,232</td>
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<tr>
<td><strong>Total</strong></td>
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<td>7,520</td>
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¹Subject to change with precise plan revisions.
²The number of proposed parking spaces at the Organ Pavilion ranges from 1,000 to 1,500.

Prado Light Standards

Western Lighting Standards Capistrano Series CA10 (or equal). Custom fixture as shown. Color shall be Frazee Shutter Green 6125N gloss enamel. Install per manufacturer’s specifications. Available through:

WESTERN LIGHTING STANDARDS
325 West Rider
Perris, CA 92370
(714) 687-5499
Palisades Light Standards

Western Light Standards with custom 10' pole and 17" diameter base fixture (or equal). Brushed aluminum finish. Install per manufacturer's specifications. Available through:

WESTERN LIGHTING STANDARDS
325 West Rider
Ferris, CA 92370
(714) 657-5499

Light Standards
Removable Bollard

Western Lighting Standards
Capistrano series custom design
with 17" base as shown (or equal).
Color to match light standards.
Install per manufacturer's
specifications. Available through:

WESTERN LIGHTING STANDARDS
325 West Rider
Pens, CA 92370
(714) 657-5499
Prado Drinking Fountain

Western Lighting Standards Capistrano series mini base as shown (or equal). Color to match light standards. Install per manufacturer's specifications. Available through:

WESTERN LIGHTING STANDARDS
325 West Rider
Perris, CA 92370
(714) 657-5499

12"

Drinking Fountain
Palisades Drinking Fountain

Haws Pedestal model #3353 (or equal) with receptor and pedestal in stainless steel with #4 satin finish. Haws Wheelchair accessible pedestal model #3180 (or equal) with outdoor pedestal fountain with built-in sandtrap. Install per manufacturer's specifications. Available through:

HAWS DRINKING FAUCET COMPANY
Fourth & Page Sheets
P.O. Box 1999
Berkeley, CA 94701
(415) 525-5801

Palisades Drinking Fountain

Haws Wheelchair accessible pedestal model #3180 (or equal) with outdoor pedestal fountain with built-in sandtrap. Install per manufacturer's specifications. Available through:

HAWS DRINKING FAUCET COMPANY
Fourth & Page Sheets
P.O. Box 1999
Berkeley, CA 94701
(415) 525-5801

Drinking Fountain
Prado Cast Iron/Wood Bench

TimberForm Site Complements model numbers 2118-x and 2119-x (or equal) with cast iron supports and patterned wood slats. Bench depth is 2’-2.5” and height is 2’-9.5”. Seat height is 1’-5” with surface mounting and wood size 1.5” x 2.5”. Length to be determined. Finish to be powder coating color RAL 6009. Install per manufacturer’s specifications. Available through:

COLUMBIA CASCADE TIMBER COMPANY
1975 S.W. Fifth Avenue
Portland, OR 97201
1-800-547-1940

Prado Concrete Bench

Dura Art Stone cast stone Coronado bench 6U, minimum 6’ length, installed with epoxy adhesive, nordic cream color and sacked smooth finish, order number: S-6U-E-S-13-SK (or equal). 26” wide seat, 17” height and minimum 7 2 length. Install per manufacturer's specifications. Available through:

DURA ART STONE
11010 Live Oak
Fontana, CA 92335
(800)821-1120
(714)850-9060

Benches
**Park Concrete Bench**

Dura Art Stone cast stone S-6B bench, epoxy adhesive installed, 
nordic cream color, sacked smooth finish, order number: S-6B-E-S-13- 
SK (or equal). 24" wide, 17" height, 72" long. Install manufacturer's 
specifications. Available through:

DURA ART STONE
11010 Live Oak
Fontana, CA 92335
(800) 821-1120
(714) 350-9000
Palisades Bench (2)

(1) Landscape Forms Gretchen's Bench of Jarrah wood with back and armrest style supports in 72" or 96" length, model #GR3005-BA-length to be determined (or equal).
(2) Gretchen's Bench of Jarrah wood freestanding style support in 72" or 96" length, model #GR 3005-FS-length to be determined (or equal). Install per manufacturer's specifications.

Available through:

LFI/LANDSCAPE FORMS
431 Lawndale Avenue
Kalamazoo, MI 49001
(800) 521-2546
(616) 381-0396
Plaza Chair

Wesnic Food Court Furniture, Bentwood III side chairs, with mesh seat and Fan Back, model #302 (or equal). Install per manufacturer's specifications. Available through:

WESNIC
6000 Bowendale Avenue
Jacksonville, FL 32216
(800)874-8558
(619)434-8255
Prado Plaza Table

Falcon Table Base model #2704-UH (or equal) with cast iron base, 18 ga. 4" steel tubing, rubber cushion glides, 15" cast iron spider, 24" diameter base spread, 27.5 overall height. 36" round marble table top available through distributor. California Umbrella with 1-1/4" diameter pole available through Sunstar Bistro. Install per manufacturer's specifications. Available through:

FALCON PRODUCTS, INC.
9387 Dielman Industrial Drive
St. Louis, MO 63132
(314) 991-9200
Palisades Plaza
Table

Falcon Table Base model #4404-UH (or equal) with cast iron base, 18 ga. 3" steel tubing, rubber cushion glides, 15" cast iron spider, 22" diameter base spread, 28.5" overall height. 36" round marble table top available through distributor. California Umbrella with 1-1/4" diameter pole available through Sundtar Bistro. Install per manufacturer's specifications. Available through:

FALCON PRODUCTS, INC.
9387 Dielman Industrial Drive
St. Louis, MO 63132
(314) 991-9200
**Prado Metal Trash Receptacles**

Victor Stanley Ironsites Concourse Series, model #RS-12 (or equal). Color to match light standards. Install per manufacturer's specifications. Available through:

**VICTOR STANLEY, INC.**
Brick House Road
Dunkirk, MD 20754
(301) 855-8300

---

**Prado Concrete Trash Receptacle**

Dura Art Stone cast stone trash receptacle model number TR-N round, nordic cream color with light sand blast finish, order number: S-TR-N-S-13-LSB (or equal) with 30" diameter, 36" height. Matching ash urn (at building entries only) order number: S-AU-N-S-13-LSB (or equal) with 19" diameter, 22" height. Install per manufacturer's specifications. Available through:

**DURA ART STONE**
11010 Live Oak
Fontana, CA 92335
(800) 821-1120
(714) 350-9000
**Park Concrete Trash Receptacle**

Dura Art Stone cast stone trash receptacle, D-round, nordic cream color with light sand blast finish, order number: S-TR-D-S-13-LSD (or equal) with 22" diameter, 36" height. Matching Ash Urn (at building entries only) order number: S-AU-D-S-13-LSB (or equal) with 14" diameter, 22" height. Install per manufacturer's specifications. Available through:

DURA ART STONE
11010 Live Oak
Fontana, CA 92335
(800) 821-1120
(714) 350-9000

**Palisades Trash Receptacle**

Woodcrafters of Florida, Inc.; Heavy Metal Collection trash receptacle model HTC-2631 (or equal) with 26" diameter, 31" height, 110 lb. weight, color D-70. Lid with lift and swing mechanism and locking device. Install per manufacturer's specifications. Available through:

WESNIC
6000 Bowendale Avenue
Jacksonville, FL 32216
(800) 874-8558
(619) 434-8255

Trash Receptacle
Spanish Village Trash Receptacle

SueMar Designs trash can containers. Round, hexagonal, and octagonal shapes, design and colors at discretion of artist, 18" chain with eye bolt and concrete anchor. Install per manufacturer's specifications. Available through:

Susan M. Fleming
SUEMAR DESIGNS
Studio 28
Spanish Village, Balboa Park
San Diego, CA 92101
(619) 595-0503

Trash Receptacles
Plant Container

Dura Art Stone cast stone 3’ & 4’ wide, design N Aquarian round planters, 30” & 36” height, nordic cream color with light sand blast finish and 2” centered drain holes. Order numbers:
- S-4-N-36-S-13-LSB-2” centered (or equal)
- S-4-N-30-S-13-LSB-2” centered (or equal)
- S-3-N-30-S-13-LSB-2” centered (or equal)

Install per manufacturer’s specifications. Available through:

DURA ART STONE
11010 Live Oak
Fontana, CA 92335
(600) 821-1120
(714) 350-9000

Plant Containers
Prado Tree Grates

Urban Accessories, cast iron tree grate model "O.T." series (or equal). Round or square shape and size to be determined. Install per manufacturer's specifications. Available through:

URBAN ACCESSORIES
First Street & Avenue "A"
Snohomish, WA 98290
(206) 568-3143
(206) 568-8000

Palisades Tree Grate

Urban Accessories cast iron tree grate model "Standard Flats" (or equal). Round or square shape and size to be determined. Install per manufacturer's specifications. Available through:

URBAN ACCESSORIES
First Street & Avenue "A"
Snohomish, WA 98290
(206) 568-3143
(206) 568-8000

Tree Grates
Stop **Sign Standard**

Western Lighting Standards Capistrano series as shown (or equal). Color shall be Frazee ShutterGreen 6125N, gloss enamel or equal. Install per manufacturer’s specifications. Available through:

**WESTERN LIGHTING STANDARDS**
325 West Rider
Perris, CA 92370
(714) 657-5499

**PLEASE SEE**
BALBOA PARK
SIGN MANUAL
UPDATE

Signage
Prado Tram Stop
Sign Standard

Western Lighting Standards Capistrano series as shown (or equal). Color shall be Frazee Shutter Green 6125N, gloss enamel or equal. Install per manufacturer's specifications. Available through:

WESTERN LIGHTING STANDARDS
325 West Rider
Perris, CA 92370
(714) 657-5499

PLEASE SEE
BALBOA PARK
SIGN MANUAL
UPDATE
Palisades Tram Stop Sign Standard

Western Lighting Standards custom design as shown (or equal). Brushed aluminum finish. Install per manufacturer's specifications. Available through:

WESTERN LIGHTING STANDARDS
325 West Rider
Perris, CA 92370
(714) 657-5499

PLEASE SEE BALBOA PARK SIGN MANUAL UPDATE
**Prado Pedestrian Orientation Sign Standards**

Western Lighting Standards Mini Capistrano series as shown (or equal). Color shall be Frazee Shutter Green 6125N gloss enamel or equal. Install per manufacturer's specifications. Available through:

WESTERN LIGHTING STANDARDS
325 West Rider
Perris, CA 92370
(714) 657-5499

**PLEASE SEE**
BALBOA PARK
SIGN MANUAL
UPDATE
Western Lighting Standards custom design as shown (or equal). Brushed aluminum finish. Install per manufacturer’s specifications. Available through:

WESTERN LIGHTING STANDARDS
325 West Rider
Perris, CA 92370
(714) 657-549

PLEASE SEE
BALBOA PARK
SIGN MANUAL
UPDATE

Balboa Park Sign Manual
Historic Preservation Standards
The Secretary of the Interior’s
Standards for Rehabilitation
and Guidelines for Rehabilitating Historic Buildings

Note: The following document is the original version included in the Appendix of the Central Mesa Precise Plan. Please visit the National Park Service web site for current preservation standards at www.nps.gov
The Secretary of the Interior's

Standards for Rehabilitation

and Guidelines for

Rehabilitating Historic Buildings (Revised 1983)

U.S. Department of the interior
National Park Service
Preservation Assistance Division
Washington, D.C.
The "Secretary of the Interior's Standards for Historic Preservation Projects" were initially prepared in 1979 by W. Brown Morton III and Gary L. Hume. The updated and expanded Guidelines for Rehabilitating Historic Buildings that follow were developed by Gary L. Hume and Kay D. Weeks, Technical Preservation Services, Preservation Assistance Division, with the assistance of the professional and support staff.
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**BUILDING EXTERIOR**

**Masonry:** Brick, stone, terra-cotta, concrete, adobe, stucco, and mortar

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- Design for Missing Historic Features ......................................................... 15

**Wood:** Clapboard, weatherboard, shingles, and other wooden siding and decorative elements

- Preservation of Historic Features (maintenance, repair, replacement) .......... 16
- Design for Missing Historic Features ......................................................... 18

**Architectural Metals:** Cast iron, steel, pressed tin, copper, aluminum, and zinc

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- Design for Missing Historic Features ......................................................... 23
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ENERGY RETROFITTING
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The Secretary of the Interior's Standards for Rehabilitation

The Secretary of the Interior is responsible for establishing standards for all programs under Departmental authority and for advising Federal agencies on the preservation of historic properties listed or eligible for listing in the National Register of Historic Places. In partial fulfillment of this responsibility, the Secretary of the Interior's Standards for Historic Preservation Projects have been developed to direct work undertaken on historic buildings.

Initially used by the Secretary of the Interior in determining the applicability of proposed project work on registered properties within the Historic Preservation Fund grant-in-aid program, the Standards for Historic Preservation Projects have received extensive testing over the years—more than 6,000 acquisition and development projects were approved for a variety of work treatments. In addition, the Standards have been used by Federal agencies in carrying out their historic preservation responsibilities for properties in Federal ownership or control; and by State and local officials in the review of both Federal and nonfederal rehabilitation proposals. They have also been adopted by a number of historic district and planning commissions across the country.

The Standards for Rehabilitation (36 CFR 67) comprise that section of the overall historic preservation project standards addressing the most prevalent treatment today: Rehabilitation. "Rehabilitation" is defined as the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values.

The Standards for Rehabilitation are as follows:

1. Every reasonable effort shall be made to provide a compatible use for a property which requires minimal alteration of the building, structure, or site and its environment, or to use a property for its originally intended purpose.

2. The distinguishing original qualities or character of a building, structure, or site and its environment shall not be destroyed. The removal or alteration of any historic material or distinctive architectural features should be avoided when possible.

3. All buildings, structures, and sites shall be recognized as products of their own time. Alterations that have no historical basis and which seek to create an earlier appearance shall be discouraged.

4. Changes which may have taken place in the course of time are evidence of the history and development of a building, structure, or site and its environment. These changes may have acquired significance in their own right, and this significance shall be recognized and respected.
5. Distinctive stylistic features or examples of skilled craftsmanship which characterize a building, structure, or site shall be treated with sensitivity.

6. Deteriorated architectural features shall be repaired rather than replaced, wherever possible. In the event replacement is necessary, the new material should match the material being replaced in composition, design, color, texture, and other visual qualities. Repair or replacement of missing architectural features should be based on accurate duplications of features, substantiated by historic, physical, or pictorial evidence rather than on conjectural designs or the availability of different architectural elements from other buildings or structures.

7. The surface cleaning of structures shall be undertaken with the gentlest means possible. Sandblasting and other cleaning methods that will damage the historic building materials shall not be undertaken.

8. Every reasonable effort shall be made to protect and preserve archeological resources affected by, or adjacent to any project.

9. Contemporary design for alterations and additions to existing properties shall not be discouraged when such alterations and additions do not destroy significant historical, architectural or cultural material, and such design is compatible with the size, scale, color, material, and character of the property, neighborhood or environment.

10. Wherever possible, new additions or alterations to structures shall be done in such a manner that if such additions or alterations were to be removed in the future, the essential form and integrity of the structure would be unimpaired.

In the past several years, the most frequent use of the Secretary's "Standards for Rehabilitation" has been to determine if a rehabilitation project qualifies as a "certified rehabilitation" pursuant to the Tax Reform Act of 1976, the Revenue Act of 1978, and the Economic Recovery Tax Act of 1981, as amended. The Secretary is required by law to certify rehabilitations that are consistent with the historic character of the structure or the district in which it is located. The Standards are used to evaluate whether the historic character of a building is preserved in the process of rehabilitation. Between 1976 and 1982 over 5,000 projects were reviewed and approved under the Preservation Tax Incentives program.

As stated in the definition, the treatment "Rehabilitation" assumes that at least some repair or alteration of the historic building will need to take place in order to provide for an efficient contemporary use; however these repairs and alterations must not damage or destroy the materials and features—including their finishes—that are important in defining the building's historic character.
In terms of specific project work, preservation of the building and its historic character is based on the assumption that (1) the historic materials and features and their unique craftsmanship are of primary importance and that (2), in consequence, they will be retained, protected, and repaired in the process of rehabilitation to the greatest extent possible, not removed and replaced with materials and features which appear to be historic, but which are—in fact—new.

To best achieve these preservation goals, a two-part evaluation needs to be applied by qualified historic preservation professionals for each project as follows: first, a particular property's materials and features which are important in defining its historic character should be identified. Examples may include a building's walls, cornice, window sash and frames and roof; rooms, hallways, stairs, and mantels; or a site's walkways, fences, and gardens. The second part of the evaluation should consist of assessing the potential impact of the work necessary to make possible an efficient contemporary use. A basic assumption in this process is that the historic character of each property is unique and therefore proposed rehabilitation work will necessarily have a different effect on each property; in other words, what may be acceptable for one project may be unacceptable for another. However, the requirement set forth in the definition of "Rehabilitation" is always the same for every project: those portions and features of the property which are significant to its historic, architectural, and cultural values must be preserved in the process of rehabilitation. To accomplish this, all ten of the Secretary of the Interior's "Standards for Rehabilitation" must be met,
GUIDELINES FOR REHABILITATING HISTORIC BUILDINGS

The Guidelines were initially developed in 1977 to help property owners, developers, and Federal managers apply the Secretary of the Interior's "Standards for Rehabilitation" during the project planning stage by providing general design and technical recommendations. Unlike the Standards, the Guidelines are not codified as program requirements. Together with the "Standards for Rehabilitation" they provide a model process for owners, developers, and federal agency managers to follow.

It should be noted at the outset that the Guidelines are intended to assist in applying the Standards to projects generally; consequently, they are not meant to give case-specific advice or address exceptions or rare instances. For example, they cannot tell an owner or developer which features of their own historic building are important in defining the historic character and must be preserved—although examples are provided in each section—or which features could be altered, if necessary, for the new use. This kind of careful case-by-case decisionmaking is best accomplished by seeking assistance from qualified historic preservation professionals in the planning stage of the project. Such professionals include architects, architectural historians, historians, archeologists, and others who are skilled in the preservation, rehabilitation, and restoration of historic properties.

The Guidelines pertain to historic buildings of all sizes, materials, occupancy, and construction types; and apply to interior and exterior work as well as new exterior additions. Those approaches, treatments, and techniques that are consistent with the Secretary of the Interior's "Standards for Rehabilitation" are listed in the "Recommended" column on the left; those approaches, treatments, and techniques which could adversely affect a building's historic character are listed in the "Not Recommended" column on the right.

To provide clear and consistent guidance for owners, developers, and federal agency managers to follow, the "Recommended" courses of action in each section are listed in order of historic preservation concerns so that a rehabilitation project may be successfully planned and completed—first, assures the preservation of a building's important or "character-defining" architectural materials and features and, second, makes possible an efficient contemporary use. Rehabilitation guidance in each section begins with protection and maintenance, that work which should be maximized in every project to enhance overall preservation goals. Next, where some deterioration is present, repair of the building's historic materials and features is recommended. Finally, when deterioration is so extensive that repair is not possible, the most problematic area of work is considered: replacement of historic materials and features with new materials.

To further guide the owner and developer in planning a successful rehabilitation project, those complex design issues dealing with new use requirements such as alterations and additions are highlighted at the end of each section to underscore the need for particular sensitivity in these areas.
Identify, Retain, and Preserve

The guidance that is basic to the treatment of all historic buildings—identifying, retaining, and preserving the form and detailing of those architectural materials and features that are important in defining the historic character—is always listed first in the "Recommended" column. The parallel "Not Recommended" column lists the types of actions that are most apt to cause the diminution or even loss of the building's historic character. It should be remembered, however, that such loss of character is just as often caused by the cumulative effect of a series of actions that would seem to be minor interventions. Thus, the guidance in all of the "Not Recommended" columns must be viewed in that larger context, e.g., for the total impact on a historic building.

Protect and Maintain

After identifying those materials and features that are important and must be retained in the process of rehabilitation work, then protecting and maintaining them are addressed. Protection generally involves the least degree of intervention and is preparatory to other work. For example, protection includes the maintenance of historic material through treatments such as rust removal, caulking, limited paint removal, and re-application of protective coatings; the cyclical cleaning of roof gutter systems; or installation of fencing, protective plywood, alarm systems and other temporary protective measures. Although a historic building will usually require more extensive work, an overall evaluation of its physical condition should always begin at this level.

Repair

Next, when the physical condition of character-defining materials and features warrants additional work repairing is recommended. Guidance for the repair of historic materials such as masonry, wood, and architectural metals again begins with the least degree of intervention possible such as patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading them according to recognized preservation methods. Repairing also includes the limited replacement in kind—or with compatible substitute material—of extensively deteriorated or missing parts of features when there are surviving prototypes (for example, brackets, dentils, steps, plaster, or portions of slate or tile roofing). Although using the same kind of material is always the preferred option, substitute material is acceptable if the form and design as well as the substitute material itself convey the visual appearance of the remaining parts of the feature and finish.

Replace

Following repair in the hierarchy, guidance is provided for replacing an entire character-defining feature with new material because the level of deterioration or damage of materials precludes repair (for example, an exterior cornice; an interior staircase or a complete porch or storefront). If the essential form and detailing are still evident so that the physical evidence can be used to re-establish the feature as an integral part of the rehabilitation project, then its replacement is appropriate. Like the guidance for repair, the preferred option is always replacement of the
entire feature in kind, that is, with the same material. Because this approach may not always be technically or economically feasible, provisions are made to consider the use of a compatible substitute material.

It should be noted that, while the National Park Service guidelines recommend the replacement of an entire character-defining feature under certain well-defined circumstances, they never recommend removal and replacement with new material of a feature that—although damaged or deteriorated—could reasonably be repaired and thus preserved.

**Design for Missing Historic Features**

When an entire interior or exterior feature is missing (for example, an entrance, or cast iron facade; or a principal staircase), it no longer plays a role in physically defining the historic character of the building unless it can be accurately recovered in form and detailing through the process of carefully documenting the historical appearance. Where an important architectural feature is missing, its recovery is always recommended in the guidelines as the first or preferred, course of action. Thus, if adequate historical, pictorial, and physical documentation exists so that the feature may be accurately reproduced, and if it is desireable to re-establish the feature as part of the building's historical appearance, then designing and constructing a new feature based on such information is appropriate. However, a second acceptable option for the replacement feature is a new design that is compatible with the remaining character-defining features of the historic building. The new design should always take into account the size, scale, and material of the historic building itself and, most importantly, should be clearly differentiated so that a false historical appearance is not created.

**Alterations/Additions to Historic Buildings**

Some exterior and interior alterations to the historic building are generally needed to assure its continued use, but it is most important that such alterations do not radically change, obscure, or destroy character-defining spaces, materials, features, or finishes. Alterations may include providing additional parking space on an existing historic building site; cutting new entrances or windows on secondary elevations; inserting an additional floor; installing an entirely new mechanical system; or creating an atrium or light well. Alterations may also include the selective removal of building or other features of the environment or building site that are intrusive and therefore detract from the overall historic character.

The construction of an exterior addition to a historic building may seem to be essential for the new use, but it is emphasized in the guidelines that such new additions should be avoided, if possible, and considered only after it is determined that those needs cannot be met by altering secondary, i.e., non character-defining interior spaces. If, after a thorough evaluation of interior solutions, an exterior addition is still judged to be the only viable alternative, it should be designed and constructed to be clearly differentiated from the historic building and so that the character-defining features are not radically changed, obscured, damaged, or destroyed.
Additions to historic buildings are referenced within specific sections of the guidelines such as Site, Roof, Structural Systems, etc., but are also considered in more detail in a separate section, NEW ADDITIONS TO HISTORIC BUILDINGS.

**Health and Safety Code Requirements; Energy Retrofitting**

These sections of the rehabilitation guidance address work done to meet health and safety code requirements (for example, providing barrier-free access to historic buildings); or retrofitting measures to conserve energy (for example, installing solar collectors in an unobtrusive location on the site). Although this work is quite often an important aspect of rehabilitation projects, it is usually not part of the overall process of protecting or repairing character-defining features; rather, such work is assessed for its potential negative impact on the building's historic character. For this reason, particular care must be taken not to radically change, obscure, damage, or destroy character-defining materials or features in the process of rehabilitation work to meet code and energy requirements.

Specific information on rehabilitation and preservation technology may be obtained by writing to the National Park Service, at the addresses listed below:

- Preservation Assistance Division
  - National Park Service
  - Department of the Interior
  - Washington, D.C. 20240

- Preservation Services Division
  - Southeast Regional Office
  - National Park Service
  - 75 Spring St. SW, Room 1140
  - Atlanta, GA 30303

- National Historic Preservation Programs
  - Western Regional Office
  - National Park Service
  - 450 Golden Gate Ave.
  - Box 36063
  - San Francisco, CA 94102

- Office of Cultural Programs
  - Mid-Atlantic Regional Office
  - National Park Service
  - 143 S, Third St.
  - Philadelphia, PA 19106

- Division of Cultural Resources
  - Rocky Mountain Regional Office
  - National Park Service
  - 655 Parfet St.
  - P.O. Box 25287
  - Denver, CO 80225

- Cultural Resources Division
  - Alaska Regional Office
  - National Park Service
  - 2525 Gambell St.
  - Anchorage, AK 99503
Masonry: Brick, stone, terra cotta, concrete, adobe, stucco and mortar

**Not Recommended**

Removing or radically changing masonry features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Replacing or rebuilding a major portion of exterior masonry walls that could be repaired so that, as a result, the building is no longer historic and is essentially new construction.

Applying paint or other coatings such as stucco to masonry that has been historically unpainted or uncoated to create a new appearance.

Removing paint from historically painted masonry.

Radically changing the type of paint or coating or its color.

Failing to evaluate and treat the various causes of mortar joint deterioration such as leaking roofs or gutters, differential settlement of the building, capillary action, or extreme weather exposure.

**Identifying, retaining, and preserving**

masonry features that are important in defining the overall historic character of the building such as walls, brackets, railings, cornices, window architraves, door pediments, steps, and columns; and joint and unit size, tooling and bonding patterns, coatings, and color.

Protecting and maintaining masonry by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved decorative features.

Masonry features (such as brick cornices and door pediments, stone window architraves, terra cotta brackets and railings) as well as masonry surfaces (modelling, tooling, bonding patterns, joint size, and color) may be important in defining the historic character of the building. It should be noted that while masonry is among the most durable of historic building materials, it is also the most susceptible to damage by improper maintenance or repair techniques and by harsh or abrasive cleaning methods. Most preservation guidance on masonry thus focuses on such concerns as cleaning and the process of repointing. For specific guidance on this subject, consult Preservation Briefs: 1, 2, 5, 4, and 7. (See Reading List and Ordering Information on pg. 58.)
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<tr>
<th><strong>Recommended</strong></th>
<th><strong>Not Recommended</strong></th>
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<tr>
<td>Cleaning masonry only when necessary to halt deterioration or remove heavy soiling.</td>
<td>Cleaning masonry surfaces when they are not heavily soiled to create a new appearance, thus needlessly introducing chemicals or moisture into historic materials.</td>
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<td>Carrying out masonry surface cleaning tests after it has been determined that such cleaning is necessary. Tests should be observed over a sufficient period of time so that both the immediate effects and the long range effects are known to enable selection of the gentlest method possible.</td>
<td>Cleaning masonry surfaces without testing or without sufficient time for the testing results to be of value.</td>
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<td>Cleaning masonry surfaces with the gentlest method possible, such as low pressure water and detergents, using natural bristle brushes.</td>
<td>Sandblasting brick or stone surfaces using dry or wet grit or other abrasives. These methods of cleaning permanently erode the surface of the material and accelerate deterioration.</td>
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<td>Inspecting painted masonry surfaces to determine whether repainting is necessary.</td>
<td>Using a cleaning method that involves water or liquid chemical solutions when there is any possibility of freezing temperatures.</td>
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<td>Removing damaged or deteriorated paint only to the next sound layer using the gentlest method possible (e.g., handscraping) prior to repainting.</td>
<td>Cleaning with chemical products that will damage masonry, such as using acid on limestone or marble, or leaving chemicals on masonry surfaces.</td>
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<td>Applying compatible paint coating systems following proper surface preparation.</td>
<td>Applying high pressure water cleaning methods that will damage historic masonry and the mortar joints.</td>
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<td>Repainting with colors that are historically appropriate to the building and district.</td>
<td>Removing paint that is firmly adhering to, and thus protecting, masonry surfaces.</td>
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<td>Using methods of removing paint which are destructive to masonry, such as sandblasting, application of caustic solutions, or high pressure waterblasting.</td>
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<td>Failing to follow manufacturers' product and application instructions when repainting masonry.</td>
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<td>Using new paint colors that are inappropriate to the historic building and district.</td>
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<td><strong>Recommended</strong></td>
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<td>Evaluating the overall condition of the masonry to determine whether more than protection and maintenance are required, that is, if repairs to the masonry features will be necessary.</td>
<td>Failing to undertake adequate measures to assure the preservation of masonry features.</td>
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<td><strong>Repairing</strong> masonry walls and other masonry features by repointing the mortar joints where there is evidence of deterioration such as disintegrating mortar, cracks in mortar joints, loose bricks, damp walls, or damaged plasterwork.</td>
<td>Removing nondeteriorated mortar from sound joints, then repointing the entire building to achieve a uniform appearance.</td>
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<td>Removing deteriorated mortar by carefully hand-raking the joints to avoid damaging the masonry.</td>
<td>Using electric saws and hammers rather than hand tools to remove deteriorated mortar from joints prior to repointing.</td>
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<td>Duplicating old mortar in strength, composition, color, and texture.</td>
<td>Repointing with mortar of high portland cement content (unless it is the content of the historic mortar). This can often create a bond that is stronger than the historic material and can cause damage as a result of the differing coefficient of expansion and the differing porosity of the material and the mortar.</td>
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<td>Repointing with a synthetic caulking compound.</td>
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<td>Using a &quot;scrub&quot; coating technique to repoint instead of traditional repointing methods.</td>
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<td>Changing the width or joint profile when repointing.</td>
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<td>Removing sound stucco; or repairing with new stucco that is stronger than the historic material or does not convey the same visual appearance.</td>
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<td>Applying cement stucco to unfired, unstabilized adobe. Because the cement stucco will not bond properly, moisture can become entrapped between materials, resulting in accelerated deterioration of the adobe.</td>
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<tr>
<td>Duplicating old mortar joints in width and in joint profile.</td>
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Recommended

Repairing masonry features by patching, piecing-in, or consolidating the masonry using recognized preservation methods. Repair may also include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of masonry features when there are surviving prototypes such as terra-cotta brackets or stone balusters.

Applying new or non-historic surface treatments such as water-repellent coatings to masonry only after repointing and only if masonry repairs have failed to arrest water penetration problems.

Replacing in kind an entire masonry feature that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. Examples can include large sections of a wall, a cornice, balustrade, column, or stairway. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Not Recommended

Replacing an entire masonry feature such as a cornice or balustrade when repair of the masonry and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the masonry feature or that is physically or chemically incompatible.

Applying waterproof, water-repellent, or non-historic coatings such as stucco to masonry as a substitute for repointing and masonry repairs. Coatings are frequently unnecessary, expensive, and may change the appearance of historic masonry as well as accelerate its deterioration.

Removing a masonry feature that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

Design for Missing Historic Features

Creating a false historical appearance because the replaced masonry feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new masonry feature that is incompatible in size, scale, material and color.
Wood: Clapboard, weatherboard, shingles, and other wooden siding and decorative elements

Because it can be easily shaped by sawing, planing, carving, and gouging, wood is the most commonly used material for architectural features such as clapboards, cornices, brackets, entablatures, shutters, columns and balustrades. These wooden features—both functional and decorative—may be important in defining the historic character of the building and thus their retention, protection, and repair are of particular importance in rehabilitation projects. For specific guidance, consult Preservation Briefs: 9, 10, and "Epoxies for Wood Repair in Historic Buildings." (See Reading List and Ordering Information on pg. 58.)

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<td>Identifying, <strong>retaining, and preserving</strong> wood features that are important in defining the overall historic character of the building such as siding, cornices, brackets, window architraves, and doorway pediments; and their paints, finishes, and colors.</td>
<td>Removing or radically changing wood features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.</td>
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<td>Protecting and maintaining wood features by providing proper drainage so that water is not allowed to stand on flat, horizontal surfaces or accumulate in decorative features.</td>
<td>Failing to identify, evaluate, and treat the causes of wood deterioration, including faulty flashing, leaking gutters, cracks and holes in siding, deteriorated caulking in joints and seams, plant material growing too close to wood surfaces, or insect or fungus infestation.</td>
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Recommended

Applying chemical preservatives to wood features such as beam ends or outriggers that are exposed to decay hazards and are traditionally unpainted.

Retaining coatings such as paint that help protect the wood from moisture and ultraviolet light. Paint removal should be considered only where there is paint surface deterioration and as part of an overall maintenance program which involves repainting or applying other appropriate protective coatings.

Inspecting painted wood surfaces to determine whether repainting is necessary or if cleaning is all that is required.

Removing damaged or deteriorated paint to the next sound layer using the gentlest method possible (handscraping and handsanding), then repainting.

Using with care electric hot-air guns on decorative wood features and electric heat plates on flat wood surfaces when paint is so deteriorated that total removal is necessary prior to repainting.

Using chemical strippers primarily to supplement other methods such as handscraping, handsanding and the above-recommended thermal devices. Detachable wooden elements such as shutters, doors, and columns may--with the proper safeguards--be chemically dip-stripped.

Applying compatible paint coating systems following proper surface preparation.

Repainting with colors that are appropriate to the historic building and district.

Evaluating the overall condition of the wood to determine whether more than protection and maintenance are required, that is, if repairs to wood features will be necessary.

Not Recommended

Using chemical preservatives such as creosote which can change the appearance of wood features unless they were used historically.

Stripping paint or other coatings to reveal bare wood, thus exposing historically coated surface's to the effects of accelerated weathering.

Removing paint that is firmly adhering to, and thus, protecting wood surfaces.

Using destructive paint removal methods such as a propane or butane torches, sandblasting or waterblasting. These methods can irreversibly damage historic woodwork.

Using thermal devices improperly so that the historic woodwork is scorched.

Failing to neutralize the wood thoroughly after using chemicals so that new paint does not adhere.

Allowing detachable wood features to soak too long in a caustic solution so that the wood grain is raised and the surface roughened.

Failing to follow manufacturers' product and application instructions when repainting exterior woodwork.

Using new colors that are inappropriate to the historic building or district.

Failing to undertake adequate measures to assure the preservation of wood features.
**Recommended**  

**Repairing** wood features by patching, piecing-in, consolidating, or otherwise reinforcing the wood using recognized preservation methods. Repair may also include the limited replacement in kind— or with compatible substitute material— of those extensively deteriorated or missing parts of features where there are surviving prototypes such as brackets, moldings, or sections of siding.

**Replacing** in kind an entire wood feature, that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. Examples of wood features include a cornice, entablature or balustrade. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

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**Not Recommended**

Replacing an entire wood feature such as a cornice or wall when repair of the wood and limited replacement of deteriorated or missing parts are appropriate.

Using substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the wood feature or that is physically or chemically incompatible.

Removing an entire wood feature that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

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**The following work is highlighted because it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.**

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**Design for Missing Historic Features**

Creating a false historic appearance because the replaced wood feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new wood feature that is incompatible in size, scale, material, and color.
Architectural Metals: Cast iron, steel, pressed tin, copper, aluminum, and zinc

Architectural metal features—such as cast-iron facades, porches, and steps; sheet metal cornices, roofs, roof cresting and storefronts; and cast or rolled metal doors, window sash, entablatures, and hardware—are often highly decorative and may be important in defining the overall historic character of the building. Their retention, protection, and repair should be a prime consideration in rehabilitation projects. For specific guidance, consult "Metals in America’s Historic Buildings." (See Reading List and Ordering Information on pg. 58.)

### Recommended

**Identifying, retaining, and preserving** architectural metal features such as columns, capitals, window hoods, or stairways that are important in defining the overall historic character of the building; and their finishes and colors.

**Protecting and maintaining** architectural metals from corrosion by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved, decorative features.

Cleaning architectural metals, when necessary, to remove corrosion prior to repainting or applying other appropriate protective coatings.

### Not Recommended

Removing or radically changing architectural metal features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Removing a major portion of the historic architectural metal from a facade instead of repairing or replacing only the deteriorated metal, then reconstructing the facade with new material in order to create a uniform, or "improved" appearance.

Radically changing the type of finish or its historic color or accent scheme.

Failing to identify, evaluate, and treat the causes of corrosion, such as moisture from leaking roofs or gutters.

Placing incompatible metals together without providing a reliable separation material. Such incompatibility can result in galvanic corrosion of the less noble metal, e.g., copper will corrode cast iron, steel, tin, and aluminum.

Exposing metals which were intended to be protected from the environment.

Applying paint or other coatings to metals such as copper, bronze, or stainless steel that were meant to be exposed.
### Recommended

Identifying the particular type of metal prior to any cleaning procedure and then testing to assure that the gentlest cleaning method possible is selected or determining that cleaning is inappropriate for the particular metal.

Cleaning soft metals such as lead, tin, copper, terneplate, and zinc with appropriate chemical methods because their finishes can be easily abraded by blasting methods.

Using the gentlest cleaning methods for cast iron, wrought iron, and steel—hard metals—in order to remove paint buildup and corrosion. If handscraping and wire brushing have proven ineffective, low pressure dry grit blasting may be used as long as it does not abrade or damage the surface.

Applying appropriate paint or other coating systems after cleaning in order to decrease the corrosion rate of metals or alloys.

Repainting with colors that are appropriate to the historic building or district.

Applying an appropriate protective coating such as lacquer to an architectural metal feature such as a bronze door which is subject to heavy pedestrian use.

Evaluating the overall condition of the architectural metals to determine whether more than protection and maintenance are required, that is, if repairs to features will be necessary.

### Not Recommended

Using cleaning methods which alter or damage the historic color, texture, and finish of the metal; or cleaning when it is inappropriate for the metal.

Removing the patina of historic metal. The patina may be a protective coating on some metals, such as bronze or copper, as well as a significant historic finish.

Cleaning soft metals such as lead, tin, copper, terneplate, and zinc with grit blasting which will abrade the surface of the metal.

Failing to employ gentler methods prior to abrasively cleaning cast iron, wrought iron or steel; or using high pressure grit blasting.

Failing to re-apply protective coating systems to metals or alloys that require them after cleaning so that accelerated corrosion occurs.

Using new colors that are inappropriate to the historic building or district.

Failing to assess pedestrian use or new access patterns so that architectural metal features are subject to damage by use or inappropriate maintenance such as salting adjacent sidewalks.

Failing to undertake adequate measures to assure the preservation of architectural metal features.
**Repairing** architectural metal features by patching, splicing, or otherwise reinforcing the metal following recognized preservation methods. Repairs may also include the limited replacement in kind—or with a compatible substitute material—of those extensively deteriorated or missing parts of features when there are surviving prototypes such as porch balusters, column capitals or bases; or porch cresting.

Replacing in kind an entire architectural metal feature that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. Examples could include cast iron porch steps or steel sash windows. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

**Design for Missing Historic Features**

Creating a false historic appearance because the replaced architectural metal feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new architectural metal feature that is incompatible in size, scale, material, and color.
The roof—with its shape; features such as cresting, dormers, cupolas, and chimneys; and the size, color, and patterning of the roofing material—can be extremely important in defining the building's overall historic character. In addition to the design role it plays, a weathertight roof is essential to the preservation of the entire structure; thus, protecting and repairing the roof as a "cover" is a critical aspect of every rehabilitation project. For specific guidance on roofs and roofing material, consult Preservation Briefs: 4. (See Reading List and Ordering Information on pg. 58.)

<table>
<thead>
<tr>
<th>Recommended</th>
<th>Not Recommended</th>
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<tbody>
<tr>
<td><strong>Identifying, retaining, and preserving</strong> roofs—and their functional and decorative features—that are important in defining the overall historic character of the building. This includes the roof's shape, such as hipped, gambrel, and mansard; decorative features such as cupolas, cresting, chimneys, and weathervanes; and roofing material such as slate, wood, clay tile, and metal, as well as its size, color, and patterning.</td>
<td>Radically changing, damaging, or destroying roofs which are important in defining the overall historic character of the building so that, as a result, the character is diminished.</td>
</tr>
<tr>
<td>Protecting and maintaining a roof by cleaning the gutters and downspouts and replacing deteriorated flashing. Roof sheathing should also be checked for proper venting to prevent moisture condensation and water penetration; and to insure that materials are free from insect infestation.</td>
<td>Removing a major portion of the roof or roofing material that is repairable, then reconstructing it with new material in order to create a uniform, or &quot;improved&quot; appearance.</td>
</tr>
<tr>
<td>Providing adequate anchorage for roofing material to guard against wind damage and moisture penetration.</td>
<td>Changing the configuration of a roof by adding new features such as dormer windows, vents, or skylights so that the historic character is diminished.</td>
</tr>
<tr>
<td>Stripping the roof of sound historic material such as slate, clay tile, wood, and architectural metal.</td>
<td>Applying paint or other coatings to roofing material which has been historically uncoated.</td>
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<tr>
<td></td>
<td>Failing to clean and maintain gutters and downspouts properly so that water and debris collect and cause damage to roof fasteners, sheathing, and the underlying structure.</td>
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<tr>
<td></td>
<td>Allowing roof fasteners, such as nails and clips to corrode so that roofing material is subject to accelerated deterioration.</td>
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</tbody>
</table>
Roof (continued)

Recommended

Protecting a leaking roof with plywood and building paper until it can be properly repaired.

Repairing a roof by reinforcing the historic materials which comprise roof features. Repairs will also generally include the limited replacement in kind or with compatible substitute material of those extensively deteriorated or missing parts of features when there are surviving prototypes such as cupola louvers, dentils, dormer roofing; or slates, tiles, or wood shingles on a main roof.

Replacing in kind an entire feature of the roof that is too deteriorated to repair--if the overall form and detailing are still evident--using the physical evidence to guide the new work. Examples can include a large section of roofing, or a dormer or chimney. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

Design for Missing Historic Features

- Designing and constructing a new feature when the historic feature is completely missing, such as a chimney or cupola. It may be an accurate restoration using historical, pictorial, and physical documentation, or be a new design that is compatible with the size, scale, material, and color of the historic building.

Not Recommended

Permitting a leaking roof to remain unprotected so that accelerated deterioration of historic building materials--masonry, wood, plaster, paint and structural members--occurs.

Replacing an entire roof feature such as a cupola or dormer when repair of the historic materials and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the roof or that is physically or chemically incompatible.

Removing a feature of the roof that is unrepairable, such as a chimney or dormer, and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new roof feature that is, incompatible in size, scale, material, and color.
Roof (continued)

<table>
<thead>
<tr>
<th>Alterations/Additions for the New Use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended</strong></td>
</tr>
<tr>
<td>Installing mechanical and service</td>
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<tr>
<td>equipment on the roof such as air</td>
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<tr>
<td>conditioning, transformers, or solar</td>
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<tr>
<td>collectors when required for the new</td>
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<tr>
<td>use so that they are inconspicuous</td>
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<tr>
<td>from the public right-of-way and do</td>
</tr>
<tr>
<td>not damage or obscure character-defining features.</td>
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<tr>
<td>Designing additions to roofs such as</td>
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<tr>
<td>residential, office, or storage</td>
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<tr>
<td>spaces, elevator housing, decks and</td>
</tr>
<tr>
<td>terraces, or dormers or skylights</td>
</tr>
<tr>
<td>when required by the new use so that</td>
</tr>
<tr>
<td>they are inconspicuous from the public</td>
</tr>
<tr>
<td>right-of-way and do not damage or</td>
</tr>
<tr>
<td>obscure character-defining features.</td>
</tr>
<tr>
<td><strong>Not Recommended</strong></td>
</tr>
<tr>
<td>Installing mechanical or service</td>
</tr>
<tr>
<td>equipment so that it damages or</td>
</tr>
<tr>
<td>obscures character-defining features;</td>
</tr>
<tr>
<td>or is conspicuous from the public</td>
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<tr>
<td>right-of-way.</td>
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<tr>
<td>Radically changing a character-defining</td>
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<tr>
<td>roof shape or damaging or destroying</td>
</tr>
<tr>
<td>character-defining roofing material as</td>
</tr>
<tr>
<td>a result of incompatible design or</td>
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<tr>
<td>improper installation techniques.</td>
</tr>
</tbody>
</table>
A highly decorative window with an unusual shape, or glazing pattern, or color is most likely identified immediately as a character-defining feature of the building. It is far more difficult, however, to assess the importance of repeated windows on a facade, particularly if they are individually simple in design and material, such as the large, multi-paned sash of many industrial buildings. Because rehabilitation projects frequently include proposals to replace window sash or even entire windows to improve thermal efficiency or to create a new appearance, it is essential that their contribution to the overall historic character of the building be assessed together with their physical condition before specific repair or replacement work is undertaken. See also Energy Retrofitting. Preservation Briefs: 9 should be consulted for specific guidance on wooden window repair. (See Reading List and Ordering Information on pg. 58.)

<table>
<thead>
<tr>
<th>Recommended</th>
<th>Not Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Identifying, retaining, and preserving windows</strong> -- and their functional and decorative features -- that are important in defining the overall historic character of the building. Such features can include frames, sash, muntins, glazing, sills, heads, hoodmolds, panelled or decorated jambs and moldings, and interior and exterior shutters and blinds.</td>
<td>Removing or radically changing windows which are important in defining the overall historic character of the building so that, as a result, the character is diminished.</td>
</tr>
<tr>
<td><strong>Protecting and maintaining</strong> the wood and architectural metal which comprise the window frame, sash, muntins, and surrounds through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and re-application of protective coating systems.</td>
<td>Changing the number, location, size or glazing pattern of windows, through cutting new openings, blocking-in windows, and installing replacement sash which does not fit the historic window opening.</td>
</tr>
<tr>
<td></td>
<td>Changing the historic appearance of windows through the use of inappropriate designs, materials, finishes, or colors which radically change the sash, depth of reveal, and muntin configuration; the reflectivity and color of the glazing; or the appearance of the frame.</td>
</tr>
<tr>
<td></td>
<td>Obscuring historic window trim with metal or other material.</td>
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<tr>
<td></td>
<td>Stripping windows of historic material such as wood, iron, cast iron, and bronze.</td>
</tr>
<tr>
<td></td>
<td>Failing to provide adequate protection of materials on a cyclical basis so that deterioration of the windows results.</td>
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<tr>
<td>Recommended</td>
<td>Not Recommended</td>
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</tr>
<tr>
<td><strong>Making windows weathertight by re-caulking and replacing or installing weatherstripping.</strong> These actions also improve thermal efficiency.</td>
<td><strong>Retrofitting or replacing windows rather than maintaining the sash; frame, and glazing.</strong></td>
</tr>
<tr>
<td>Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, i.e., if repairs to windows and window features will be required.</td>
<td><strong>Failing to undertake adequate measures to assure the preservation of historic windows.</strong></td>
</tr>
<tr>
<td><strong>Repairing</strong> window frames and sash by patching, splicing, consolidating or otherwise reinforcing. Such repair may also include replacement in kind of those parts that are either extensively deteriorated or are missing when there are surviving prototypes such as architraves, hoodmolds, sash, sills, and interior or exterior shutters and blinds.</td>
<td><strong>Replacing an entire window when repair of materials and limited replacement of deteriorated or missing parts are appropriate.</strong></td>
</tr>
<tr>
<td><strong>Replacing</strong> in kind an entire window that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.</td>
<td><strong>Failing to reuse serviceable window hardware such as brass lifts and sash locks.</strong></td>
</tr>
<tr>
<td><strong>Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the window or that is physically or chemically incompatible.</strong></td>
<td><strong>Removing a character-defining window that is unrepairable and blocking it in; or replacing it with a new window that does not convey the same visual appearance.</strong></td>
</tr>
<tr>
<td><strong>Introducing a new design that is incompatible with the historic character of the building.</strong></td>
<td><strong>Creating a false historical appearance because the replaced window is based on insufficient historical, pictorial, and physical documentation.</strong></td>
</tr>
</tbody>
</table>

**Design for Missing Historic Features**

Designing and installing new windows when the historic windows (frames, sash, and glazing) are completely missing. The replacement windows may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the window openings and the historic character of the building.
Windows (continued)

**Recommended**

**Alterations/Additions** for the New Use

Designing and installing additional windows on rear or other non-character-defining elevations if required by the new use. New window openings may also be cut into exposed party walls. Such design should be compatible with the overall design of the building, but not duplicate the fenestration pattern and detailing of a character-defining elevation.

Providing a setback in the design of dropped ceilings when they are required for the new use to allow for the full height of the window openings.

**Not Recommended**

Installing new windows, including frames, sash, and muntin configuration that are incompatible with the building's historic appearance or obscure, damage, or destroy character-defining features.

Inserting new floors or furred-down ceilings which cut across the glazed areas of windows so that the exterior form and appearance of the windows are changed.
Entrances and porches are quite often the focus of historic buildings, particularly when they occur on primary elevations. Together with their functional and decorative features such as doors, steps, balustrades, pilasters, and entablatures, they can be extremely important in defining the overall historic character of a building. Their retention, protection, and repair should always be carefully considered when planning rehabilitation work.

**Recommended**

**Identifying, retaining, and preserving** entrances--and their functional and decorative features--that are important in defining the overall historic character of the building such as doors, fanlights, sidelights, pilasters, entablatures, columns, balustrades, and stairs.

**Protecting and maintaining** the masonry, wood, and architectural metal that comprise entrances and porches through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and re-application of protective coating systems.

Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, that is, if repairs to entrance and porch features will be necessary.

**Not Recommended**

Removing or radically changing entrances and porches which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Stripping entrances and porches of historic material such as wood, iron, cast iron, terra cotta, tile and brick.

Removing an entrance or porch because the building has been re-oriented to accommodate a new use.

Cutting new entrances on a primary elevation.

Altering utilitarian or service entrances so they appear to be formal entrances by adding panelled doors, fanlights, and sidelights.

Failing to provide adequate protection to materials on a cyclical basis so that deterioration of entrances and porches results.

Failing to undertake adequate measures to assure the preservation of historic entrances and porches.
Recommended

Reparing entrances and porches by reinforcing the historic materials. Repair will also generally include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of repeated features where there are surviving prototypes such as balustrades, cornices, entablatures, columns, sidelights, and stairs.

Replacing in kind an entire entrance or porch that is too deteriorated to repair—if the form and detailing are still evident—using the physical evidence to guide the new work. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Not Recommended

Replacing an entire entrance or porch when the repair of materials and limited replacement of parts are appropriate.

Using a substitute material for the replacement parts that does not convey the visual appearance of the surviving parts of the entrance and porch or that is physically or chemically incompatible.

Removing an entrance or porch that is unrepairable and not replacing it; or replacing it with a new entrance or porch that does not convey the same visual appearance.

The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

Design for Missing Historic Features

Designing and constructing a new entrance or porch if the historic entrance or porch is completely missing. It may be a restoration based on historical, pictorial, and physical documentation, or it a new design that is compatible with the historic character of the building.

Creating a false historical appearance because the replaced entrance or porch is based on insufficient historical, pictorial, and physical documentation.

Introducing a new entrance or porch that is incompatible in size, scale, material, and color.

Alterations/Additions for the New Use

Designing enclosures for historic porches when required by the new use in a manner that preserves the historic character of the building. This can include using large sheets of glass and recessing the enclosure wall behind existing scrollwork, posts, and balustrades.

Enclosing porches in a manner that results in a diminution or loss of historic character such as using solid materials such as wood, stucco, or masonry.
<table>
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<tr>
<th>Recommended</th>
<th>Not Recommended</th>
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<tbody>
<tr>
<td>Designing and installing additional entrances, or porches when required for the new-use in a manner that preserves the historic character of the building, i.e., limiting such alteration to non-character-defining elevations.</td>
<td>Installing secondary service entrances and porches that are incompatible in size and scale with the historic building or obscure, damage, or destroy character-defining features.</td>
</tr>
</tbody>
</table>
Storefronts are quite often the focus of historic commercial buildings and can thus be extremely important in defining the overall historic character. Because storefronts also play a crucial role in a store's advertising and merchandising strategy to draw customers and increase business, they are often altered to meet the needs of a new business. Particular care is required in planning and accomplishing work on storefronts so that the building's historic character is preserved in the process of rehabilitation. For specific guidance on the subject Preservation Briefs: 11 should be consulted. (See Reading List and Ordering Information on pg. 58.)

**Recommended**

Identifying, retaining, and preserving storefronts—and their functional and decorative features—which are important in defining the overall historic character of the building such as display windows, signs, doors, transoms, kick plates, corner posts, and entablatures.

Protecting and maintaining masonry, wood, and architectural metals which comprise storefronts through appropriate treatments such as cleaning, rust removal, limited paint removal, and reapplication of protective coating systems.

**Not Recommended**

Removing or radically changing storefronts—and their features—which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Changing the storefront so that it appears residential rather than commercial in character.

Removing historic material from the storefront to create a recessed arcade.

Introducing coach lanterns, mansard overhangings, wood shakes, nonoperable shutters, and small-paned windows if they cannot be documented historically.

Changing the location of a storefront's main entrance.

Failing to provide adequate protection to materials on a cyclical basis so that deterioration of storefront features results.

Protecting storefronts against arson and vandalism before work begins by boarding up windows and installing alarm systems that are keyed into local protection agencies.

Permitting entry into the building through unsecured or broken windows and doors so that interior features and finishes are damaged through exposure to weather or through vandalism.

Stripping storefronts of historic material such as wood, cast iron, terra cotta, carrara glass, and brick.
**Recommended**

Evaluating the overall condition of storefront materials to determine whether more than protection and maintenance are required, that is, if repairs to features will be necessary.

Repairing storefronts by reinforcing the historic materials. Repairs will also generally include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of storefronts where there are surviving prototypes such as transoms, kick plates, pilasters, or signs.

Replacing in kind an entire storefront that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. If using the same material is not technically or economically feasible, then compatible substitute materials may be considered.

**Not Recommended**

Failing to undertake adequate measures to assure the preservation of the historic storefront.

Replacing an entire storefront when repair of materials and limited replacement of its parts are appropriate.

Using substitute material for the replacement parts that does not convey the same visual appearance as the surviving parts of the storefront or that is physically or chemically incompatible.

Removing a storefront that is unrepairable and not replacing it; or replacing it with a new storefront that does not convey the same visual appearance.

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**Design for Missing Historic Features**

Designing and constructing a new storefront when the historic storefront is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, materials, and colors of the historic building. Such a new design should generally be flush with the facade; and the treatment of secondary design elements, such as awnings or signs, kept as simple as possible. For example, new signs should fit flush with the existing features of the facade, such as the fascia board or cornice.

Creating a false historical appearance because the replaced storefront is based on insufficient historical, pictorial, and physical documentation.

Introducing a new design that is incompatible in size, scale, material, and color.

Using new illuminated signs; inappropriately scaled signs and logos; signs that project over the sidewalk unless they were a characteristic feature of the historic building; or other types of signs that obscure, damage, or destroy remaining character-defining features of the historic building.
If features of the structural system are exposed such as loadbearing brick walls, cast iron columns, roof trusses, posts and beams, vigas, or stone foundation walls, they may be important in defining the building's overall historic character. Unexposed structural features that are not character-defining or an entire structural system may nonetheless be significant in the history of building technology; therefore, the structural system should always be examined and evaluated early in the project planning stage to determine both its physical condition and its importance to the building's historic character or historical significance. See also Health and Safety Code Requirements.

<table>
<thead>
<tr>
<th>Recommended</th>
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<tbody>
<tr>
<td><strong>Identifying, retaining, and preserving</strong> structural systems—and individual features of systems—that are important in defining the overall historic character of the building, such as post and beam systems, trusses, summer beams, vigas, cast iron columns, above-grade stone foundation walls, or loadbearing brick or stone walls.</td>
<td>Removing, covering, or radically changing features of structural systems which are important in defining the overall historic character of the building so that, as a result, the character is diminished.</td>
</tr>
<tr>
<td></td>
<td>Putting a new use into the building which could overload the existing structural system; or installing equipment or mechanical systems which could damage the structure.</td>
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<td></td>
<td>Demolishing a loadbearing masonry wall that could be augmented and retained and replacing it with a new wall (i.e., brick or stone), using the historic masonry only as an exterior veneer.</td>
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<tr>
<td></td>
<td>Leaving known structural problems untreated such as deflection of beams, cracking and bowing of walls, or racking of structural members.</td>
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<tr>
<td></td>
<td>Utilizing treatments or products that accelerate the deterioration of structural material such as introducing urea–formaldehyde foam insulation into frame walls.</td>
</tr>
</tbody>
</table>
### Structural System (continued)

**Recommended**

<table>
<thead>
<tr>
<th>Protecting and maintaining the structural system by cleaning the roof gutters and downspouts; replacing roof flashing; keeping masonry, wood, and architectural metals in a sound condition; and assuring that structural members are free from insect infestation.</th>
</tr>
</thead>
</table>

Examining and evaluating the physical condition of the structural system and its individual features using non-destructive techniques such as X-ray photography.

**Repairing** the structural system by augmenting or upgrading individual parts or features. For example, weakened structural members such as floor framing can be spliced, braced, or otherwise supplemented and reinforced.

Replacing in kind—or with substitute material—those portions or features of the structural system that are either extensively deteriorated or are missing when there are surviving prototypes such as cast iron columns, roof rafters or trusses, or sections of loadbearing walls. Substitute material should convey the same form, design, and overall visual appearance as the historic feature; and, at a minimum, be equal to its loadbearing capabilities.

**Not Recommended**

<table>
<thead>
<tr>
<th>Failing to provide proper building maintenance on a cyclical basis so that deterioration of the structural system results.</th>
</tr>
</thead>
</table>

Utilizing destructive probing techniques that will damage or destroy structural material.

Upgrading the building structurally in a manner that diminishes the historic character of the exterior, such as installing strapping channels or removing a decorative cornice; or damages interior features or spaces.

Replacing a structural member or other feature of the structural system when it could be augmented and retained.

Installing a replacement feature that does not convey the same visual appearance, e.g., replacing an exposed wood summer beam with a steel beam.

Using substitute material that does not equal the loadbearing capabilities of the historic material and design or is otherwise physically or chemically incompatible.

The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

### Alterations/Additions for the New Use

Limiting any new excavations adjacent to historic foundations to avoid undermining the structural stability of the building or adjacent historic buildings.

Carrying out excavations or regrading adjacent to or within a historic building which could cause the historic foundation to settle, shift, or fail; or could have a similar effect on adjacent historic buildings.
Revised Structural System (continued)

**Recommended**

Correcting structural deficiencies in preparation for the new use in a manner that preserves the structural system and individual character-defining features.

Designing and installing new mechanical or electrical systems when required for the new use which minimize the number of cutouts or holes in structural members.

Adding a new floor when required for the new use if such an alteration does not damage or destroy the structural system or obscure damage, or destroy character-defining spaces, features, or finishes.

Creating an atrium or a light well to provide natural light when required for the new use in a manner that assures the preservation of the structural system as well as character-defining interior spaces, features, and finishes.

**Not Recommended**

Radically changing interior spaces or damaging or destroying features or finishes that are character-defining while trying to correct structural deficiencies in preparation for the new use.

Installing new mechanical and electrical systems or equipment in a manner which results in numerous cuts, splices, or alterations to the structural members.

Inserting a new floor when such a radical change damages a structural system or obscures or destroys interior spaces, features, or finishes.

Inserting new floors or furred-down ceilings which cut across the glazed areas of windows so that the exterior form and appearance of the windows are radically changed.

Damaging the structural system or individual features; or radically changing, damaging, or destroying character-defining interior spaces, features, or finishes in order to create an atrium or a light well.
An interior floor plan, the arrangement of spaces, and built-in features and applied finishes may be individually or collectively important in defining the historic character of the building. Thus, their identification, retention, protection, and repair should be given prime consideration in every rehabilitation project and caution exercised in pursuing any plan that would radically change character-defining spaces or obscure, damage or destroy interior features or finishes.

**Interior Spaces, Features, and Finishes**

**Recommended**

**Interior Spaces**

Identifying, retaining, and preserving a floor plan or interior spaces that are important in defining the overall historic character of the building. This includes the size, configuration, proportion, and relationship of rooms and corridors; the relationship of features to spaces; and the spaces themselves such as lobbies, reception halls, entrance halls, double parlors, theaters, auditoriums, and important industrial or commercial use spaces.

**Not Recommended**

Radically changing a floor plan or interior spaces—including individual rooms—which are important in defining the overall historic character of the building so that, as a result, the character is diminished.

Altering the floor plan by demolishing principal walls and partitions to create a new appearance.

Altering or destroying interior spaces by inserting floors, cutting through floors, lowering ceilings, or adding or removing walls.

Relocating an interior feature such as a staircase so that the historic relationship between features and spaces is altered.
**Interior Features and Finishes**

Identifying, **retaining, and preserving** interior features and finishes that are important in defining the overall historic character of the building, including columns, cornices, baseboards, fireplaces and mantels, paneling, light fixtures, hardware, and flooring; and wallpaper, plaster, paint, and finishes such as stenciling, marbling, and graining; and other decorative materials that accent interior features and provide color, texture, and patterning to walls, floors, and ceilings.

**Recommended**

- Removing or radically changing features and finishes which are important in defining the overall historic character of the building so that, as a result, the character is diminished.
- Installing new decorative material that obscures or damages character-defining interior features or finishes.
- Removing paint, plaster, or other finishes from historically finished surfaces to create a new appearance (e.g., removing plaster to expose masonry surfaces such as brick walls or a chimney piece).
- Applying paint, plaster, or other finishes to surfaces that have been historically unfinished to create a new appearance.
- Stripping historically painted wood surfaces to bare wood, then applying clear finishes or stains to create a "natural look."
- Stripping paint to bare wood rather than repairing or reapplying grained or marbled finishes to features such as doors and paneling.
- Radically changing the type of finish or its color, such as painting a previously varnished wood feature.
- Failing to provide adequate protection to materials on a cyclical basis so that deterioration of interior features results.

**Not Recommended**

Protecting and maintaining masonry, wood, and architectural metals which comprise interior features through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and reapplication of protective coatings systems.
Interior Features and Finishes (continued)

**Recommended**

Protecting interior features and finishes against arson and vandalism before project work begins, erecting protective fencing, boarding-up windows, and installing fire alarm systems that are keyed to local protection agencies.

Protecting interior features such as a staircase, mantel, or decorative finishes and wall coverings against damage during project work by covering them with heavy canvas or plastic sheets.

Installing protective coverings in areas of heavy pedestrian traffic to protect historic features such as wall coverings, parquet flooring and panelling.

Removing damaged or deteriorated paints and finishes to the next sound layer using the gentlest method possible, then repainting or refinishing using compatible paint or other coating systems.

Repainting with colors that are appropriate to the historic building.

Limiting abrasive cleaning methods to certain industrial or warehouse buildings where the interior masonry or plaster features do not have distinguishing design, detailing, tooling, or finishes; and where wood features are not finished, molded, beaded, or worked by hand. Abrasive cleaning should only be considered after other, gentler methods have been proven ineffective.

Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, that is, if repairs to interior features and finishes will be necessary.

**Not Recommended**

Permitting entry into historic buildings through unsecured or broken windows and doors so that interior features and finishes are damaged by exposure to weather or through vandalism.

Stripping interiors of features such as woodwork, doors, windows, light fixtures, copper piping, radiators; or of decorative materials.

Failing to provide proper protection of interior features and finishes during work so that they are gouged, scratched, dented, or otherwise damaged.

Failing to take new use patterns into consideration so that interior features and finishes are damaged.

Using destructive methods such as propane or butane torches or sandblasting to remove paint or other coatings. These methods can irreversibly damage the historic materials that comprise interior features.

Using new paint colors that are inappropriate to the historic building.

Changing the texture and patina of character-defining features through sandblasting or use of other abrasive methods to remove paint, discoloration or plaster. This includes both exposed wood (including structural members) and masonry.

Failing to undertake adequate measures to assure the preservation of interior features and finishes.
Repairs indicated my preservation concerns. Designing and installing a new interior feature or finish is completely missing. Creating a false historical appearance because the replaced feature is based on insufficient physical, historical, and pictorial documentation or on information derived from another building.

### Interior Features and Finishes (continued)

<table>
<thead>
<tr>
<th>Recommended</th>
<th>Not Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repairing interior features and finishes by reinforcing the historic materials. Repair will also generally include the limited replacement in kind--or with compatible substitute material--of those extensively deteriorated or missing parts of repeated features when there are surviving prototypes such as stairs, balustrades, wood panelling, columns; or decorative wall coverings or ornamental tin or plaster ceilings.</td>
<td>Replacing an entire interior feature such as a staircase, panelled wall, parquet floor, or cornice; or finish such as a decorative wall covering or ceiling when repair of materials and limited replacement of such parts are appropriate.</td>
</tr>
<tr>
<td>Replacing in kind an entire interior feature or finish that is too deteriorated to repair--if the overall form and detailing are still evident--using the physical evidence to guide the new work. Examples could include wainscoting, a tin ceiling, or interior stairs. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.</td>
<td>Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts or portions of the interior feature or finish or that is physically or chemically incompatible.</td>
</tr>
<tr>
<td>The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.</td>
<td>Removing a character-defining feature or finish that is unrepairable and not replacing it; or replacing it with a new feature or finish that does not convey the same visual appearance.</td>
</tr>
</tbody>
</table>

**Design for Missing Historic Features**

Creating a new interior feature or finish that is incompatible with the scale, design, materials, color, and texture of the surviving interior features and finishes.
Alterations/Additions for the New Use

Not Recommended

Recommended

Accommodating service functions such as bathrooms, mechanical equipment, and office machines required by the building's new use in secondary spaces such as first floor service areas or on upper floors.

Reusing decorative material or features that have had to be removed during the rehabilitation work including wall and baseboard trim, door moulding, panelled doors; and simple wainscoting; and relocating such material or features in areas appropriate to their historic placement.

Installing permanent partitions in secondary spaces; removable partitions that do not destroy the sense of space should be installed when the new use requires the subdivision of character-defining interior spaces.

Enclosing an interior stairway where required by code so that its character is retained. In many cases, glazed fire-rated walls may be used.

Placing new code-required stairways or elevators in secondary and service areas of the historic building.

Creating an atrium or a light well to provide natural light when required for the new use in a manner that preserves character-defining interior spaces, features, and finishes as well as the structural system.

Adding a new floor if required for the new use in a manner that preserves character-defining structural features and interior spaces, features, and finishes.

Dividing rooms, lowering ceiling's, and damaging or obscuring character-defining features such as fireplaces, niches, stairways or alcoves, so that a new use can be accommodated in the building.

Discarding historic material when it can be reused within the rehabilitation project or relocating it in historically inappropriate areas.

Installing permanent partitions that damage or obscure character-defining spaces, features, or finishes.

Enclosing an interior stairway with fire-rated construction so that the stairwell space or any character-defining features are destroyed.

Radically changing, damaging, or destroying character-defining spaces, features, or finishes when adding new code-required stairways and elevators.

Destroying character-defining interior spaces, features, or finishes; or damaging the structural system in order to create an atrium or light well.

Inserting a new floor within a building that alters or destroys the fenestration; radically changes a character-defining interior space; or obscures, damages, or destroys decorative detailing.
Mechanical Systems: Heating, Air Conditioning, Electrical, and Plumbing

The visible features of historic heating, lighting, air conditioning and plumbing systems may sometimes help define the overall historic character of the building and should thus be retained and repaired, whenever possible. The systems themselves (the compressors, boilers, generators and their ductwork, wiring and pipes) will generally either need to be upgraded, augmented, or entirely replaced in order to accommodate the new use and to meet code requirements. Less frequently, individual portions of a system or an entire system are significant in the history of building technology; therefore, the identification of character-defining features or historically significant systems should take place together with an evaluation of their physical condition early in project planning.

<table>
<thead>
<tr>
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<th>Not Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Identifying</strong>, retaining, and preserving visible features of early mechanical systems that are important in defining the overall historic character of the building, such as radiators, vents, fans, grilles, plumbing fixtures, switchplates, and lights.</td>
<td>Removing or radically changing features of mechanical systems that are important in defining the overall historic character of the building so that, as a result, the character is diminished.</td>
</tr>
</tbody>
</table>

**Protecting** and maintaining mechanical, plumbing, and electrical systems and their features through cyclical cleaning and other appropriate measures.

Failing to provide adequate protection of materials on a cyclical basis so that deterioration of mechanical systems and their visible features results.

Preventing accelerated deterioration of mechanical systems by providing adequate ventilation of attics, crawlspaces, and cellars so that moisture problems are avoided.

Enclosing mechanical systems in areas that are not adequately ventilated so that deterioration of the systems results.

**Repairing** mechanical systems by augmenting or upgrading system parts, such as installing new pipes and ducts; rewiring; or adding new compressors or boilers.

Replacing a mechanical system or its functional parts when it could be upgraded and retained.
Mechanical Systems (continued)

**Recommended**

**Replacing** in kind—or with compatible substitute material—those visible features of mechanical systems that are either extensively deteriorated or are missing when there are surviving prototypes such as ceiling fans, switchplates, radiators, grilles, or plumbing fixtures.

The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

**Alterations/Additions for the New Use**

- Installing a completely new mechanical system if required for the new use so that it causes the least alteration possible to the building's floor plan, the exterior elevations, and the least damage to historic building material.

- Installing the vertical runs of ducts, pipes, and cables in closets, service rooms, and wall cavities.

- Installing air conditioning units if required by the new use in such a manner that the historic materials and features are not damaged or obscured.

- Installing heating/air conditioning units in the window frames in such a manner that the cash and frames are protected. Window installations should be considered only when all other viable heating/cooling systems would result in significant damage to historic materials.

**Not Recommended**

- Installing a replacement feature that does not convey the same visual appearance.

- Installing a new mechanical system so that character-defining structural or interior features are radically changed, damaged, or destroyed.

- Installing vertical runs of ducts, pipes, and cables in places where they will obscure character-defining features.

- Concealing mechanical equipment in walls or ceilings in a manner that requires the removal of historic building material.

- Installing "dropped" acoustical ceilings to hide mechanical equipment when this destroys the proportions of character-defining interior spaces.

- Cutting through features such as masonry walls in order to install air conditioning units.

- Radically changing the appearance of the historic building or damaging or destroying windows by installing heating/air conditioning units in historic window frames.
**BUILDING SITE**

The relationship between a historic building or buildings and landscape features within a property's boundaries--or the building site--helps to define the historic character and should be considered an integral part of overall planning for rehabilitation project work.

<table>
<thead>
<tr>
<th>Recommended</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Identifying, retaining, and preserving</strong> buildings and their features as well as features of the site that are important in defining its overall historic character. Site features can include driveways, walkways, lighting, fencing, signs, benches, fountains, wells, terraces, canal systems, plants and trees, berms, and drainage or irrigation ditches; and archaeological features that are important in defining the history of the site.</td>
<td></td>
</tr>
<tr>
<td>Retaining the historic relationship between buildings, landscape features, and open space.</td>
<td></td>
</tr>
<tr>
<td>Removing or radically changing buildings and their features or site features which are important in defining the overall historic character of the building site so that, as a result, the character is diminished.</td>
<td></td>
</tr>
</tbody>
</table>

| Protecting and maintaining buildings and the site by providing proper drainage to assure that water does not erode foundation walls; drain toward the building; nor erode the historic landscape. |
| Removing or relocating historic buildings on a site or in a complex of related historic structures--such as a mill complex or farm--thus diminishing the historic character of the site or complex. |
| Moving buildings onto the site, thus creating a false historical appearance. |
| Lowering the grade level adjacent to a building to permit development of a formerly below-grade area such as a basement in a manner that would drastically change the historic relationship of the building to its site. |
| Failing to maintain site drainage so that buildings and site features are damaged or destroyed; or, alternatively, changing the site grading so that water no longer drains properly. |
### Recommended

- Minimizing disturbance of terrain around buildings or elsewhere on the site, thus reducing the possibility of destroying unknown archeological materials.
- Surveying areas where major terrain alteration is likely to impact important archeological sites.
- Protecting, e.g., preserving in place known archeological material whenever possible.
- Planning and carrying out any necessary investigation using professional archeologists and modern archeological methods when preservation in place is not feasible.
- Protecting the building and other features of the site against arson and vandalism before rehabilitation work begins, i.e., erecting protective fencing and installing alarm systems that are keyed into local protection agencies.
- Providing continued protection of masonry, wood, and architectural metals which comprise building and site features through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and re-application of protective coating systems; and continued protection and maintenance of landscape features, including plant material.
- Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, that is, if repairs to building and site features will be necessary.

### Not Recommended

- Introducing heavy machinery or equipment into areas where their presence may disturb archeological materials.
- Failing to survey the building site prior to the beginning of rehabilitation project work so that, as a result, important archeological material is destroyed.
- Leaving known archeological material unprotected and subject to vandalism, looting, and destruction by natural elements such as erosion.
- Permitting unqualified project personnel to perform data recovery so that improper methodology results in the loss of important archeological material.
- Permitting buildings and site features to remain unprotected so that plant materials, fencing, walkways, archeological features, etc. are damaged or destroyed.
- Stripping features from buildings and the site such as wood siding, iron fencing, masonry balustrades; or removing or destroying landscape features, including plant material.
- Failing to provide adequate protection of materials on a cyclical basis so that deterioration of building and site features results.
- Failing to undertake adequate measures to assure the preservation of building and site features.
**Recommended**

**Repairing** features of buildings and the site by reinforcing the historic materials. Repair will also generally include replacement in kind—without a compatible substitute material—of those extensively deteriorated or missing parts of features where there are surviving prototypes such as fencing and paving.

**Replacing** in kind an entire feature of the building or site that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence to guide the new work. This could include an entrance or porch, walkway, or fountain. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation project work and should only be considered after the preservation concerns listed above have been addressed.

**Design for Missing Historic Features**

Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial, and physical documentation.

Introducing a new building or site feature that is out of scale or otherwise inappropriate.

Introducing a new landscape feature or plant material that is visually incompatible with the site or that destroys site patterns or vistas.

**Not Recommended**

Replacing an entire feature of the building or site such as a fence, walkway, or driveway when repair of materials and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the building or site feature or that is physically or chemically incompatible.

Removing a feature of the building or site that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.
Building Site (continued)

Recommended

Alterations/Additions for the New Use

Designing new onsite parking, loading docks, or ramps when required by the new use so that they are as unobtrusive as possible and assure the preservation of character-defining features of the site.

Designing new exterior additions to historic buildings or adjacent new construction which is compatible with the historic character of the site and which preserve the historic relationship between a building or buildings, landscape features, and open space.

Removing nonsignificant buildings, additions, or site features which detract from the historic character of the site.

Not Recommended

Placing parking facilities directly adjacent to historic buildings where automobiles may cause damage to the buildings or landscape features or be intrusive to the building site.

Introducing new construction onto the building site which is visually incompatible in terms of size, scale, design, materials, color and texture or which destroys historic relationships on the site.

Removing a historic building in a complex, a building feature, or a site feature which is important in defining the historic character of the site.
The relationship between historic buildings, and streetscape and landscape features within a historic district or neighborhood helps to define the historic character and therefore should always be a part of the rehabilitation plans.

**Recommended**

**Identifying, retaining, and preserving** buildings, and streetscape, and landscape features which are important in defining the overall historic character of the district or neighborhood. Such features can include streets, alleys, paving, walkways, street lights, signs, benches, parks and gardens, and trees.

Retaining the historic relationship between buildings, and streetscape and landscape features such as a town square comprised of row houses and stores surrounding a communal park or open space.

**Protecting and maintaining** the historic masonry, wood, and architectural metals which comprise building and streetscape features, through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and reapplication of protective coating systems; and protecting and maintaining landscape features, including plant material.

Protecting buildings, paving, iron fencing, etc. against arson and vandalism before rehabilitation work begins by erecting protective fencing and installing alarm systems that are keyed into local protection agencies.

**Not Recommended**

Removing or radically changing those features of the district or neighborhood which are important in defining the overall historic character so that, as a result, the character is diminished.

Destroying streetscape and landscape features by widening existing streets, changing paving material, or introducing inappropriately located new streets or parking lots.

Removing or relocating historic buildings, or features of the streetscape and landscape, thus destroying the historic relationship between buildings, features and open space.

Failing to provide adequate protection of materials on a cyclical basis so that deterioration of building, streetscape, and landscape features results.

Permitting buildings to remain unprotected so that windows are broken; and interior features are damaged.

Stripping features from buildings or the streetscape such as wood siding, iron fencing, or terra cotta balusters; or removing or destroying landscape features, including plant material.
<table>
<thead>
<tr>
<th>Recommended</th>
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</tr>
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<tbody>
<tr>
<td>Evaluating the overall condition of building, streetscape and landscape materials to determine whether more than protection and maintenance are required, that is, if repairs to features will be necessary.</td>
<td>Failing to undertake adequate measures to assure the preservation of building, streetscape, and landscape features.</td>
</tr>
</tbody>
</table>

**Repairing** features of the building, streetscape, or landscape by reinforcing the historic materials. Repair will also generally include the replacement in kind—or with a compatible substitute material—of those extensively deteriorated or missing parts of features when there are surviving prototypes such as porch balustrades, paving materials, or streetlight standards.

**Replacing** in kind an entire feature of the building, streetscape, or landscape that is too deteriorated to repair—when the overall form and detailing are still evident—using the physical evidence to guide the new work. This could include a storefront, a walkway, or a garden. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Replacing an entire feature of the building, streetscape, or landscape such as a porch, walkway, or streetlight, when repair of materials and limited replacement of deteriorated or missing parts are appropriate.

Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the building, streetscape, or landscape feature or that is physically or chemically incompatible.

Removing a feature of the building, streetscape, or landscape that is unrepairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

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The following work is highlighted to indicate that it represents the particularly complex technical or design aspects of rehabilitation projects and should only be considered after the preservation concerns listed above have been addressed.

**Design for Missing Historic Features**

Designing and constructing a new feature of the building, streetscape, or landscape when the historic feature is completely missing, such as row house steps, a porch, streetlight, or terrace. It may be a restoration based on historical, pictorial, and physical documentation, or be a new design that is compatible with the historic character of the district or neighborhood.

Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial and physical documentation.

Introducing a new building, streetscape or landscape feature that is out of scale or otherwise inappropriate to the setting's historic character, e.g., replacing picket fencing with chain link fencing.
### Alterations/Additions for the New Use

**Recommended**

Designing required new parking so that it is as unobtrusive as possible, i.e., on side streets or at the rear of buildings. "Shared" parking should also be planned so that several businesses can utilize one parking area as opposed to introducing random, multiple lots.

Designing and constructing new additions when required by the new use. New work should be compatible with the historic character of the district or neighborhood in terms of size, scale, design, material, color, and so forth.

Removing nonsignificant buildings, additions, or streetscape and landscape features which detract from the historic character of the district or the neighborhood.

**Not Recommended**

Placing parking facilities directly adjacent to historic buildings which cause the removal of historic plantings, relocation of paths and walkways, or blocking of alleys.

Introducing new construction into historic districts that is visually incompatible or that destroys historic relationships within the district or neighborhood.

Removing a historic building, building feature, or landscape or streetscape feature that is important in defining the overall historic character of the district or the neighborhood.
Although the work in these sections is quite often an important aspect of rehabilitation projects, it is usually not part of the overall process of preserving character-defining features (maintenance, repair, replacement); rather, such work is assessed for its potential negative impact on the building’s historic character. For this reason, particular care must be taken not to obscure, radically change, damage, or destroy character-defining features in the process of rehabilitation work to meet new use requirements.
HEALTH AND SAFETY CODE REQUIREMENTS

As a part of the new use, it is often necessary to make modifications to a historic building so that it can comply with current health, safety, and code requirements. Such work needs to be carefully planned and undertaken so that it does not result in a loss of character-defining spaces, features, and finishes.

**Recommended**

Identifying the historic building's character-defining spaces, features, and finishes so that code-required work will not result in their damage or loss.

Complying with health and safety codes, including seismic codes and barrier-free access requirements, in such a manner that character-defining spaces, features, and finishes are preserved.

Working with local code officials to investigate alternative life safety measures or variances available under some codes so that alterations and additions to historic buildings can be avoided.

Providing barrier-free access through removable or portable, rather than permanent, ramps.

Providing seismic reinforcement to a historic building in a manner that avoids damaging the structural system and character-defining features.

Upgrading historic stairways and elevators to meet health and safety codes in a manner that assures their preservation, i.e., so that they are not damaged or obscured.

Installing sensitively designed fire suppression systems, such as a sprinkler system for wood frame mill buildings, instead of applying fire-resistant sheathing to character-defining features.

**Not Recommended**

Undertaking code-required alterations to a building or site before identifying those spaces, features, or finishes which are character-defining and must therefore be preserved.

Altering, damaging, or destroying character-defining spaces, features, and finishes while making modifications to a building or site to comply with safety codes.

Making changes to historic buildings without first seeking alternatives to code requirements.

Installing permanent ramps that damage or diminish character-defining features.

Reinforcing a historic building using measures that damage or destroy character-defining structural and other features.

Damaging or obscuring historic stairways and elevators or altering adjacent spaces in the process of doing work to meet code requirements.

Covering character-defining wood features with fire-resistant sheathing which results in altering their visual appearance.
<table>
<thead>
<tr>
<th><strong>Recommended</strong></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Applying fire-retardant coatings, such as intumescent paints, which expand during fire to add thermal protection to steel.</td>
<td>Using fire-retardant coatings if they damage or obscure character-defining features.</td>
</tr>
<tr>
<td>Adding a new stairway or elevator to meet health and safety codes in a manner that preserves adjacent character-defining features and spaces.</td>
<td>Radically changing, damaging, or destroying character-defining spaces, features, or finishes when adding a new code-required stairway or elevator.</td>
</tr>
<tr>
<td>Placing a code-required stairway or elevator that cannot be accommodated within the historic building in a new exterior addition. Such an addition should be located at the rear of the building or on an inconspicuous side; and its size and scale limited in relationship to the historic building.</td>
<td>Constructing a new addition to accommodate code-required stairs and elevators on character-defining elevations highly visible from the street; or where it obscures, damages or destroys character-defining features.</td>
</tr>
</tbody>
</table>
ENERGY RETROFITTING

Some character-defining features of a historic building or site such as cupolas, shutters, transoms, skylights, sun rooms, porches, and plantings also play a secondary energy conserving role. Therefore, prior to retrofitting historic buildings to make them more energy efficient, the first step should always be to identify and evaluate the existing historic features to assess their inherent energy conserving potential. If it is determined that retrofitting measures are necessary, then such work needs to be carried out with particular care to insure that the building's historic character is preserved in the process of rehabilitation.

**Recommended**

**District/Neighborhood**

Maintaining those existing landscape features which moderate the effects of the climate on the setting such as deciduous trees, evergreen wind-blocks, and lakes or ponds.

**Building Site**

Retaining plant materials, trees, and landscape features, especially those which perform passive solar energy functions such as sun shading and wind breaks.

Installing freestanding solar collectors in a manner that preserves the historic property's character-defining features.

Designing attached solar collectors, including solar greenhouses, so that the character-defining features of the property are preserved.

**Not Recommended**

Stripping the setting of landscape features and landforms so that the effects of the wind, rain, and the sun result in accelerated deterioration of historic materials.

Removing plant materials, trees, and landscape features, so that they no longer perform passive solar energy functions.

Installing freestanding solar collectors that obscure, damage, or destroy historic landscape or archeological features.

Locating solar collectors where they radically change the property's appearance; or damage or destroy character-defining features.
ENERGY RETROFITTING (continued)

<table>
<thead>
<tr>
<th>Masonry/Wood/Architectural Metals</th>
<th>Not Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installing thermal insulation in attics and in unheated cellars and crawlspaces to increase the efficiency of the existing mechanical systems.</td>
<td>Applying urea formaldehyde foam or any other thermal insulation with a water content into wall cavities in an attempt to reduce energy consumption.</td>
</tr>
<tr>
<td>Installing insulating material on the inside of masonry walls to increase energy efficiency where there is no character-defining interior moulding around the window or other interior architectural detailing.</td>
<td>Resurfacing historic building materials with more energy efficient but incompatible materials, such as covering historic masonry with exterior insulation.</td>
</tr>
<tr>
<td>Installing passive solar devices such as a glazed &quot;trombe&quot; wall on a rear or inconspicuous side of the historic building.</td>
<td>Installing passive solar devices such as an attached glazed &quot;trombe&quot; wall on primary or other highly visible elevations; or where historic material must be removed or obscured.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Woofs</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Placing solar collectors on non-character-defining roofs or roofs of nonhistoric adjacent buildings.</td>
<td>Placing solar collectors on roofs when such collectors change the historic roofline or obscure the relationship of the roof to character-defining roof features such as dormers, skylights, and chimneys.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Windows</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilizing the inherent energy conserving features of a building by maintaining windows and louvered blinds in good operable condition for natural ventilation.</td>
<td>Removing historic shading devices rather than keeping them in an operable condition.</td>
</tr>
<tr>
<td>Improving thermal efficiency with weatherstripping, storm windows, caulking, interior shades, and, if historically appropriate, blinds and awnings.</td>
<td>Replacing historic multi-paned sash with new thermal sash utilizing false muntins.</td>
</tr>
<tr>
<td>Installing interior storm windows with air-tight gaskets, ventilating holes, and/or removable clips to insure proper maintenance and to avoid condensation damage to historic windows.</td>
<td>Installing interior storm windows that allow moisture to accumulate and damage the window.</td>
</tr>
</tbody>
</table>
**ENERGY RETROFITTING**

Windows (continued)

**Recommended**

Installing exterior storm windows which do not damage or obscure the windows and frames. *

Considering the use of lightly tinted glazing on non-character-defining elevations if other energy retrofitting alternatives are not possible.

**Not Recommended**

Installing new exterior storm windows which are inappropriate in size or color, which are inoperable.

Replacing windows or transoms with fixed thermal glazing or permitting windows and transoms to remain inoperable rather than utilizing them for their energy conserving potential.

Using tinted or reflective glazing on character-defining or other conspicuous elevations.

**Entrances and Porches**

Utilizing the inherent energy conserving features of a building by maintaining porches, and double vestibule entrances, in good condition so that they can retain heat or block the sun and provide natural ventilation.

Enclosing porches located on character-defining elevations to create passive solar collectors or **airlock** vestibules. Such enclosures can destroy the historic appearance of the building.

**Interior Features**

Retaining historic interior shutters and transoms for their inherent energy conserving features.

Removing historic interior features which play a secondary energy conserving role.

**New Additions to Historic Buildings**

Placing new additions that have an energy conserving function such as a solar greenhouse on non-character-defining elevations.

Installing new additions such as multi-story solar greenhouse additions which obscure, damage, destroy character-defining features.

**Mechanical Systems**

Installing thermal insulation in attics and in unheated cellars and crawlspacesto conserve energy.

Applying urea formaldehyde foam or any other thermal insulation with a water content or that may collect moisture into wall cavities.
**NEW ADDITIONS TO HISTORIC BUILDINGS**

An attached exterior addition to a historic building expands its "outer limits" to create a new profile. Because such expansion has the capability to radically change the historic appearance, an exterior addition should be considered only after it has been determined that the new use cannot be successfully met by altering non-character-defining interior spaces. If the new use cannot be met in this way, then an attached exterior addition is usually an acceptable alternative. New additions should be designed and constructed so that the character-defining features of the historic building are not radically changed, obscured, damaged, or destroyed in the process of rehabilitation. New design should always be clearly differentiated so that the addition does not appear to be part of the historic resource.

<table>
<thead>
<tr>
<th><strong>Recommended</strong></th>
<th><strong>Not Recommended</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Placing functions and services required for the new use in non-character-defining interior spaces rather than installing a new addition.</td>
<td>Expanding the size of the historic building by constructing a new addition when the new use could be met by altering non-character-defining interior spaces.</td>
</tr>
<tr>
<td>Constructing a new addition so that there is the least possible loss of historic materials and so that character-defining features are not obscured, damaged, or destroyed.</td>
<td>Attaching a new addition so that the character-defining features of the historic building are obscured, damaged, or destroyed.</td>
</tr>
<tr>
<td>Locating the attached exterior addition at the rear or on an inconspicuous side of a historic building; and limiting its size and scale in relationship to the historic building.</td>
<td>Designing a new addition so that its size and scale in relation to the historic building are out of proportion, thus diminishing the historic character.</td>
</tr>
<tr>
<td>Designing new additions in a manner that makes clear what is historic and what is new.</td>
<td>Duplicating the exact form, material, style, and detailing of the historic building in the new addition so that the new work appears to be part of the historic building.</td>
</tr>
<tr>
<td></td>
<td>Imitating a historic style or period of architecture in new additions, especially for contemporary uses such as drive-in banks or garages.</td>
</tr>
</tbody>
</table>
**Recommended**

Considering the attached exterior addition both in terms of the new use and the appearance of other buildings in the historic district or neighborhood. Design for the new work may be contemporary or may reference design motifs from the historic building. In either case, it should always be clearly differentiated from the historic building and be compatible in terms of mass, materials, relationship of solids to voids, and color.

Placing new additions such as balconies and greenhouses on non-character-defining elevations and limiting the size and scale in relationship to the historic building.

Designing additional stories, when required for the new use, that are set back from the wall plane and are as inconspicuous as possible when viewed from the street.

**Not Recommended**

Designing and constructing new additions that result in the diminution or loss of the historic character of the resource, including its design, materials, workmanship, location, or setting.

Using the same wall plane, roof line, cornice height, materials, siding lap or window type to make additions appear to be a part of the historic building.

Designing new additions such as multi-story greenhouse additions that obscure, damage, or destroy character-defining features of the historic building.

Constructing additional stories so that the historic appearance of the building is radically changed.
READING LIST AND ORDERING INFORMATION

Preservation Tax Incentives Program Information


Preservation Briefs are prepared for property owners, developers, or Federal agency managers to assist in evaluating and resolving common preservation and repair problems. The briefs are often given to preservation tax incentives program applicants to help explain recommended historic preservation method and approaches in the rehabilitation of historic buildings. Copies, except where noted, are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. GPO prices are subject to change without notice.


Preservation Briefs: 3. Conserving Energy in Historic Buildings by Baird M. Smith, AIA. Provides information on materials and techniques to consider or avoid when undertaking weatherization and energy conservation measures in historic buildings. 8 pages. 8 illus. April, 1978. GPO Stock Number: 024-016-00103-6: 1-100 copies, $2.25 each; multiples of 100, $22.


* Unavailable from the Government Printing Office. Single copies available from the National Park Service Regional Offices (see Introduction to Guidelines).
Preservation Briefs: 6. Dangers of Abrasive Cleaning to Historic Buildings by Anne E. Grimmer. Cautions against the use of sandblasting to clean various buildings and suggests measures to mitigate the effects of improper cleaning. Explains the limited circumstances under which abrasive cleaning may be appropriate. 8 pages. 10 illus. June, 1979. GPO Stock Number: 024-016-00112-5: 1-100 copies, $2.25 each; multiples of 100, $22.


Technical Reports address in detail technical problems confronted by architects, engineers, government officials, and other technicians involved with the preservation of historic buildings. Copies, except where noted, are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. GPO prices are subject to change without notice.

Access to Historic Building for the Disabled: Suggestions for Planning and Implementation by Charles Parrott. Addresses the special concerns of improved access by disabled persons to historic buildings, as well as legal requirements and compliance planning procedures. Also examines techniques to make programs and services housed in historic buildings accessible in lieu of architectural changes. 92 pages. 42 illus. 1980. GPO Stock Number: 024-016-00149-4. $5.50.

** Directory of Historic Preservation Easement Organizations compiled by Charles E. Fisher, William G. MacRostie, and Christopher A. Sowick. Lists over 185 organizations throughout the nation who are willing to accept historic preservation easements. 23 pages. 3 illus. Rev., December, 1981.

_Epoxies for Wood Repairs in Historic Buildings_ by Morgan W. Phillips and Judith E. Selwyn. Presents research findings on the formulations of epoxy consolidants and patching compounds for use on wooden elements in preservation projects, including case study applications. 72 pages. 43 illus. Appendix. 1978. GPO Stock Number: 024-016-00095-1. $5.00.


_Metals in America's Historic Buildings: Uses and Preservation Methods_ by Margot Gayle and David W. Look, AIA (Part I); and John Waite (Part II). Concentrates on the historic uses of such architectural metals as lead, tin, zinc, copper, nickel, iron, steel, and aluminum (Part I). Also discusses the sources of metal deterioration and suggests appropriate preservation and maintenance techniques, addressing each metal individually (Part II). 170 pages. 180 illus. 1980. GPO Stock Number 024-016-00143-5. $7.00.

** Moving Historic Buildings by John Obed Curtis. Discusses the limited circumstances under which a historic masonry or frame building should be moved; establishes a methodology for planning, research, and recording prior to the move; and addresses the actual siting, foundation construction, building reassembly, and restoration after a successful move has taken place. 56 pages. 47 illus. Selected bibliography. 1979.

** Photogrammetric Recording of Cultural Resources by Perry E. Borchers. Describes the basic principles of photogrammetry and their application to the recording of cultural resources. 38 pages. 28 illus. 1977.


** Unavailable from the Government Printing Office. Requests for single copies may be sent to Technical Preservation Services, Preservation Assistance Division, National Park Service, Washington, D.C. 20240. Due to limited stock, copies of all materials requested may not be available.

Wallpapers in Historic Preservation by Catherine Lynn Frangiamore. Surveys the technology, styles, and uses of wallpapers in America with suggestions for using wallpaper within a restoration project. 56 pages. 39 illus. Appendices. 1977. GPO Stock Number: 024-005-00685-1. $5.00.


** Unavailable from the Government Printing Office. Requests for single copies may be sent to: Technical Preservation Services, Preservation Assistance Division, National Park Service, Washington, D.C. 20240. Due to limited stock, copies of all materials requested may not be available.

TPS Publications: Outside The Government Printing Office
Some of the publications TPS has developed have been printed by the private sector and are only available from these non-governmental sources. The following list includes the sources' addresses:


Introduction

The Preservation Assistance Division (PAD) of the National Park Service is responsible for developing standards and guidelines for the treatment of historic resources listed on or eligible for the National Register of Historic Places. The Secretary of the Interior's Standards for Historic Preservation Projects provide general objectives and principles which prescribe the scope and appropriateness of such work for seven treatments: acquisition, stabilization, protection, preservation, rehabilitation, restoration and rehabilitation. Selecting a project work treatment involves selection of specific standards that correspond to the work and can thus guide it to a consistent end.

The scope of work considered appropriate necessarily differs in these treatments. For example, both protection and stabilization seek to arrest deterioration -- often preparatory to other work -- without extensive repairs and replacement of the property's existing materials and features. Preservation calls for repair and maintenance of existing historic materials; in the case of landscapes, this could involve the constant removal of unwanted plant material in order to retain the existing landscape form. Rehabilitation may be the most common treatment today, even in historic landscapes, as it calls for repair and limited replacement of deteriorated or missing features, and permits new construction in order to accommodate a new use. Restoration, by definition, involves removal of later historic features and replacement of missing earlier features in order illustrate a particular period of significance to the public. For restoration as well as reconstruction, which provides for construction of a vanished historic property, thorough documentation is required.

The rehabilitation standards, used primarily for the Federal tax credits program, were revised in the spring of 1990. At present, NPS is considering revisions to the other standards to make them consistent with the rehabilitation standards, and to ensure that the standards work as well for landscapes as they do for buildings and archeological resources. The draft revised standards are included for your information.

PAD is also developing specific guidance for the treatment of historic landscapes. The Guidelines for the Treatment of Historic Landscapes will interpret the general standards, providing specific work examples and suggestions for work projects for all treatments. Used together, standards and guidelines will provide much needed direction for landscape architects, managers, administrators, planners, and academics who are planning and undertaking work on historic landscapes.

Approach

Standards

An approach has been adopted that calls for general and specific standards that can be applied to all historic properties. To this end, the NPS recommends that the term "historic property" be used to encompass the individual resource types such as buildings, structures, landscapes, objects, or archeological sites.

The revised specific standards for six of the seven work treatments (protection, stabilization, preservation, restoration and reconstruction) include language and principles that reference historic landscapes, but apply to all historic properties. Finally, a change to the March 1990 revised rehabilitation standards is proposed that would alter standard 1, which addresses the continuing or new use of a property. The revision deletes the phrase "of the building and its site and environment" and replaces it with "of the property and environment." This revision makes the standard apply evenly to all historic properties, eliminating the perceived emphasis on buildings.

Guidelines

The NPS will also develop a "handbook" which provides guidance for the treatment of historic landscapes. The handbook will include guidelines similar to the rehabilitation guidelines developed for historic buildings. It is our intent that the handbook include a narrative introduction which addresses topics such as integrity, significance, and choosing the appropriate treatment; the revised standards; and guidelines for applying the treatments to landscape features. We propose that the Guidelines be organized by landscape feature, including examples from all preservation treatments. The guidelines will be illustrated with diagrams, photographs, and drawings. A draft outline of the handbook is attached.
Schedule/Process for the Standards and Landscape Guidelines

1. The enclosed draft standards were distributed in August to State Historic Preservation Offices, municipal offices, professional organizations (including the ASLA Open Committee on Historic Preservation), and NPS Regions for review and comment. This initial deadline has passed, but opportunities still exist for additional input. If you are interested in submitting comments, please contact the ASLA Open Committee Co-chairs, Patricia O'Donnell and Noel Vernon.

2. NPS will revise the draft standards based on comments and suggestions (Late Fall 1990)

3. NPS will host an historic landscape symposium to discuss the revised standards and landscape guidelines (Winter 1991)

4. NPS will prepare symposium proceedings (Late Winter 1991)

5. Draft revised standards will be published in the Federal Register for public comment (1991)

6. Draft landscape guidelines handbook with illustrations will be prepared for comment (1991)


Issues for Your Consideration

The Secretary of the Interior's Standards provide principles for the treatment of historic landscapes under eligible for or listed on the National Register of Historic Places. They should serve as a minimum benchmark for the preservation of historic character. The standards should always be considered when work is proposed in a historically significant landscape.

Your Assistance is Needed For:

1. Comments and suggestions on the revised standards

2. Comments and suggestions on the landscape guidelines
   a. Issues and topics to be addressed
   b. Examples of successful treatment projects

   Comments and suggestions related to standards and guidelines should be sent to:
   Noel Vernon, Co-chair
   ASLA Open Committee on Historic Preservation
   Ball State University
   College of Architecture and Planning
   Department of Landscape Architecture
   Muncie, Indiana 47306-0310

3. Suggestions for technical information related to the treatment of historic landscapes including technical information that is needed in the field as well as possible. Case studies:
   a. Tech Notes (project specific)
   b. Preservation Briefs (addresses more general preservation issues)

   Comments on technical information should be sent to:
   Lauren Meier
   Historical Landscape Architect
   National Park Service
   Preservation Assistance Division (424)
   P.O. Box 37127
   Washington, D.C. 20013-7127
   (202) 343-9597
Secretary of the Interior's Standards for Historic Preservation Projects

ACQUISITION

Acquisition is defined as the act or process of acquiring, through purchase or donation, fee title or interest other than fee title of real property.

Standards for Acquisition

1. Careful consideration shall be given to the type and extent of property rights which are required to ensure the preservation of the historic resource and its setting. The preservation objectives shall determine the exact property rights to be acquired.

2. The purchase of less-than-fee-simple interests, such as facade, conservation, or scenic easements, shall be undertaken when a limited interest achieves the same preservation objectives as fee simple acquisition.

3. Properties shall be acquired in fee simple when absolute ownership is required to ensure their preservation.

4. All components of the property necessary to protect its historic significance shall be acquired. These include land, viewsheds, outbuildings, furnishings, archeological remains, and other features associated with the property.
PROTECTION

Protection is defined as the act or process of applying measures necessary to safeguard the historic character of a property by defending or guarding it from further deterioration, loss, or attack, or to shield it from danger or injury. In the case of buildings, structures, objects, or landscapes, such treatment is generally of a temporary nature and anticipates future historic preservation treatment: in the case of archeological sites, the measure may be temporary or permanent.

Standards for Protection

1. An analysis of the actual or anticipated threats to the property shall be made prior to applying protective measures.
2. Protection shall safeguard the existing condition of a property from further deterioration or damage caused by natural forces or human activity.
3. If deteriorated or threatened historic materials or features must be removed during the process of protection, they shall be repaired and reused or properly recorded and safely stored until a future treatment is determined.
4. If a distinctive feature no longer performs its function or is vulnerable to vandalism, a suitable protective covering shall be applied until the feature can be repaired or replaced with a new feature that matches the old in design, color, texture, and other visual qualities and, where possible, materials.
5. Invasive vegetation that damages or threatens historic materials and features shall be controlled using the gentlest means possible.
6. A property shall be used for its historic purpose; or shall be placed in a new use that requires minimal change to the defining characteristics of the property and its environment.
7. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
8. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or historic features from other properties, shall be avoided.
9. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
10. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
11. Deteriorated historic features shall be repaired rather than replaced.
12. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
13. Significant archeological resources shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
STABILIZATION

Stabilization is defined as the act or process of applying measures necessary to reestablish the stability of an unsafe, damaged, or deteriorated property, while retaining the essential form as it exists at present.

Standards for Stabilization

1. Stabilization shall reestablish the stability of a property through reinforcement or by arresting material deterioration leading to structural or environmental failure.

2. Stabilization shall be accomplished in such a manner that it does not cause damage to any character-defining features, and in such a way that does not detract from the property's appearance. When reinforcement is required, such work shall be concealed wherever possible, except where concealment would result in the alteration or destruction of the materials, features, or spaces that characterize the historic property.

3. Invasive vegetation that threatens the stability of a structure or landscape feature shall be controlled using the gentlest means possible.

4. A property shall be used for its historic purpose, or shall be placed in a new use that requires minimal change to the defining characteristics of the property and its environment.

5. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

6. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or historic features from other properties shall be avoided.

7. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

8. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

9. Deteriorated historic features shall be repaired rather than replaced.

10. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

11. Significant archeological resources shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
PRESERVATION

Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and material of an historic property. It may include initial stabilization work, where necessary, as well as ongoing maintenance and repair of the historic materials and features.

Standards for Preservation

1. Preservation shall retain the existing form, integrity, materials and character-defining features of the historic building, structure, landscape, object, or site, by arresting or retarding the deterioration of a property through a program of ongoing maintenance.

2. Preservation shall manage vegetation change through ongoing maintenance of existing historic plant material, including the removal of invasive or severely deteriorated plant material. Replacement of historic plant material, when necessary to preserve the character of the property, shall match the historic appearance, function, and, where possible, species or variety.

3. A property shall be used for its historic purpose, or shall be placed in a new use that requires minimal change to the defining characteristics of the property and its environment.

4. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

5. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or historic features from other properties shall be avoided.

6. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

7. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

8. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, were possible, materials. Replacement of missing features shall be substantiated by documentary or physical evidence.

9. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

10. Significant archaeological resources shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
REHABILITATION

Rehabilitation is defined as the act or process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions or features of the property which are significant to its historical and cultural values.

Standards for Rehabilitation

1. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

2. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

3. Construction of historic designs that were never built shall not be undertaken.

4. New additions, alterations, or new construction in an historic landscape shall be visually differentiated from the old and shall be compatible with the historic character of the landscape.

5. Replacement of missing historic plant material or vegetation features shall be substantiated by documentary or physical evidence. The replacement plant material or features shall match the historic appearance, function, and where possible, species or variety.

6. A property shall be used for its historic purpose, or shall be placed in a new use that requires minimal change to the defining characteristics of the property and its environment.

7. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

8. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or historic features from other properties shall be avoided.

9. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

10. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

11. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, were possible, materials. Replacement of missing features shall be substantiated by documentary or physical evidence.

12. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

13. Significant archeological resources shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

Note: These standards may not apply to tax act projects.
RESTORATION

Restoration is defined as the act or process of accurately recovering the form, features, and details of a property as it appeared at a particular period of time by means of the removal of later work or by the replacement of missing earlier work.

Standards for Restoration

1. Restoration shall be undertaken only when there is definitive physical and documentary evidence as a basis for the work and when restoration is essential for understanding and interpreting the value of the property. Restoration work shall be consistent with the period of significance of the historic building, structure, landscape, object, or site.

2. The existing condition of a property to be restored shall be documented prior to the alteration or removal of character-defining features.

3. Restoration shall recognize the dynamic nature of landscapes; vegetation that existed during the period of significance shall not be removed, unless removal and replacement is essential to maintain the character of the landscape.

4. Restoration shall replace missing vegetation features by duplicating the historic feature in form, mass, texture, color, function, and other visual qualities, and where possible, species or variety. The new feature shall be based on physical or documentary evidence.

5. A property shall be used for its historic purpose, or shall be placed in a new use that requires minimal change to the defining characteristics of the property and its environment.

6. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided unless it is essential to restore the property to an earlier period.

7. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or historic features from other properties shall be avoided.

8. Most properties change over time; those changes that occurred within the period of significance shall be retained and preserved.

9. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that represent the period of significance shall be preserved.

10. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, were possible, materials. Replacement of missing features shall be substantiated by documentary or physical evidence.

11. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

12. Significant archeological resources shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
RECONSTRUCTION

Reconstruction is defined as the act or process of reproducing by new construction, the exact form, features and details of a vanished building, structure, landscape, or object as it appeared at a specific period of time and on its original site.

Standards for Reconstruction

1. Reconstruction of a part or all of a property in its historic location shall be appropriate when the reconstruction is essential for understanding and interpreting its value; when no other building, structure, landscape, or object with the same associative value has survived; and when sufficient historical documentation exists to insure an accurate reproduction of the original. Reconstructions shall be clearly identified.

2. Reconstruction shall duplicate all missing elements of the property in design, color, texture, and other visual qualities and, where possible, materials including plant species and variety. Reconstruction of missing features and elements shall be based upon accurate duplication of historic features and elements, substantiated by documentary or physical evidence, rather than upon conjectural designs or the availability of different features from other historic properties.

3. Reconstruction of a building, structure, landscape, or object shall be preceded by a thorough archaeological investigation to locate, identify, and evaluate the significance of all subsurface features and artifacts. If any significant archaeological resources must be disturbed, mitigation measures shall be undertaken.
Guidelines for the Treatment of Historic Landscapes

Preface
Acknowledgements
Process for Developing the Standards and Guidelines
Definitions

Introduction
Purpose of the Standards and Guidelines
Preservation Process: Inventory, Analysis, Treatment
Assessing Integrity and Significance in an Historic Landscape
Choosing the Appropriate Treatment
Special Issues
Changes in use in a historic landscape
Handicapped access
New construction
Substitute materials
Historic designs that were never built

The Secretary of the Interior’s Standards for Historic Preservation Projects
Acquisition
Protection
Stabilization
Preservation
Rehabilitation
Restoration
Reconstruction

Guidelines for the Treatment of Historic Landscapes
Historic Setting
Relationship of the property to its neighborhood/community
Relation of the environment to the property

Historic Property
Overall spatial relationships/Historic boundary/Views and vistas
Natural Systems
Design Intent/Functional Response

Historic Landscape Features/Elements
Landform
Plant Material and Vegetation Features
Water Features/Elements
Circulation
Structures
Site Furnishings (Functional elements)
Objects (Decorative elements)
Recreation: Facilities
Ball fields and courts
Golf courses
Swimming facilities
Picnic areas and Camping grounds

Other Issues:
Uses
Agricultural
Recreational
Industrial
Residential
Materials
Masonry
Wood
Stone
Wrought Iron
Concrete
ACQUISITION

Acquisition is defined as the act or process of acquiring, through purchase or donation, fee title or interest other than fee title of real property.

Standards for Acquisition

1. Careful consideration shall be given to the type and extent of property rights which are required to ensure the preservation of the historic resource and its setting. The preservation objectives shall determine the exact property rights to be acquired.

2. The purchase of less-than-fee-simple interests, such as facade, conservation, or scenic easements, shall be undertaken when a limited interest achieves the same preservation objectives as fee simple acquisition.

3. Properties shall be acquired in fee simple when absolute ownership is required to ensure their preservation.

4. All components of the property necessary to protect its historic significance shall be acquired. These include land, viewsheds, outbuildings, furnishings, archeological remains, and other features associated with the property.
PROTECTION

Protection is defined as the act or process of applying measures necessary to safeguard the historic character of a property by defending or guarding it from further deterioration, loss, or attack, or to shield it from danger or injury. In the case of buildings, structures, objects, or landscapes, such treatment is generally of a temporary nature and anticipates future historic preservation treatment; in the case of archeological sites, the measure may be temporary or permanent.

Standards for Protection

1. An analysis of the actual or anticipated threats to the property shall be made prior to applying protective measures.

2. Protection shall safeguard the existing condition of a property from further deterioration or damage caused by natural forces or human activity.

3. If deteriorated or threatened historic materials or features must be removed during the process of protection, they shall be repaired and reused or properly recorded and safely stored until a future treatment is determined.

4. If a distinctive feature no longer performs its function or is vulnerable to vandalism, a suitable protective covering shall be applied until the feature can be repaired or replaced with a new feature that matches the old in design, color, texture, and other visual qualities and, where possible, materials.

5. Invasive vegetation that damages or threatens historic materials and features shall be controlled using the gentlest means possible.

6. A property shall be used for its historic purpose; or shall be placed in a new use that requires minimal change to the defining characteristics of the property and its environment.

7. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

8. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or historic features from other properties, shall be avoided.

9. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

10. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

11. Deteriorated historic features shall be repaired rather than replaced.

12. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

13. Significant archeological resources shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
STABILIZATION

Stabilization is defined as the act or process of applying measures necessary to reestablish the stability of a unsafe, damaged, or deteriorated property while retaining the essential form as it exists at present.

Standards for Stabilization

1. Stabilization shall reestablish the stability of a property through reinforcement or by arresting material deterioration leading to structural or environmental failure.

2. Stabilization shall be accomplished in such a manner that it does not cause damage to any character-defining features, and in such a way that does not detract from the property's appearance. When reinforcement is required, such work shall be concealed wherever possible, except where concealment would result in the alteration or destruction of the materials, features, or spaces that characterize the historic property.

3. Invasive vegetation that threatens the stability of a structure or landscape feature shall be controlled using the gentlest means possible.

4. A property shall be used for its historic purpose, or shall be placed in a new use that requires minimal change to the defining characteristics of the property and its environment.

5. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

6. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or historic features from other properties shall be avoided.

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11. Significant archeological resources shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
PRESERVATION

Preservation is defined as the act or process of applying measures necessary to sustain the existing form, integrity, and material of an historic property. It may include initial stabilization work, where necessary, as well as ongoing maintenance and repair of the historic materials and features.

Standards for Preservation

1. Preservation shall retain the existing form, integrity, materials and character-defining features of the historic building, structure, landscape, object, or site, by arresting or retarding the deterioration of a property through a program of ongoing maintenance.

2. Preservation shall manage vegetation change through ongoing maintenance of existing historic plant material, including the removal of invasive or severely deteriorated plant material. Replacement of historic plant material, when necessary to preserve the character of the property, shall match the historic appearance, function, and, where possible, species or variety.

3. A property shall be used for its historic purpose, or shall be placed in a new use that requires minimal change to the defining characteristics of the property and its environment.

4. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

5. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or historic features from other properties shall be avoided.

6. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

7. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

8. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary or physical evidence.

9. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

10. Significant archeological resources shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
REHABILITATION

Rehabilitation is defined as the act or process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions or features of the property which are significant to its historical and cultural values.

Standards for Rehabilitation

1. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

2. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

3. Construction of historic designs that were never built shall not be undertaken.

4. New additions, alterations, or new construction in an historic landscape shall be visually differentiated from the old and shall be compatible with the historic character of the landscape.

5. Replacement of missing historic plant material or vegetation features shall be substantiated by documentary or physical evidence. The replacement plant material or features shall match the historic appearance, function, and where possible, species or variety.

6. A property shall be used for its historic purpose, or shall be placed in a new use that requires minimal change to the defining characteristics of the property and its environment.

7. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

8. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or historic features from other properties shall be avoided.

9. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

10. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

11. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary or physical evidence.

12. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

13. Significant archeological resources shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

Note: * These standards may not apply to tax act projects
RESTORATION

Restoration is defined as the act or process of accurately recovering the form, features and details of a property as it appeared at a particular period of time by means of the removal of later work or by the replacement of missing earlier work.

Standards for Restoration

1. Restoration shall be undertaken only when there is definitive physical and documentary evidence as a basis for the work and when restoration is essential for understanding and interpreting the value of the property. Restoration work shall be consistent with the period of significance of the historic building, structure, landscape, object, or site.

2. The existing condition of a property to be restored shall be documented prior to the alteration or removal of character-defining features.

3. Restoration shall recognize the dynamic nature of landscapes; vegetation that existed during the period of significance shall not be removed, unless removal and replacement is essential to maintain the character of the landscape.

4. Restoration shall replace missing vegetation features by duplicating the historic feature in form, mass, texture, color, function, and other visual qualities, and where possible, species or variety. The new feature shall be based on physical or documentary evidence.

5. A property shall be used for its historic purpose, or shall be placed in a new use that requires minimal change to the defining characteristics of the property and its environment.

6. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided unless it is essential to restore the property to an earlier period.

7. Each property shall be recognized as a physical record of its time, place and use. Changes that create a false sense of historical development, such as adding conjectural features or historic features from other properties shall be avoided.

8. Most properties change over time; those changes that occurred within the period of significance shall be retained and preserved.

9. Distinctive materials, features, finishes, and construction techniques or examples of craftsmanship that represent the period of significance shall be preserved.

10. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, were possible, materials. Replacement of missing features shall be substantiated by documentary or physical evidence.

11. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

12. Significant archeological resources shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
Organ Pavilion Traffic
Circulation and Parking Study
May 29, 1990

Mr. David Twomey, Assistant Director  
Parks and Recreation Department  
Balboa Park, Conference Building  
M.S. 37  
San Diego, CA 92101  

Dear Dave:  

The following describes the elements completed to date with respect to P&D’s effort on the Organ Pavilion Traffic Circulation and Parking Study. The attachments include collected data, field notes and analytical worksheets.

**Data Collection/Research**

The collection of data necessary for the study is essentially complete. P&D performed the following:

Surveyed parking lots serving the facilities in the vicinity of the Organ Pavilion to establish departure patterns throughout the evening with respect to time and direction, vehicle occupancy ratios, parking space utilization and the **picking** up of guests adjacent to performance venues.

- Defined characteristics of the parking and circulation system including capacities for all parking facilities, intersection **geometrics**, roadway cross-sections and vehicle queuing capacity.

- Researched schedule of performance patterns and venue capacities to determine peak summer attendance requirements for parking spaces and the resulting distribution of vehicles to the roadway network during late evening.

Counted turn movements at President's Way and Park Boulevard to determine existing operations of the intersection under evening departure conditions.
The data collected is summarized in the attached material.

**Analysis**

Based on the above data, evaluation was begun of the parking and network operations projected to occur during summer peak evenings under different circulation scenarios. These scenarios were to analyze the impacts of different capacities for the proposed Organ Pavilion parking structure, different intersection geometrics (President's Way at Park Boulevard) on vehicle queuing and delay and the impact of restricting directional traffic on the Cabrillo Bridge into the Park. The following summarizes the results obtained to date.

**Vehicle queuing at President's Way/Park boulevard intersection:** The following table summarizes the results concerning operating LOS and vehicle queuing at the subject intersection under different scenarios.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>LOS</th>
<th>Vehicle Queuing</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXISTING</td>
<td>B</td>
<td>Minimal</td>
</tr>
<tr>
<td>• Existing Parking Facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Old Globe/Carter Theaters in operation (winter Saturday)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-way circulation on roadways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic signal control at intersection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUTURE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Organ Pavilion Parking Structure-1500 spaces</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Summer Saturday (all venues in operation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Cabrillo Bridge inbound only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Traffic signal control at intersection</td>
<td>Excessive delays and queuing</td>
<td></td>
</tr>
<tr>
<td>- Free right turn at intersection</td>
<td>Maximum delay 15 minutes, maximum queue length 582 vehicles</td>
<td></td>
</tr>
<tr>
<td>- Two free right turn lanes at intersection</td>
<td>Maximum delay 4 minutes, maximum queue length 207 vehicles</td>
<td></td>
</tr>
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</table>

Based on projected summer event attendance and departure patterns, and assuming a 1500 space capacity for the Organ Pavilion structure, special operations will be required
at the President's Way/Park Boulevard intersection to avoid extensive delays for exiting patrons. At a minimum, these should consist of allowing free right turns from President's Way which will result in maximum delay on the order of 15 minutes. Provision of two free flow right turn lanes would require the addition of a third southbound lane on Park Boulevard and would require some capital improvements in the area. These measures would reduce delays and queuing significantly.

In addition, a preliminary evaluation of the feasibility of the proposed realignment of President's Way around the perimeter of the proposed parking structure was performed. This realignment appears to be feasible on the basis of vertical and horizontal control. Vertical grades on the roadway would be rather steep but are deemed feasible based on expected operating speeds of the vehicles using the facility. Horizontal sight distance at the northeast corner of the structure could be a problem. For this reason, care should be taken in regards to garage access and landscaping in this area.

We would welcome the opportunity to complete this effort when appropriate. If you have any additional questions or comments, please feel free to give me a call.

Sincerely,

**P&D TECHNOLOGIES**

Arnold Torma, T.E.
Director of Transportation

AT:kw

cc: E. Wundram

Attachments
TRAFFIC COUNTS

ATTENDANCE DATA

LEVEL OF SERVICE ANALYSIS
COLLECTED DATA SUMMARY

EXISTING AVAILABLE PARKING SPACES:

ORGAN PAN. = 456
ALCAZAR CARD. = 137
STARLIGHT = 437
PAN AM. PLAZA = 113
PLAZA DE PANAMA = 292

AVAILABLE SEATS:

CASCIONS CARTER = 300
OLD GLOBE = 600
FESTIVAL = 650
STARLIGHT = 4300

CARS EXITING IN PEAK 15 MIN (3/10/90)

ORGAN PAN. = 116
ALCAZAR CARD. = 65
STARLIGHT = 2
PAN AM PLAZA = 44
PLAZA DE PANAMA = 9

SAT. 3/10/90

OLD GLOBE: 800
CASCIONS CARTER: (PARKED = 500)

SAT. 7/29/89

OLD GLOBE: 564
CASCIONS CARTER: 192
FESTIVAL: 544 (TP)
STARLIGHT: 2500 (TP)

3600

FUTURE AVAILABLE PARKING SPACES

ORGAN PAN. = 1,000 - 1,500
ALCAZAR CARD. = 127
STARLIGHT = 437

1,574 - 2,074

NET CHANGE = 139 - 639
## GARS LEAVING PARKING LOT

<table>
<thead>
<tr>
<th>ME</th>
<th>PAN AMERICAN PLAZA (113)</th>
<th>ORGAN PAVILLION (458)</th>
<th>ALCAZAR GARDENS (137)</th>
<th>PLAZA DE PANAMA (292)</th>
<th>STARLIGHT-BOWL (437)</th>
</tr>
</thead>
<tbody>
<tr>
<td>106-10:15</td>
<td>2</td>
<td>29</td>
<td>15</td>
<td>16</td>
<td>3</td>
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<td>10:15-10:20</td>
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<td>4</td>
<td>10</td>
<td>-2</td>
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<td>25</td>
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<td>10:30-10:45</td>
<td>44</td>
<td>116</td>
<td>65</td>
<td>9</td>
<td>2</td>
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<tr>
<td>10:45-11:00</td>
<td>9</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
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<td>198</td>
<td>120</td>
<td>62</td>
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| ALK/15     | 441                      | 116                   | 65                    | 9                     | 2                    |

<p>| TOTAL       | 10:30-10:45 AM = 2.36 VSH | Overall Total = 461   |</p>
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<th>Time (5 min intervals)</th>
<th>Pan American Plaza (113)</th>
<th>Organ Pavilion (456)</th>
<th>Alcazar Gardens (137)</th>
<th>Plaza de Panama (292)</th>
<th>Starlight Bowl (437)</th>
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<td>104</td>
<td>230</td>
<td>131</td>
<td>92</td>
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<td>201</td>
<td>112</td>
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<td>9:30</td>
<td>93</td>
<td>177</td>
<td>96</td>
<td>66 (11)</td>
<td>4</td>
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<tr>
<td>9:45</td>
<td>78</td>
<td>152</td>
<td>81</td>
<td>44 (24)</td>
<td>4</td>
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<tr>
<td>10:00</td>
<td>34</td>
<td>36</td>
<td>16</td>
<td>35 (24)</td>
<td>2</td>
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<td>10:15</td>
<td>25</td>
<td>32</td>
<td>11</td>
<td>33 (23)</td>
<td>2</td>
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(NO. OF VEHICLES ENTERING EACH AREA)

(NO. OF PARKED VEHICLES PRESENT)
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<th>PED P.U.</th>
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<td>8</td>
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</tr>
<tr>
<td>10:00-10:15</td>
<td>33</td>
<td>3</td>
</tr>
<tr>
<td>10:15-10:30</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>10:30-10:45</td>
<td>103</td>
<td>8</td>
</tr>
<tr>
<td>10:45-11:00</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>208</td>
<td>19</td>
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PARK NOTE

3-3-90  10 PM (SAT)
2 Plays + NA Play in Palisades

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<tr>
<th>LOT</th>
<th>OCC</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td>NAVY</td>
<td>EMPTY</td>
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<tr>
<td>AEROSPACE/SL</td>
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<tr>
<td>PALISADES</td>
<td>2/3</td>
<td>P&amp;R trucks parked, NA Play</td>
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<tr>
<td>ORGAN PAV.</td>
<td>2/3</td>
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<tr>
<td>ALCAZAR</td>
<td>FULL</td>
<td></td>
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<tr>
<td>PRADEO</td>
<td>FULL</td>
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<tr>
<td>BALEA DR.</td>
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<tr>
<td>PEPPER GROVE</td>
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<tr>
<td>FLEET</td>
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<td>CENTER OPEN</td>
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<tr>
<td>BALBOA BLD.</td>
<td>3/4</td>
<td></td>
</tr>
<tr>
<td>NAT HISTOR.</td>
<td>1/2</td>
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<tr>
<td>FIG TREE AREA</td>
<td>FULL</td>
<td></td>
</tr>
<tr>
<td>SAN JUAN VILLAGE</td>
<td>1/4</td>
<td></td>
</tr>
<tr>
<td>CAROUSEL</td>
<td>EMPTY</td>
<td></td>
</tr>
<tr>
<td>ZOO</td>
<td>EMPTY</td>
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CONGESTION EXITING MINIMAL
PLAYS SOLD OUT
### Location
PARK BL / PRESIDENTS WY S.D.

### Weather

### Road Surface

### Date
3-10-90

### Job No.

### Observer

<table>
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<tr>
<th>Time Starts</th>
<th>N/S on</th>
<th>E/W on</th>
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<th>W/B on</th>
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<td>R</td>
<td>T</td>
<td>L</td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>7:20 11:45</td>
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<td>30</td>
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<td>5</td>
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<td>7</td>
<td>6</td>
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<td>Group</td>
<td>224</td>
<td>474</td>
<td>0</td>
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</tr>
</tbody>
</table>

### Remarks

### Geometrics
Indicate North

### Identify in Diagram:
1. Lanes, lane widths
2. Parking (PKG) locations
3. Islands (physical or painted)
4. Bus stops
5. Grade

### PK HR:

<table>
<thead>
<tr>
<th>Total</th>
<th>0</th>
<th>84</th>
<th>24</th>
<th>440</th>
<th>0</th>
<th>744</th>
<th>0</th>
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<tr>
<td>Group</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>
EXISTING CONDITIONS

INTERSECTION CAPACITY UTILIZATION CALCULATION WORKSHEET

Location: PARK BLVD @ PRESIDENTS WAY

Northbound
\[
\frac{28}{1500} = 0.02
\]

Southbound
\[
\frac{440}{2 \times 1700} = 0.13
\]

Eastbound
\[
\frac{624}{1500} = 0.42 \text{ or } \frac{84}{1500} = 0.006
\]

Westbound
\[
\frac{0}{1700} = 0.00
\]

Critical Movement
ICU = 0.57

LOS = A

Remarks:
* 2 vehicles per cycle turn right, basic cycle

(744 - 120 = 624)

Job No.

Daie
**1985 HCM: SIGNALIZED INTERSECTIONS**

**SUMMARY REPORT**

```
**************************************************************
INTERSECTION: PRESIDENT'S WAY/PARK BL.
AREA TYPE: .. OTHER
ANALYST: .. RCS
DATE: .. 3/19/90
TIME: .. SAT. EVNG. PEAK PER.
COMMENT: .. OBSERVED VOLUMES: 3/10/90

<table>
<thead>
<tr>
<th>VOLUMES</th>
<th>GEOMETRY</th>
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<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>NB</td>
</tr>
<tr>
<td>LT</td>
<td>84</td>
</tr>
<tr>
<td>TH</td>
<td>0</td>
</tr>
<tr>
<td>ET</td>
<td>624</td>
</tr>
<tr>
<td>RR</td>
<td>120</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>ADJUSTMENT FACTORS</th>
</tr>
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<tbody>
<tr>
<td>GRADE</td>
</tr>
<tr>
<td>(%)</td>
</tr>
<tr>
<td>EB</td>
</tr>
<tr>
<td>WB</td>
</tr>
<tr>
<td>NE</td>
</tr>
<tr>
<td>SB</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>SIGNAL SETTINGS</th>
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<tbody>
<tr>
<td>PH-1</td>
</tr>
<tr>
<td>EB</td>
</tr>
<tr>
<td>NB</td>
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<td>TH</td>
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<td>PD</td>
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<td>RT</td>
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<tr>
<td>PD</td>
</tr>
<tr>
<td>GREEN</td>
</tr>
<tr>
<td>YELLOW</td>
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</table>

<table>
<thead>
<tr>
<th>LEVEL OF SERVICE</th>
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</thead>
<tbody>
<tr>
<td>LANE GRP.</td>
</tr>
<tr>
<td>EB</td>
</tr>
<tr>
<td>TR</td>
</tr>
<tr>
<td>NB</td>
</tr>
<tr>
<td>TR</td>
</tr>
<tr>
<td>SB</td>
</tr>
<tr>
<td>TR</td>
</tr>
<tr>
<td>F</td>
</tr>
</tbody>
</table>

INTERSECTIO: Delav = 12.8 (sum) vs. <sum.; avg. 0.659 | LOS B |
```
**VEHICLE CULVER SUMMARY - MAGNITUDE COUNT**

**CITY OF SAN DIEGO TRAFFIC ENGINEERING SECTION**

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>PEAK HOURS</th>
<th>15-MIN PERIODS ** (HOUR)</th>
<th>TOTAL 24 HOURS</th>
<th>FILE NO 075Y-39</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>600</strong></td>
<td><strong>15-MIN PERIODS</strong></td>
<td><strong>15-MIN PERIODS</strong></td>
<td><strong>15-MIN PERIODS</strong></td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>60</td>
<td>60 70 ( 70)</td>
<td>60 60</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>120</td>
<td>70 80 ( 80)</td>
<td>70 70</td>
<td></td>
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<tr>
<td>600</td>
<td>100</td>
<td>90 100 ( 90)</td>
<td>90 90</td>
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<tr>
<td>600</td>
<td>200</td>
<td>10 20 ( 20)</td>
<td>10 10</td>
<td></td>
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</tbody>
</table>

PM PEAK HOURS 360 ENDING AT 1800

<table>
<thead>
<tr>
<th>06-25-69 MON</th>
<th>900</th>
<th>10 10 10 10 ( 40)</th>
<th>10 10 10 10 ( 40)</th>
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</thead>
<tbody>
<tr>
<td>06-25-69 TUE</td>
<td>900</td>
<td>9 9 9 9 (18)</td>
<td>9 9 9 9 (18)</td>
</tr>
<tr>
<td>06-25-69 WED</td>
<td>900</td>
<td>9 9 9 9 (18)</td>
<td>9 9 9 9 (18)</td>
</tr>
<tr>
<td>06-25-69 THU</td>
<td>900</td>
<td>9 9 9 9 (18)</td>
<td>9 9 9 9 (18)</td>
</tr>
<tr>
<td>06-25-69 FRI</td>
<td>900</td>
<td>9 9 9 9 (18)</td>
<td>9 9 9 9 (18)</td>
</tr>
<tr>
<td>06-25-69 SAT</td>
<td>900</td>
<td>9 9 9 9 (18)</td>
<td>9 9 9 9 (18)</td>
</tr>
<tr>
<td>06-25-69 SUN</td>
<td>900</td>
<td>9 9 9 9 (18)</td>
<td>9 9 9 9 (18)</td>
</tr>
</tbody>
</table>

TOTAL - 24 HOURS 9,150*

**AVE. WEEKDAY COUNT: 4,200**
<table>
<thead>
<tr>
<th>Time</th>
<th>In</th>
<th>Out</th>
<th>Total</th>
<th>Northbound</th>
<th>Southbound</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30-9:45</td>
<td>19</td>
<td>10</td>
<td>62</td>
<td>8</td>
<td></td>
<td>62</td>
</tr>
<tr>
<td>9:45-10:00</td>
<td>33</td>
<td>7</td>
<td>60</td>
<td>16</td>
<td>33</td>
<td>60</td>
</tr>
<tr>
<td>10:00-10:15</td>
<td>42</td>
<td>7</td>
<td>60</td>
<td>33</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>10:15-10:30</td>
<td>57</td>
<td>11</td>
<td>67</td>
<td>30</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>10:30-10:45</td>
<td>207</td>
<td>13</td>
<td>236</td>
<td>103</td>
<td>236</td>
<td>536</td>
</tr>
<tr>
<td>10:45-11:00</td>
<td>45</td>
<td>8</td>
<td>53</td>
<td>48</td>
<td>53</td>
<td>96</td>
</tr>
</tbody>
</table>
### Summary of Data Collected: 3/10/90

<table>
<thead>
<tr>
<th>Time</th>
<th>Southbound</th>
<th>Northbound</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:20 - 9:45 AM</td>
<td>54</td>
<td>81</td>
<td>135</td>
</tr>
<tr>
<td>9:45 - 10:00</td>
<td>0</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>10:00 - 10:15</td>
<td>27</td>
<td>33</td>
<td>60</td>
</tr>
<tr>
<td>10:15 - 10:30</td>
<td>37</td>
<td>30</td>
<td>67</td>
</tr>
<tr>
<td>10:30 - 10:45</td>
<td>133</td>
<td>103</td>
<td>236</td>
</tr>
<tr>
<td>10:45 - 11:00</td>
<td>2</td>
<td>18</td>
<td>20</td>
</tr>
</tbody>
</table>
### 15 Min. Exit Volumes - Presidents Way

<table>
<thead>
<tr>
<th>Time Interval</th>
<th>Spring Existing</th>
<th>Summer + Starlight + Festival</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 - 9:15</td>
<td>62</td>
<td>279</td>
<td>272</td>
<td>279</td>
</tr>
<tr>
<td>9:15 - 9:30</td>
<td>66</td>
<td>270</td>
<td>263</td>
<td>270</td>
</tr>
<tr>
<td>10:00 - 10:15</td>
<td>66</td>
<td>302</td>
<td>274</td>
<td>302</td>
</tr>
<tr>
<td>10:15 - 10:30</td>
<td>396</td>
<td>1035</td>
<td>1063</td>
<td>1063</td>
</tr>
<tr>
<td>Jars - 1000</td>
<td>20</td>
<td>90</td>
<td>88</td>
<td>90</td>
</tr>
</tbody>
</table>

Total: 460 2073 2018 2072
MOVIEW THEATER (443)
Peak Parking Spaces Occupied vs SEATS
On a: SATURDAY

PARKING GENERATION RATES

<table>
<thead>
<tr>
<th>Average Rate</th>
<th>Range of Rates</th>
<th>Standard Deviation</th>
<th>Number of Studies</th>
<th>Average Number of Seats</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.26</td>
<td>0.11–0.42</td>
<td>0.11</td>
<td>9</td>
<td>1562</td>
</tr>
</tbody>
</table>

DATA PLOT AND EQUATION

Fitted Curve Equation: \( P = 0.50(X) - 322.0 \)
\( R^2 = 0.837 \)
7/29 Sat eve.
Globe: 564
Carter: 192
Festival: 546 (average of all Sat. eves.)
Total: 1302

Staff: 167
2500 typ. sat
Queuing Analysis
3/10/90 EXISTING  

ASSUME 2.5 PASSENGERS PER VEHICLE  

800 IN ATTENDANCE  \rightarrow  NO. SPACES OCCUPIED = 800/2.5 = 320  

ACTUAL SPACES OCCUPIED JUST PRIOR TO PEAK 15 MIN EXIT = 359  

SPACES OCCUPIED BY VEHICLES OTHER THAN PLAY = 359 - 320 = 39  

FUTURE:  

3800 IN ATTENDANCE  \rightarrow  NO. SPACES = 0.5(3800) - 322 = 1578  

ACTUAL SPACES TO BE OCCUPIED JUST PRIOR TO PEAK EXIT = 1578 + 39 = 1617  

SCENARIO 1 - ORGAN PAVILLION GARAGE HAS 1000 SPACES  

ASSUMPTIONS: 1. ALL PLAYS ARE RUNNING IN CLUSTER SATURDAY  
    2. PEAK 15 MIN EXIT VOLUMES FOLLOW SAME TIME PATTERN AS OBSERVED ON 3/10/90.  
    3. OVERFLOW VEHICLES WILL PARK IN DAYLITE.  

TOTAL SPACES AVAILABLE WEST OF PARK BL = 1574  

# CARS PARKED ON WEST SIDE OF PARK = 1574  

# CARS PARKED ON EAST SIDE OF PARK = 1617 - 1574 = 43  

SCENARIO 2 - ORGAN PAVILLION GARAGE HAS 1500 SPACES  

ASSUMPTIONS: SAME AS SCENARIO 1  

TOTAL SPACES AVAILABLE WEST OF PARK BL = 2074  

# CARS PARKED ON WEST SIDE OF PARK = 1617.  

# CARS PARKED ON EAST SIDE OF PARK = 0  

FROM INSTANT: THE TOTAL VEHICLES LEFT BETWEEN 10:30 - 11:00 AM  

236/359 = 66%  

FOR FUTURE: EXPECT 66% OF 1459 WILL LEAVE BETWEEN 10:30 - 11:00 AM  

= 1227
**Checked**

**Date**

**Sheet No.**

**Job No.**

**As Counted 3/10/90**

**Assumptions:**

1. T.S. & pre-cleats & back operating & fully actuated.

2. EB stripping is

![Graph showing cumulative vehicles over time. The graph has a timeline ranging from 7:30 AM to 11:00 AM, with cumulative vehicles ranging from 0 to 2,500. Key points at 9:45 AM with 54 vehicles, 10:00 AM with 54 vehicles, 10:15 AM with 91 vehicles, 11:00 AM with 104 vehicles, 10:45 AM with 204, and 11:00 AM with 253 vehicles.]
FUTURE: SCENARIO 2

ASSUMPTIONS:
1. T.S. 2 PRESIDENTS & PARK OPERATING AT FULLY ACTUATED
2. EG STRIPING IS
3. ALL EXITING TRAFFIC ARRIVES AT PRESIDENTS/PARK INTERSECTION
4. ALL PLANS ARE RUNNING
5. FUTURE NUMBERS BASED ON INCREASED PLAY ACTIVITY (IE: FESTIVAL & STADIUM)
   WHILE OTHER PARKING ACTIVITY IS HELD CONSTANT WITH EXISTING
6. PATTERN OF PEAK EXIT PERIOD IS SAME AS EXISTING.
FUTURE SCENARIO 2

Assumptions:
1. The 2 private parking operating as busy as usual.
2. FC synthetic
3. All existing traffic arrives at President/Park intersection
4. All AMs are running
5. Volume numbers based on increased peak activity (i.e., festival or sporting) while other parking activity held constant with existing
6. Pattern of peak exit periods is same as existing.

RT. LANE CAP.
1520 vph
3.5 min of stopped = 420

\[ Q_0 = 1520 \times \frac{25}{60} = 643 \text{ vph} \]

\[ \frac{815}{41} = 19.9 \text{ min} \]

Graph with data points and trend line.
FUTURE: SCENARIO 2

ASSUMPTIONS:
1. 72 m 2 HIT 7. 3 MTH COMMON AS 20% ORIGINAL.
2. E/C SUBDIVISION IS 3/4-
3. ALL EXITING TRAFFIC AFFECTED AT PEDESTRIAN/PARK INTERSECTION.
4. ALL Lanes ARE RUNNING.
5. FUTURE NUMBERS BASED ON INCREASED PEAK ACTIVITY (i.e., FISCHER & ASSOCIATES)
   WHILE OTHER PEAKING ACTIVITY IS HELD CONSTANT WITH EXISTING.
6. PATTERN OF PEAK HOURS REMAINS SAME AS EXISTING.

L.T. LANE 13 (18)

\[
u = \frac{1520}{4} = 380 \\ \text{vph}
\]
FUTURE: SCENARIO 2

ASSUMPTIONS:
1. T.S. 2 PRESIDENTS & PARK OPERATING AS FULLY ACTIVATED.
2. EB STRIPING IS 9
3. ALL EXITING TRAFFIC ARRIVES AT PRESIDENTS/PARK INTERSECTION
4. ALL Lanes ARE RUNNING
5. FUTURE NUMBERS BASED ON INCREASED ACTIVITY (i.e., FESTIVAL/STADIUM)
   WHILE OTHER PARKING ACTIVITY IS HELD CONSTANT WITH EXISTING.
6. PATTERN OF PEAK EXIT PERIODS IS SAME AS EXISTING.

2 FREE

\[
\begin{align*}
AP &= 3000 \text{ vph} \\
- \frac{2000}{\text{q}} &= 75
\end{align*}
\]
Field Measurements
Parking Structure Notes
SUMMARY OF PARKING STRUCTURE DESIGN GUIDELINES

ENTRANCE/EXIT LANES

CAPACITY:
- ENTRANCE (WITH GATE CONTROL) = 400 vph
- EXIT (WITH GATE CONTROL) = 200 vph

* NOTE: SURGE TYPE FACILITIES SHOULD BE ABLE TO EMPTY IN 30 MIN. ALL OTHER TYPES, 1 HOUR.

NUMBER OF LANES REQUIRED:
- ENTRANCE = 1 LANE PER 500 PARKING SPACES (SHORT TERM PARKING)
- EXIT = 1 LANE PER 250 PARKING SPACES (SHORT TERM PARKING)

* RULE OF THUMB: 2 EXIT LANES FOR EVERY ENTRANCE LANE.
* TIP: USE REVERSIBLE LANES FOR SURGE TYPE PARKING

QUEING AREAS:
- FREE FLOW = 1 CAR LENGTH (14') PER ENTRANCE LANE
- TICKET DISPENSER = 2 CAR LENGTHS (36') PER ENTRANCE LANE
- CASHIER = 8 CAR LENGTHS (152') PER ENTRANCE LANE

DRIVEWAY DIMENSIONS (PEDESTRIAN CONSIDERATIONS):

<table>
<thead>
<tr>
<th>WIDTH:</th>
<th>HIGH PEQ. ACTIVITY</th>
<th>ALL OTHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINIMUM (ONE-WAY)</td>
<td>15'</td>
<td>15'</td>
</tr>
<tr>
<td>MINIMUM (TWO-WAY)</td>
<td>25'</td>
<td>25'</td>
</tr>
<tr>
<td>MAXIMUM</td>
<td>30'</td>
<td>35'</td>
</tr>
</tbody>
</table>

RIGHT TURN RADII:
- MINIMUM                       | 5'                  | 10'        |
- MAXIMUM                       | 10'                | 30'        |

SPACING:
- FROM PROPERTY LINE           | 0'                  | 0'         |
- FROM STREET CORNER           | 10'                 | 10'        |
- BETWEEN DRIVEWAYS             | 10'                 | 0'         |
**Table I—Summary of Suggested Parking Garage Design Parameters**

**Structure Size**

Most desirable is a parking structure with 500 to 2,500 parking spaces, scaled to the capacity of adjacent street access. Structure height may be limited by local building codes as well as interfloor circulation constraints. Generally, maximum parking structure heights range between 5 and 9 levels (60 to 90 feet) with up to 30,000 square feet of floor area per parking level.

**Location Guidelines**

Accessibility is a principal factor in parking garage location. Parking garages exceeding 1,200 should have nearby or direct freeway access.

Acceptable walking distance between parking place and destination is another key factor, and is influenced by population size and trip purpose. Guidelines for walking distance are:

1. For larger cities (over 250,000 population)
   - Long-term parking: 1,000 to 1,500 feet
   - Short-term parking: 500 to 800 feet
2. For smaller cities (under 250,000 population)
   - Long-term parking: 600 to 700 feet
   - Short-term parking: 200 to 350 feet

**Entrance/Exit Lanes**

Generally, a parking garage should be able to fill or completely discharge within a maximum of 1 hour. Special-event surge-type demand facilities should be capable of emptying in 30 minutes.

Maximum lane capacities for parking garage entrances range up to 660 vehicles per hour; for controlled entrance lanes, 400 vehicles per hour per lane is commonly used as a maximum design capacity. Discharge capacities range from 150 and 225 vehicles per hour for each gate-controlled exit lane. General requirements for number of access lanes and reservoir area are:

- Entrance lanes
  - Short-term parking: 1 per 600 spaces
  - Long-term parking: 1 per 500 spaces
- Exit lanes
  - Short-term parking: 1 per 250 spaces
  - Long-term parking: 1 per 200 spaces
- Inbound reservoir area
  - Free-flow entry: 1 space per entry lane
  - Ticket-dispenser entry: 2 spaces per entry lane
  - Entrance cashiering: 8 spaces per entry lane
  - Attendant parking: 10 percent of parking capacity served by each entry lane.

**Parking Dimensions**

**Table I—(continued)**

- Parking stalls: Minimum stall widths for self-park operations are 8.5 feet for angle parking and 9.0 feet for 90-degree parking; for attendant-park operations, stall widths range from 8.0 to 8.5 feet. Minimum stall length is 18 feet. Special compact-car stalls are standardized at 7.5 feet wide by 15 feet long.

- Aisle width: Minimum widths for one-way aisles range from 11 to 12.5 feet; two-way aisles, from 20 to 22 feet.

- Column spacing: Traditionally, columns have been spaced at intervals of three parking spaces. This results in a 28.5-foot spacing, assuming 90-degree parking and 18-inch columns. Because columns are located 3 feet in from aisles, a parking bay or module of 62 feet requires an over-all minimum column spacing of 31 by 28.5 feet. Larger columns, angle parking, and for more stalls between columns requires spacing to be increased accordingly to maintain adequate clearances.

- Clear-span design: Column-free designs may provide structural support spans from 48 to 65 feet.

- Floor heights: Minimum clear height is 7.0 feet; however, 7.5 feet is most desirable, which provides a 9.6 to 10-foot floor-to-floor height.

**Other Considerations**

- Ramp grades: A maximum grade of 4 percent should be used for sloping floor garages where ramps provide direct access to stalls. Where conventional interfloor ramps are used (either straight or helical), grades should not exceed 15 percent; grades of 7 to 8 percent are preferable.

- Lighting intensity: Garage illumination should approximate 2 to 5 footcandles along straight aisles and in parking areas, 50 footcandles immediately inside entrance and exits, 15 footcandles in areas where drivers are expected to turn, and 20 to 50 footcandles in cashiering and wailing areas, and other pedestrian areas.

- Passenger elevators: Recommended for parking structures of 3 or more floors. Needs can be generally equated to the number of parking stalls: two elevators for the first 600 stalls and one extra elevator for each additional 600 stalls or substantial fraction thereof.
lished by parking studies. However, many areas of greatest parking need may be economically impractical parking locations because of site costs or lack of convenient access. A project's economic practicality may be improved, in some instances, through sharing land and development cost with other land uses. Such joint use also provides continuity for pedestrian movements and minimizes land fragmentation.

Parking facility usefulness can be improved by location and design considerations that permit daytime and nighttime use, and provide for differing usage characteristics of these different time demands. For example, daytime parking may be business oriented while nighttime parking is mainly for recreational or cultural purposes.

Accessibility

Accessibility to parking sites for both vehicles and pedestrians is an important aspect of site selection.

Parking Access. Pedestrian considerations are critically important to site selection and parking development. Ideal sites are those within short walking distance of parkers' destinations. Maximum walking distances of 1,000 to 1,500 feet (305 to 457 meters) for work trips, and 500 to 800 feet (152 to 244 meters) for shoppers, represent desirable guidelines for large cities. For smaller cities, maximum desirable walking distances are 600 to 700 feet (183 to 213 meters) for work trips, and 200 to 350 feet (70 to 107 meters) for shoppers.

For pedestrian access to be safe and convenient, it should be restricted to designated points, with informal pathways for random access prevented. Restricting pedestrian access to prescribed points may conflict with convenience considerations, but is necessary for safe operation, minimizing pedestrian-automobile conflicts, and for security reasons stemming from unauthorized and/or undetected access. Designated points of pedestrian access at parking locations further serve to direct unfamiliar users to their intended destination along the safest and most convenient route.

Pedestrian access is improved when sites can allow direct connections to major generators via bridge or tunnel, avoiding vehicular traffic crossings. Enclosed pedestrian overpasses offer weather protection and—whether covered or not—are generally preferred over tunnels for security reasons. Overlighting and unrestricted sight distances add to actual and perceived security of pedestrian users.

Walking distances can be psychologically enhanced if they are designed to route pedestrians along commercial frontages having display windows. Cantilevered structure appurtenances over sidewalks, landscape plantings, informational and directional signing, or other amenities such as time and temperature displays, make walking more pleasant.

While hilly terrain may leave few alternatives, steep hillside locations are undesirable from the standpoint of pedestrian convenience. Where such grade differences are unavoidable, parking sites located uphill from major trip generators should be favored, since pedestrians are psychologically more influenced by the perceived walking trip to the generator than by the return trip. However, hillside locations may offer unique means for vehicular access to different parking garage levels, not requiring interfloor ramp travel.

Pedestrian access points should preferably be located on the parking facility side nearest the major generator(s), providing

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17 Herbert S. Levinson and Edward M. Whitlock, "Economic and Environmental Considerations in Parking and Design" (Paper presented at American Society of Civil Engineers Annual and National Environmental Convention, Kansas City, Missouri, October 25, 1974) p. 7.
pedestrians visual contact with generators and routing them over the shortest possible distance. Unsafe alternative routes should be discouraged by use of barriers or other disincentives (landscaping, fencing, architectural facades, signing). While barriers may be necessary to direct safe pedestrian travel, they should not be designed in such a way as to provide hiding places, or restrict sight distances and lighting.

Existing at-grade pedestrian street crossing facilities and controls surrounding potential parking sites should be examined, and changes warranted by the addition of a parking operation should be anticipated. Nearby intersections may require traffic signalization, or rephasing of existing signal controls, for increased pedestrian movements. Midblock pedestrian crossings may be justified, or street type and traffic conditions might be such as to preclude at-grade pedestrian crossings altogether. Upgraded street lighting may also be required.

Vehicular Accessibility. Site selection and facility design must recognize vehicular interchange between a parking facility and the street system as of major importance to user, operator, and the community. From these differing perspectives, vehicular access considerations may face conflicting objectives. Parkers will desire convenience and undelayed ingress and egress. Operators will be concerned with the street system's ability to accommodate entering and exiting traffic. The general community will be concerned about traffic routing impacts, back-ups onto city streets, and pedestrian safety. It is important that these objectives be attained, and conflicts minimized as much as possible.

Ideally, sites should be located to minimize cruising by motorists in search of a suitable parking space. A site requiring motorists to travel on side streets to enter a parking facility may be suitable for workers, familiar with the location and routing, but is not convenient for transient parkers entering the area. Nor may it be acceptable to residents and property owners along the side streets, because of increased traffic flows.

Design and capacity analysis should view a parking site and its surrounding streets as a system. Directional traffic approaches to the influence area, and traffic conditions and controls on adjacent streets, are critical considerations to both site selection and facility design. Precise routing from major arterials and freeways to potential parking sites must be examined in regard to probable traffic impacts of future development. Introduction of a parking facility may complicate traffic patterns, requiring one-way street systems or other means to reduce driving times and improve accessibility.

Sites offering access from different streets, such as corner locations, can be advantageous for parking facilities if entrances and exits can be located without intersection interference. However, corner sites are desirable for retail development and often command a higher land cost.

A site's ability to offer well-located street access points may be determined by answers to such key questions as:

1. Will traffic queues from nearby intersections extend across potential entrance or exit points?
2. Are there already traffic queues on site approaches?
3. Can all access to and from two-way streets be via right turns?
4. Can streets be widened to provide adequate storage space for queued vehicles?

Facility size should be scaled to the ability of adjacent streets to accommodate parking facility traffic. This suggests a range from

![Figure 7: Potential traffic movements into and out of a proposed garage can be determined if the destinations of potential parkers are obtained on a relatively accurate location basis (such as a block face) and give some indication of time of arrival and duration of stay.](image-url)
approximately 500 to 2,500 spaces. Parking garages exceeding 1,200 spaces should be located for nearby or direct freeway access.

The ideal movement into an off-street parking facility is a straight approach, requiring no on-street turning movement. A left turn from a one-way street into a parking facility is also desirable, because a driver using the inside lane for a left turn has better visibility and can make more accurate vehicle maneuvering judgments.

Site access from high-volume two-way streets may require left-turn restrictions on entering and exiting parking facility traffic, special left-turn lanes at mid-block entrance locations, or access separated from adjacent street traffic. When entrances and exits are separated, entrances should be placed in the upstream traffic portion of the block, and exits should be located in the downstream portion of the block. Side-by-side entry and exit points should preferably be located at mid-block.

Environmental design for minimizing air pollution from traffic congestion requires sufficient entrance and exit capacity. As a general guideline, one inbound lane should be provided for every 500 spaces in a garage serving long-term employee parking, and for every 600 spaces in garages serving short-term shopper parking. One outbound exit lane should be provided for every 200 spaces in an employee garage, and for every 250 spaces in a shopper garage.14

Parking facility entrances should be clearly visible to drivers along approach streets. Whether the facility itself should be unmistakably visible as a parking facility is subject to considerations discussed later. Sidewalk pedestrian circulation requirements should be recognized where multi-lane access points may be required. In some cases, this may limit width of the access points.

Additional design parameters for vehicular access and pedestrian circulation are discussed in Chapters IV and VI.

Site Efficiency

The size, shape, and often the topography, of a site influence parking layout efficiency. Site efficiency may also depend on a site's ability to accommodate multiple-use development.

Site Size and Shape. Rectangular sites generally provide the best shape, since parking structures usually have rectangular floor plans. Although irregular-shaped sites are generally avoided, they can be suitable for helically-shaped parking ramps, serving circular floor plans. For parking structures, odd-shaped sites may offer opportunities to develop either ingress or egress ramps outside the basic structure envelope, or special access to streets.

Site topography may permit direct street access between different parking levels.

Site width is particularly important to parking layout efficiency. Design alternatives and space-use efficiency are seriously impaired with site widths less than 120 feet (37 meters). Site widths between 95 and 120 feet (29 and 37 meters) can be used for parking structures, but require angle parking and severely limit alternative parking layouts and interfloor ramp systems. Site widths between 120 and 200 feet (37 and 61 meters) can accommodate several different floor layouts, parking angles, and interfloor ramp designs, providing alternatives from which to select the most cost-effective and space-efficient design.

Site length is relevant to both space-use efficiency and operational efficiency. Longer sites permit more space-efficient develop-

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ment of parking stalls along access aisles parallel to the site's long dimensions. This is because there are more stalls on which to prorate unusable floor space located at structure corners.

However, as aisle lengths increase as a result of available site length, inefficiencies may develop in traffic operation caused by excessive travel length and increased potential for conflicting traffic movements. Longer travel lengths require more driving time, reducing user convenience, increasing air pollution, and requiring more extensive traffic control measures within a parking facility. These factors are aggravated by increased chances for disruption to circulating traffic caused by parking-unparking maneuvers.

Maximum site length is related to horizontal circulation require-
ments of particular facility configurations. Generally a 300-foot-long (91 meters) aisle is considered optimum in efficient length.15 Shortening the length decreases space-use efficiency on a per stall basis. Lengthening increases travel time and traffic conflict potentials, unless auxiliary ramp systems are provided.

Land-Use Compatibility
Local ordinances frequently regulate new development. Height limitations, building setback requirements, visual screening of parked cars, and landscape requirements used to improve land-use compatibility affect parking design and, in some instances, site selection.

Height Limitations. Parking structure height is limited by (1) how many floor levels motorists are willing to traverse to reach a parking space, (2) cost of building vertically compared to cost of horizontal development, and (3) conformity to building heights in the area. The first two aspects represent design and economic controls; the third aspect relates to local ordinances.

In parking structures, clear height between floor and ceiling is commonly a little over 7 feet; 7.5 feet is desirable, (2.13 meters minimum, 2.29 meters desirable), floor-to-floor height being approximately 10 feet (3.05 meters). It has been found that to require drivers to make more than five or six 360-degree turns in traveling between the most distant parking level and the street level invites driver confusion, particularly on downward movements. Depending on ramp-system configuration, this maximum

turn parameter will generally limit parking structures to seven stories above ground, resulting in 90 feet (approximately 27 meters) of maximum overall height, including roof-level light standards and stair/elevator towers.

Local regulations sometimes limit the maximum ground space for parking facilities, which may require multi-level development to provide a desired number of parking spaces. On the other hand, local regulations may also establish maximum building heights for reasons of visual amenity and/or fire-fighting accessibility. Table VIII provides typical examples of building code regulations for above-ground open-wall parking structures. Of the 92 cities listed, 30 permit 6 tiers of floors, and 26 permit 9 tiers. Seven cities allow 85-foot structural heights.

Height limitations, whether imposed by accepted design practices or local regulations, can have significant cost impacts on parking structure development. When height limitations prevent development of a desired number of above-ground parking spaces on a particular site, the alternatives are to acquire more land or to extend below ground, which both increase costs. A third alternative is to reduce capacity.

Setback Requirements. Street setback requirements are advantageous, although they can increase development cost by reducing overall size of possible sites. Advantages are generally believed to overshadow incurred costs. Setbacks provide more reservoir space to temporarily store entering and exiting traffic between street and parking facility access openings. Sight distances at parking garage entrances and exits are less likely to be obstructed, and turning radii can be more generous, providing faster traffic movement. Setbacks also allow space for landscaping and aesthetic improvements.

Visual Screening. Parking structures can be developed to look like a parking facility or blend with surrounding architectural statements. The choice depends on individual project goals and area objectives. When a parking facility looks like a parking facility, it serves as its own advertisement, conveying evidence of parking availability. However, many developers have felt that maintaining existing neighborhood architectural character, or improving visual aesthetics, is prerequisite for area or generator attraction. As a result, they have provided facades that fit the parking structure into the surrounding area.

Visual screening may have aesthetic as well as economic value. However, screening can conflict with good design and safety practices. Considerations requiring special attention include natural ventilation (or use of mechanical ventilation), maintenance of critical sight distances at access points, user security and orientation to surrounding generators; and natural lighting. Screening can also serve to control pedestrian access.

Multiple-use development is an effective means of blending parking with its environment, and at the same time integrating pedestrian and vehicular systems. Multiple-use development can both unify and beautify downtown areas.

Multiple use is the integration of parking with other land uses on the same site. A parking garage constructed under or above an office building, or as part of a retail complex, are examples—as would be a parking garage driving ramp extended outside a garage structure in airspace over property devoted to nonparking use.

Multiple-use development improves city center environmental quality, provides pedestrian circulation continuity, improves CBD land-use accessibility, and helps offset parking development costs. Advantages can also include convenience afforded by close proximity of parking facility and generator, a higher assurance of parking-space utilization, and lower total land costs through reduction in land requirements. Development cohesiveness and reduction of facilities are fostered by multiple-use development.

Principal problems are increased development costs and legal constraints impacting some public agencies. However, increased

![Figure 11. A multiple-use development concept integrating parking with other land uses on the same site, as well as a separate site.](image-url)
Access Design

Parking garages have a main floor and storage floors. The main floor's principal function is accepting and delivering vehicles to and from the street system. This usually makes it the primary traffic control area where customers enter and leave by car and on foot. Vehicle storage may also be a main-floor function.

Main Floor Facilities

Areas for cashiering, ticket dispensing, manager's office, and employee facilities are usually provided on the main floor. Public restrooms and other customer convenience facilities, such as package checkrooms, telephones, vending machines, and waiting areas, when provided, are located typically on the main floor.

For commercial multiple-use developments incorporating structure parking, the street level or main floor is usually most desirable for retail development. Street-level retail development in multiple-use parking garages helps also to maintain block-face continuity in commercial areas.

While located generally at street level, the main floor can be one level above or below street level to accommodate multiple-use development. The most important main-floor design consideration involves location and capacity of entrance and exit points on surrounding streets.

Access and Reservoir Requirements

Access points should be provided in conformance with local regulations. They should present a recognizable and attractive appearance to prospective customers, while simultaneously providing for safe crossing of pedestrian and vehicular traffic. Requirements for reservoir storage space and control of entering and departing movements depend on whether parking fees are charged and method of revenue collection, type of operation (self-park or attendant-park), magnitude of peak parking-unparking activity, and reservoir opportunities on surrounding streets.

Functions of Reservoir Spaces. The purpose of reservoir spaces is to temporarily store queued vehicles entering or leaving a parking facility. Exit reservoir space should be adequate to prevent queued traffic, stopped to pay the parking fee and/or stopped by street traffic, from congesting the garage circulation system and blocking stall access.

Entrance reservoir problems exist principally in attendant-park garages, where customers drive into the garage entrance reservoir, leaving vehicles to be parked by garage attendants. In self-parking garages, customers drive directly to storage levels, pausing briefly at the entrance, if at all, to receive a parking ticket or to activate an automatic revenue control mechanism.

Most parking garages are operated as self-parking facilities because customers prefer to park their own vehicles and because operators prefer to avoid high labor costs associated with attendant-park operation. Self-park facilities usually require an inbound traffic reservoir for one to eight cars per entry lane, depending on revenue control and operational type (see Table IX). This space provides for driver orientation and prevents blocking of the street system by vehicle queues.

Anticipation of the amount of queuing at entrance and exit control points, or queuing by exiting vehicles that might be blocked by street traffic, requires an analysis of average arrival rates of parking-unparking vehicles and the capacity of revenue-control points and the recipient street lanes.

Desirable Intake/Discharge Capacities. Generally, garages should be able to fill or completely discharge within a maximum of 1 hour. When generated parking demand is of a surge type, such as demand generated by sporting events, rapid parking garage filling and emptying becomes a critical consideration. Ideally, special-event, surge-type demand facilities should be capable of emptying within 30 minutes.

With well-designed stall/aisle and interfloor ramp systems, traffic-flow capacity limitations most often occur at entrance and exit points, and at junction points where departing vehicles enter the street system. Traffic flow breakdowns happen when the parking

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TABLE IX—Typical Inbound Reservoir Needs

<table>
<thead>
<tr>
<th>Use</th>
<th>Reservoir Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free flow entry</td>
<td>1 space per entry lane</td>
</tr>
<tr>
<td>Ticket dispenser entry</td>
<td>2 spaces per entry lane</td>
</tr>
<tr>
<td>Manual ticket dispensing</td>
<td>8 spaces per entry lane</td>
</tr>
<tr>
<td>Attendant parking</td>
<td>10 percent of that portion of parking capacity served by the entry lane</td>
</tr>
</tbody>
</table>

Source: Paul C. Box & Associates, generally unpublished field studies.

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garage system is constrained by traffic restrictions at entrance points or is congested by the lack of capacity at exits. These conditions usually happen in morning and afternoon peak periods, but could occur at other times if the turnover rate is high.

**Entrance/Exit Capacity.** Entrance/exit capacity should prevent vehicles from queuing on approach streets, and minimize vehicle queuing before they enter the street flow. Too many lanes at entrance or exit points may cause driver confusion through duplication, and are a costly misuse of space, inviting inefficient labor use when garage personnel issue tickets or collect fees. The important consideration is that an adequate number of lanes be provided, not necessarily the maximum number possible.

**Automatic Gate Controls.** Lifting, barrier-arm gate types are often used at entrances or exits to ensure parking ticket issuance or parking fee payment (and/or to count or ensure one-way traffic flow). Capacity varies according to barrier purpose, angle of approach, curvature radius of the vehicle travel path, and approach lane gradient.

Entrance gates are usually in conjunction with automatic ticket dispensers or magnetic-coded card readers. Lane capacity with automatic ticket dispenser and gate control is generally between 350 vehicles per hour (when tight turning movements are required) and 500 vehicles per hour when the approach is straight or in-line with structure openings.\(^{24}\) Under conditions of constant waiting lines, 660 vehicles per hour per lane with automatic ticket dispensers have been counted.\(^{25}\) Maximum design capacity is typically 400 vehicles per hour per controlled entrance lane.

Contemporary parking garage design favors large, unrestricted entrance openings, well delineated for easy driver recognition. In some instances, entrances have been made three lanes wide to avoid impressions of a "hole-in-the-wall." However, two-lane entrances are more common.

The discharge capacity of gate-controlled exit lanes has been found to range between 150 and 225 vehicles per hour per lane.\(^ {26}\) Full discharge capacity may not be achieved if there is insufficient


reservoir space beyond the gate or garage exit for vehicles to queue while waiting for acceptable gaps in street traffic flow. Parking garages generally need two exit lanes for each entry lane. Reversible lane operation is desirable to accommodate peak outbound and inbound traffic flow. Directional traffic flow is commonly facilitated with red and green traffic signal lights over each lane.

**Entrance/Exit Dimension Guidelines**. Driveway entrance and exit design should consider driveway width, turning radii, angle of approach and departure in relation to the street, directional traffic flow, and spacing from intersections, other driveways and property lines. Table X gives suggested driveway design values for urban area locations with both high and low pedestrian activity. Ideally, pedestrian-vehicular crossing separations should be used where driveways cross sidewalks with very high pedestrian traffic.

When driveway widths and radii (on the entering side) are made larger, more rapid traffic flow generally can be expected. While generous widths and radii are usually desirable, driveways with high pedestrian volume crossings may be designed with less generous dimensions to encourage lower vehicular entry and exit speed.

**Entrance/Exit Safety**. Sidewalk pedestrian circulation requirements should be recognized in developing multi-lane garage access points. Ideally, several car-lengths should be provided between the sidewalk and the control point.

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**Functional Design and Parking Garage Layout**

**Table X—Typical Entrance and Exit Driveway Dimension Guidelines**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>High Pedestrian Activity</th>
<th>All Other</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width* (in feet)</td>
<td>Minimum (one-way)</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Minimum (two-way)</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>Right turn radius** (in feet)</td>
<td>Minimum</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Spacing† (in feet)</td>
<td>From property line</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>From street corner</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Between driveways</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Angle‡ (in degrees)</td>
<td></td>
<td>75</td>
<td>45</td>
</tr>
</tbody>
</table>

---

* As in central business areas or in same block with auditoriums, schools, and libraries.

† The remaining city streets including neighborhood business, residential, and industrial.

‡ Measured along right-of-way line at inner point of curved radius sweep or between radius and near edge of curbed island at least 50 square feet in area. The minimum width applies principally to one-way driveways.

§ On side of driveways exposed to entry or exit by right turning vehicles.

Ω Measured along curb or edge of pavement from roadway end of radius.

|| Minimum acute angle measured from edge of pavement.


Special consideration should be given to entrance lighting, since drivers entering a parking garage from bright sunlight may experience some temporary visual impairment if light levels are low immediately inside the entrance. While landscaping of border areas between structure and street often improves aesthetics, care should be taken to assure that decorative landscape features, after maturity, do not obstruct lateral sight distance at garage access points.

Parking garage exits should be designed to permit unobstructed sight distance for drivers and pedestrians. Wherever possible, however, signs and pavement markings should be used to alert both drivers and pedestrians to potential crossing conflicts. Some ga-
Chapter VI

PEDESTRIAN CIRCULATION

Parking garage planning and design should provide attractive pedestrian circulation within the garage and between the garage and final destinations. Three basic movements are normally accommodated:

1. horizontal movement from parked vehicle to stairs or elevators—usually along the parking garage driving aisles,
2. vertical movement—by stairs, ramps, or elevators, and
3. connections to street and adjacent buildings—usually separate walkways.

Planning

In most parking garages, pedestrian regulations are difficult to enforce. Pedestrians tend to walk in a path representing the shortest distance, and they have a basic resistance to changing grades or following a prescribed path that is obviously circuitous to an alternate travel route.

Design Concepts

When possible, it is desirable to separate pedestrians from major vehicular movements. However, within a garage it is nearly impossible to separate the horizontal movement of pedestrians from circulating vehicular traffic. Raised or separated walkways on parking floors usually do not receive enough use to merit their expense and, when provided, are often discontinuous. The two basic design concepts involved are pedestrian-vehicular coordination and pedestrian-vehicular separation.

Pedestrian-Vehicular Coordination. Parking garage designs must anticipate moving pedestrians off of storage floors over the shortest possible distance, via the vehicular circulation system. This is accomplished by locating pedestrian access points around the structure perimeter (see Figure 53). Garages with large floor areas, or garages located underground or under office structures or other types of activity centers, frequently provide centrally located pedestrian access points (see Figure 54). It is desirable to have all
parking spaces no more than 100 feet (30.5 meters) from the nearest pedestrian access point on parking levels.

Sight distance, adequate lighting, and well-marked pedestrian access points, coupled with signing for pedestrians, driver orientation, and clearly defined vehicular movements, will aid pedestrian circulation on parking floors.

Pedestrian-Vehicular Separation. The physical separation of pedestrians and vehicles can be essential for a location where major flows of pedestrians and vehicles are likely to cross. Basically, pedestrians can be segregated from vehicular traffic by providing separate walkways or by pedestrian tunnels or bridges.

Pedestrian-vehicular separation measures increase construction costs and require more space. However, pedestrians must be afforded safe walking paths. Separated pedestrian systems offer the opportunity to provide direct, climate-controlled connections to adjacent buildings and/or other pedestrianways, adding to the attractiveness of both the trip generators and the parking facility. In areas of intense pedestrian activity, separated systems are especially desirable from aspects of safety, reduced walking distance, convenience, and comfort.

**Pedestrian Service Facilities and Amenities**

Features such as signing for pedestrians and illumination are essential for safe and orderly movement. Facilities offering functional convenience and visual amenity can help to make pedestrians comfortable and pleasantly aware of their surroundings.

Pedestrian Signage. A parking garage informational system for pedestrians is indispensable. When properly designed, it can improve pedestrian safety and perceptions of the facility, while simultaneously contributing to a smooth flow of pedestrian traffic. The parking garage layout is in itself an information system that, if poorly designed, necessitates more add-on visual graphics and signing.

A garage pedestrian information system should be uniform in location, color, size, and style, and continuous between the parking spaces and generator for both directions of pedestrian movements. The clear orientation of pedestrians is essential. Good graphics suggests the use of one style of lettering, locating messages at decisionmaking points, segregating informational and directional signing from advertising, and avoiding advertisements at critical decision points in order to provide maximum visibility.
A study of visual design aspects for signing at terminals emphasizes these guidelines:

1. Messages should be direct and simple, using short, familiar terms.
2. The number of independent informational messages should be kept to a minimum.
3. Message content should be consistent in terms and units, not requiring translation.
4. Continuity and consistency in graphic design, and clear lines of sight, should be provided throughout the pedestrian signage system.

In multiple-use developments, pedestrian signage in parking areas should be consistent with signing elsewhere in the development. It should clearly identify routes to generators, parking areas, special garage service facilities, and to bus stops or taxicab stands when these facilities are pertinent to the parking facility.

Illumination. Lighting, a necessity for security and pedestrian movement, creates a psychological impression of the walking environment on pedestrians. Adequate lighting can create a feeling of comfort and security, but it can also emphasize the cleanliness (or uncleanness) of a parking facility. Generally, minimum lighting should be in the range of 10 to 20 horizontal footcandles (106 to 212 Lux). However, other considerations such as maximum discomfort glare rating, reflectance, and emergency lighting require detailed design based on accepted standards.

Lighting patterns should emphasize floor areas, particularly where elevation changes exist. Natural lighting should be provided for daytime operation wherever feasible.

Pedestrian Service Facilities. Special service facilities such as package checkrooms or areas, waiting areas, vending machines, and restrooms can be provided in parking garages as customer conveniences. When provided, these facilities are usually located on the main level of pedestrian activity, and preferably where they can be easily monitored by garage personnel.

Garages frequently provide maps showing nearby stores and other parking facilities, including informational brochures on operating procedures. In attendant-park garages, it is customary to provide waiting rooms or areas. Public restrooms generally have disappeared from newer self-service garages, possibly because of the associated security and maintenance problems.

Some parking facilities have enhanced their service and customer relations by providing baby strollers, diaper-changing areas and bottle warmers, wheelchairs, umbrellas, and other items for customers' convenience. These items also can provide a profitable means of advertising for local business firms and the parking facility.

Vending machines inside parking garages are a matter of policy. Anticipated vending machine revenues and patron convenience should be compared to the costs of space, maintenance, refuse removal, signing, and control of vandalism and loitering.

Public pay telephones are usually placed in parking garages simply for convenience, since they generally do not receive enough use to justify their existence by telephone company standards. Public telephones are normally located near the main pedestrian entrance on ground level.

Trash receptacles should be adequate in number and located where they are easy to use. They must be conspicuously recognizable, yet designed to compliment their environment.

Aesthetics. Pedestrian malls and walkways connecting parking facilities with trip generators offer opportunities for interesting and varied visual treatments. This can be accomplished with the use of different textured (or colored) paving materials arranged in decorative patterns, and with landscape plantings.

Materials for doors, walls, floors, and other surface areas along pedestrianways should be able to resist and endure abuse. Surface areas should be of materials resistant to breakage and marking, and should be easy to clean and maintain.

Maintenance. Attention should be given to water drainage and to cleaning pedestrian areas. Water hose connections should be provided at convenient locations—generally not more than 120 feet (36 meters) apart—to facilitate washing walkway areas and watering landscape plantings.

For mechanized sweeping, attention should be given to adequate dimensions along pedestrianways, and their load-bearing capacity. For extensive pedestrian systems, provision for mechanized cleaning can also serve double duty in providing access for emergency vehicles and snow removal equipment.
Pedestrian Travel Facilities

The type and size of pedestrian facilities depends on how they are to be used and what degree of comfort is to be provided. Pedestrian walkway widths should be related to the particular pedestrian flows they are expected to accommodate. For example, the capacity of a walkway used by special-event crowds (high pedestrian demand in a short time period) may be quite different from requirements for shoppers (less intense pedestrian demand, spread over a longer time frame). Because pedestrian traffic generated in most parking garages is light, traditional level-of-service standards are rarely relevant. Design of walkways and pedestrian areas becomes more concerned with spatial composition and amenities influencing the pedestrian environment.

Walkway Widths

Minimum walkway widths for light pedestrian flows typically range from 1 to 5 feet \(^{47}\) (1.2 to 1.5 meters), with the principal consideration being to provide enough space for two persons to walk abreast or to pass each other. If the walkway is obstructed laterally, effective width is decreased, and an extra 1.5 feet (0.5 meter) of walkway width should be provided. Walkways adjacent to display windows or sales counters should provide an extra 3 feet (0.9 meter) of width.

Wider walkways should be used for sidewalks along streets bordering parking facilities. A walkway having an effective width of 7.5 feet (2.3 meters) is considered a minimum for lightly used urban sidewalks. This width will provide an open-flow level of service for pedestrian volumes up to approximately 200 persons per hour. Figure 55 illustrates several design situations providing an effective 7.5-foot (2.3-meter) walkway width. These designs allow couples to be passed by individuals without significant psychological interaction or physical restriction.

Pedestrian Crude Separations

Grade-separated walkways provide additional space for pedestrian movements, eliminate pedestrian-vehicular conflicts, permit opportunities for views and vistas, and offer more opportunities for people-interaction between multi-level structures. However, for grade-separated walkways to be justified on a traffic basis only,

\(^{47}\) Ibid., p. 149.
SEC. 101.0800 PARKING ASSESSMENT DISTRICT

Property (hereinafter in this section referred to as subject property) within an assessment district formed pursuant to any parking district ordinance adopted by the City Council shall be excepted from the requirements of any zone as to the number of required off-street parking spaces in accordance with the application of the following formula:

\[
\text{effective assessment against the subject property} = \frac{\text{total assessment against all property in the parking district} \times \text{parting spaces provided in the district facility}}{\text{spaces, a remaining fraction of effective parking spaces excepted.}}.
\]

The remainder of the off-street parking spaces required by the applicable zoning regulations shall be provided on the lot of premise of the subject property or as otherwise provided in the particular zone. Property located within more than one parking assessment district shall be entitled to an exception based on the sum of the exceptions calculated by the application of the formula referred to above to each parking assessment district.

[Added 1-28-64 by Ord. 8960 N.S.] Amended 8-29-70 by Ord. 10399 N.S., effective 5-1-71; Renumbered 11-13-78 by Ord. 12485 N.S., formerly contained in Sec. 101.0800.]

SEC. 101.0810 COMPUTATION

In computing the required number of off-street parking spaces, a remaining fraction of one half or more shall be deemed a whole unit of measurement; a remaining fraction of less than one-half may be disregarded.

[Added 1-28-64 by Ord. 8960 N.S.] Amended 8-29-70 by Ord. 10379 N.S., effective 3-1-71; Renumbered 11-13-78 by Ord. 12485 N.S., formerly contained in Sec. 101.0800.]

SEC. 101.0811 MARKING OF SPACES

Where five or more required spaces are provided on a lot, each space shall be clearly marked with paint in any other material contrasting in color with the surface to which applied.

[Added 1-28-64 by Ord. 8960 N.S.] Amended 8-27-70 by Ord. 10375 N.S., effective 3-1-71; Renumbered 11-13-78 by Ord. 12485 N.S., formerly contained in Sec. 101.0800.]

SEC. 101.0812 COMPUTATION - UNMARKED AREAS

In an unmarked parking area containing less than five spaces, the number of spaces shall be the quotient of the total number of square feet in the usable parking area divided by 350 square feet.

[Added 1-28-64 by Ord. 8960 N.S.] Amended 8-27-70 by Ord. 10375 N.S., effective 3-1-71; Renumbered 11-13-78 by Ord. 12485 N.S., formerly contained in Sec. 101.0800.]

SEC. 101.0813 MINIMUM DIMENSIONS FOR PARKING SPACES

A. Parking spaces shall have a minimum width of eight and one-half (8-1/2) feet and a minimum depth of twenty (20) feet, except for spaces for less than standard size cars as authorized by this section, which shall have a minimum width of seven and one-half (7-1/2) feet and a minimum depth of fifteen (15) feet.

B. Commencement on the effective date of the ordinance adopting these regulations, 40 percent of the total minimum off-street parking requirement may be allocated to compact car spaces; commencing January 1, 1981, this allocation may be increased to 50 percent; and, commencing January 1, 1983, this allocation may be increased to 60 percent.

C. Compact car spaces shall be clearly designated and all necessary markings and signs shall be maintained and/or replaced on a regular interval as may be necessary. When existing parking areas are redesigned to accommodate compact car spaces, the old signs and space markings shall be removed or completely covered in an appropriate manner as approved by the Zoning Administrator.

D. Aisles and driveways shall be dimensioned in substantial conformance with standards adopted by the Planning Commission as set forth in a document entitled "Locational Criteria, Development Standards and Operational Standards - Off-street Parking Lot," on file in the office of the Planning Department. Substantial conformance shall be determined by the Zoning Administrator; said determination shall be subject to appeal in the manner set forth in Section 101.0503.

[Added 1-28-64 by Ord. 8960 N.S.] Amended 8-27-70 by Ord. 10375 N.S., effective 3-1-71; Renumbered and amended 11-13-78 by Ord. 12485 N.S., formerly contained in Sec. 101.0800. (Amended 6-23-86 by O-16672 N.S.)

SEC. 101.0814 ACCESS AND GRADES

A. Each space shall open directly upon an aisle or driveway of such width and design as to provide safe and efficient means of vehicular access to such parking space, except as herein provided. All required parking facilities shall have convenient, direct and adjacent access to a public street or alley.
List of Resources
List of Resources

Amero, Richard W.
"Balboa Park, Fairy City or Country Park", 1984.

Amero, Richard W.

Amero, Richard W.

Amero, Richard, and Monty Griffin

Balboa Park Citizen's Study Committee

Balboa Park: El Prado Complex

Balboa Park Expositions 1915-1936

Centre City Planning Committee, City of San Diego
Planning Department

Christman, Florence
Romance of Balboa Park. 3d ed. San Diego: Committee of 100, c. 1977.

City of San Diego Planning Department

City of San Diego Planning Department
Appendix

City of San Diego Planning Department


Cockerell, T.D.A.

"Kate Sessions and California Floriculture"

Dickson, George


Economic Behavior Analysts, Inc.


Estrada Land Planning, Inc.

Balboa Park Master Plan. San Diego, Ca.: City of San Diego Planning Department, 1989.

Fong and La Rocca Associates


Frick, Fay A.

Rebuttal to essay by Richard Amero, Balboa Park, Fairy City or Country Park

Gage, Lyman


Harland Bartholomew and Associates


Mahalik, Paul, and Robert Ward

"Balboa Park’s Landscape: A Historic Perspective. “, 1983

Martyn, Gloria


Metropolitan Transit Development Board (MTDB)

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<tr>
<th>Author</th>
<th>Title</th>
<th>Source</th>
</tr>
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<tbody>
<tr>
<td>Montes, Gregory</td>
<td>&quot;San Diego’s City Park 1902-1910 from Parsons to Balboa&quot;</td>
<td>The Journal of San Diego History, Winter 1979</td>
</tr>
<tr>
<td>Stein, Clarence</td>
<td>&quot;The Outdoor Living Room.&quot;</td>
<td>San Diego and Point Magazine. Vol. 8, No. 8, July 1956, p. 23</td>
</tr>
</tbody>
</table>
Appendix

Whiffen, Marcus, and Carla Breeze
The Art Deco Architecture of the Southwest.
Albuquerque: University of New Mexico Press,
1984.

Wilbur Smith Associates
Centre City and Balboa Park Parking Management
Plan - Final Draft. Prepared for the City of

Winslow, Carleton Monroe
The Architecture and the Gardens of the San Diego

Winslow, Carleton Monroe Jr.
“The Architecture of the Panama-California
Exposition, 1909-1915.” M.A. Thesis, University of
San Diego, 1976.

1915 Exposition: Letters and Minutes.
Committee on the Preservation of Exposition