California Trial Court Facilities Standards

JUDICIAL COUNCIL OF CALIFORNIA

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ADMINISTRATIVE OFFICE OF THE COURTS

California Trial Court Facilities Standards 2006 Edition

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PREFACE

The Judicial Council of California, under Government Code, section 70391, has full responsibility, jurisdiction, control, and authority for trial court facilities. and shall adopt appropriate facilities standards. The Administrative Office of the Courts (AOC), Office of Court Construction and Management (OCCM) as staff to the Judicial Council, has the responsibility under rule 6.150 of the California Rules of Court to prepare and present to the Judicial Council recommendations for policies, procedures, and standards for ensuring that the courts have adequate and sufficient facilities.

With the transfer of responsibility for design, construction, and management of court facilities from counties to the state, the AOC has determined that it is prudent to develop standards reflecting the best practices and successful solutions for basic components of the trial court building. Upon adoption by the Judicial Council, the AOC, in accordance with rule 6.183 of the California Rules of Court, will apply these *California Trial Court Facilities Standards* (hereinafter Facilities Standards) for design and construction of court facilities.

This volume supersedes the *Trial Court Facility Guidelines,* adopted by the Judicial Council effective July 2002.

This 2006 edition has been developed using input from a variety of sources, including the review of earlier facility guidelines; comments from knowledgeable judges, court administrators, court facility planners, and facility operations technicians; experienced architects and engineers; and references such as federal and other state court facility standards. The process included visits to existing courthouses and interviews with local court administrators and courthouse security providers. These post-occupancy evaluations of selected buildings enabled the OCCM to gain a broader perspective on court facility planning and operational requirements; subsequently workshops were held on each subject area with source experts to identify best practices that could be applied to the design of trial court buildings. Throughout the process, "lessons learned" in the design and construction of recent courthouses were identified and discussed.

These Facilities Standards shall be utilized with professional care as defined in the Agreement for Services between the AOC and consultants retained for specific projects, and shall be used in conjunction with applicable code and project requirements as the basis of design for new court facilities in California. For each court building project, the AOC and the affected court will establish an advisory group in accordance with California Rules of Court, rule 6.183(d); the advisory group will assist the AOC with implementing the Facilities Standards for that specific building.

The Facilities Standards will promote buildings that provide long-term value to the judiciary, to the courthouse occupants, to the community in which they reside, and the taxpayers of California. These Facilities Standards attempt to maximize value to the State of California by balancing the aesthetic, functional, and security requirements of courthouse design with the budget realities of initial construction cost and the long-term life cycle cost of owning and operating institutional buildings.

Judicial Council of California
Administrative Office of the Courts
Office of Court Construction and Management
Design and Construction Services

1

GENERAL PRINCIPLES

Aerial view

San Francisco Civic Center Courthouse
San Francisco, CA
RossDrulisCusenbery Architects
Hood-Miller Associates
Mark Cavagnero Associates/John M. Y. Lee

The California Trial Court Facilities Standards define the minimum space and the functional, technical, and security requirements for the design of new court facilities in the State of California. The Facilities Standards reflect best practices and successful solutions, as the basis for achieving design excellence within contemporary court facilities.

The Facilities Standards are criteria to be used by design professionals, the judiciary, court administrators, and facility planners. The Standards provide a resource of planning and technical criteria. Each courthouse project entails many variables that influence design decisions, including size, calendar type, location, climate, geography, and site context. The Standards provide a basic understanding of the programmatic, design, and operational concerns common to court facilities, and illustrate how standards may reasonably be applied to meet the needs of individual projects. The specific solutions may vary by project; therefore, the diagrams shown are representational and do not describe the only acceptable solutions. Flexibility has been indicated where possible.

The Standards represent minimum planning and design expectations; design professionals must understand that these Standards do not exempt them from meeting the professional standard of care.

This document is intended primarily for new and solely court building projects. However, many of the design criteria and performance standards may be applicable to court renovation projects or building system upgrades in existing court buildings, as well as buildings shared with other related justice agencies.

1.1 DESIGN PRINCIPLES

Design Excellence

The Standards require implementation of design excellence principles, collectively known as the *Principles of Design for California Court Buildings.* These principles are adapted from and based, in part, on the *Guiding Principles for Federal Architecture,* by Daniel Patrick Moynihan, Hon. AIA, former U.S. Senator (N.Y.), 1962, and on the *Excellence in Public Buildings Initiative,* by Stephan Castellanos, FAIA, former State Architect of California. These principles include:

- Court buildings shall represent the dignity of the law, the importance of the activities within the courthouse, and the stability of the judicial system.
- Court buildings shall represent an individual expression that is responsive to local context, geography, climate, culture, and history, and shall improve and enrich the sites and communities in which they are located.
- Court buildings shall represent the best in architectural planning, design, and contemporary thought, and shall have requisite and adequate spaces that are planned and designed to be adaptable to changes in judicial practice.
- Court buildings shall be economical to build, operate, and maintain.
- Court buildings shall provide a healthy, safe, and accessible environment for all occupants.
- Court buildings shall be designed and constructed using proven best practices and technology, with careful use of natural resources, and controlling long-term ownership costs.

Flexibility and Growth

California court facilities shall be planned for flexibility and, to the extent feasible, to accommodate growth.

- Court facility space needs change over time. Examples of programmed flexibility include: standard courtroom sizes with capacity for juries or special case types, and standard structural modules with adequate dimension and capacity to be converted to courtroom space.
- Floor-to-floor heights, location of vertical and horizontal circulation elements, and column bay dimensions shall allow for conversion of office space into courtrooms. This approach will permit expansion of the judiciary within buildings containing infrastructure elements such as central holding, secure elevators, and electronic security systems. Building infrastructure and raceway shall allow for a reasonable amount of future expansion consistent with the project program and funding.

Small, Medium, and Large Courthouses

Design responses to programmatic needs will vary, depending on the court facility size, type, and location. For example, a small rural courthouse requires a different architectural scale, exterior cladding, room sizes, and building systems than those required for a large urban courthouse. Design professionals shall modulate design solutions to ensure that they are consistent and appropriate for the court type, size, location, context, project complexity, and community they serve.

Building Orientation and Wayfinding

Many court facility users, especially first-time visitors and persons with hearing or visual impairment, are unfamiliar with the public functions and spaces in the courthouse and require assistance in determining where they need to go. Clear circulation, wayfinding visual cues, signage, and graphics are important design elements that will minimize confusion and enhance the visitor's experience when using the courts.

Architects shall provide clear and identifiable pedestrian paths of travel to the main entrance of the courthouse and through internal corridor and site circulation systems, enabling the public to easily understand the facility's organization. They will provide a coordinated series of visual cues, placed in strategic locations, to allow visual orientation to key functional public areas, including courtrooms, clerk's office, self-help centers, and the jury assembly room.

Views to the outdoors, architectural elements, windows, doors, skylights, public art, landscaping, color, texture, and scale are among the design opportunities that can be applied when developing a wayfinding program. Other visual strategies that enhance orientation include stylized door types, door surrounds, and interior glazing in addition to standardized, multilingual signage. These elements encourage building users to rely on intuitive decisions, rather than signage only, when navigating the building.

Other wayfinding strategies include:

- Design the public lobby as a focal point for the entire facility. Locate the entries of high-volume public use spaces so that they can be seen directly from the public entry lobby. If locations of high-volume spaces cannot be seen from the lobby, provide visual clues immediately upon entering the building.
- Provide clear, concise, and attractive graphics, signage, and visual elements so that visitors can locate their destinations without asking security personnel or courthouse staff for assistance.
- Plan and locate public toilet rooms, waiting areas, courtrooms, and public areas in the same areas on each floor to enhance orientation.

1.2 SUSTAINABLE DESIGN

Expectations and design goals for sustainable trial court buildings in California provide the basis for planning and design solutions, as outlined below.

Objectives

Architects and engineers shall focus on proven design approaches and building elements that improve court facilities for building occupants and result in cost-effective, sustainable buildings. All new courthouse projects shall be designed for sustainability and, at a minimum, to the standards of a LEED™ 2.1 "Certified" rating. Depending upon the project's program needs and construction cost budget, projects may be required to meet the standards for a LEED 2.2 "Silver" rating. At the outset of a project, the AOC

will determine whether a project will participate in the formal LEED certification process of the United States Green Building Council (USGBC).

Design Criteria and Performance Goals

The following design criteria and performance goals are universally applicable to all court buildings. They shall provide a direct benefit to building occupants and reduce ownership costs.

- Comply with LEED criteria as described above.
- Plan and design for flexibility, to anticipate future changes and enhance building longevity. Use modular planning and flexible building infrastructure for HVAC, power, security, and communications systems.
- Use natural strategies to protect and restore water resources. Limit disruption to existing vegetated areas. To purify runoff and promote groundwater recharge, use natural storm water treatment systems such as bioretention, bioswales, and permeable paving.
- Improve energy efficiency and ensure thermal comfort. Optimize the building envelope and develop passive solar strategies. Design energy-efficient HVAC systems. Use energy analysis to refine the design so that whole-building energy consumption is at least 15 percent less than permissible for a code-compliant court building. Perform building commissioning to ensure that systems perform as designed. Coordinate daylighting with high-efficiency electric lighting and programmable controls.
- Promote occupant health and well-being in the indoor environment. Provide a connection to natural daylight, optimal lighting and acoustics, and good indoor air quality. Develop systems and detailing to ensure thermal comfort and prevent microbial contamination. Use natural ventilation, aided by HVAC systems, to promote effective ventilation; consider localized occupant-controlled systems.
- Plan for recycling of materials during construction, demolition, and occupancy. Develop specifications for construction recycling; require contractors to develop a construction waste management plan that identifies companies licensed to recycle materials. Provide collection bins for recyclable materials on each floor and a staging area for materials collection.

The following design criteria and performance goals shall be applied as best practices:

- Conserve water and consider water reuse systems. Use low-flow plumbing fixtures, water-efficient appliances, and energy-efficient HVAC equipment. Consider collection of rainwater, reuse of gray water for nonpotable uses, and construction of wetlands bioswales for natural wastewater treatment.
- Use environmentally preferable building materials. Evaluate the life cycle environmental impacts, resource efficiency, and performance of building materials. Seek out nontoxic materials from local, renewable, and sustainably acquired resources that minimize waste and pollution from manufacturing, installation, and maintenance. Use wood products from independently certified, sustainably managed sources. Do not use tropical hardwoods.
- Use appropriate plant materials. Reduce maintenance and irrigation requirements by giving preference to native plant species. Explore opportunities to provide habitat for wildlife and to restore degraded site areas.
- Select and develop sites to promote livable communities. Seek opportunities to redevelop existing sites. Develop links to public transit and create strategies for pedestrian-friendly, mixed-use communities. Consider regional land-use patterns and impacts to the watershed and wildlife habitat. Provide dedicated open space, greenways, and flyways.
- Reduce environmental impact related to energy use. Investigate opportunities to reduce reliance on fossil fuels and to use cleaner power sources. Consider cogeneration, fuel cells, photovoltaic cells, solar hot water, and other renewable energy sources. Explore the potential to use green power. Consider overall source energy use when evaluating system options.

Participation in Energy Savings Programs

Participation in the California Savings By Design Energy Efficiency Policy, or other programs that are or may become available, is encouraged to promote

energy efficiency and environmental awareness, and as a guide for sound energy use and cost decisions.

Programs such as California's Savings By Design program address energy efficiency in new construction and renovation projects, and are funded by utility customers through the Public Purpose Programs surcharge applied to gas and electric services. Free services offered under programs such as these include design assistance, energy efficiency analysis, life cycle cost, and financial incentives for the facility owner and design team.

- As long as the Savings By Design program is funded, all new California court projects may participate in the program and implement energy efficiency measures in accordance with the project's financial criteria.
- Upon designation for energy savings programs, a court project shall be analyzed by the "whole building approach" and by Life Cycle Cost Analysis (LCCA) to determine the energy efficiency measures to be included in the court building.

1.3 PHYSICAL DURABILITY AND FUNCTIONAL USEFULNESS

California court facilities shall be designed to provide long-term value by balancing initial construction costs with projected life cycle operational costs. To maximize value and limit ownership costs, the Standards require architects, engineers, and designers to develop building components and assemblies that function effectively for the durations (target functional lifetime) listed in Table 1.1.

Life Cycle Cost Analysis

Selection of building components, materials, and systems must consider long-term costs for operations and maintenance. Applying LCCA when reviewing design options and selecting design alternatives provides useful indicators of initial and future costs.

- LCCA shall be applied to identify the lowest cost alternatives over a 25-year life cycle for design alternatives.
- Provide a minimum 25-year life cycle cost for construction, maintenance, operational, and recurring costs, using the building LCCA program available from the Federal Energy Management Program (FEMP).
- Energy consumption costs shall be calculated from annual energy usage reports generated by compliance software and utility rate schedules. The annual discount, inflation, and escalation rates shall be determined before start of project.

1.4 ACCESSIBILITY

Accessibility is an integral component of civic building planning and design. As an essential element of the justice system, courthouses must be easily accessible to the public. Because of the unique spaces and functions, court buildings often present unique access challenges for persons with disabilities or with limited English language proficiency.

Universal Design

> *Universal Design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.*
>
> Ronald L. Mace, FAIA (1941–1998)
> Founder of the Center for Universal Design

Since most people experience changing physical abilities over a lifetime and benefit from barrier-free design, the design team shall use the principles of Universal Design to ensure equal access to court facilities, to simplify life for everyone, and to make the built environment usable by as many people as possible, regardless of age, ability, or condition.

The principles of Universal Design are:

- Equitable Use: The design is useful and marketable to people with diverse abilities.
- Flexibility in Use: The design accommodates a wide range of individual preferences and abilities.
- Simple and Intuitive: Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
- Perceptible Information: The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
- Tolerance for Error: The design minimizes hazards and the adverse consequences of accidental or unintended actions.

- Low Physical Effort: The design can be used efficiently and comfortably and with a minimum of fatigue.
- Size and Space for Approach and Use: Appropriate size and space are provided for approach, reach, manipulation, and use regardless of the user's body size, posture, or mobility.

The Center for Universal Design (1997)
The Principles of Universal Design, Version 2.0
Raleigh, N.C.: North Carolina State University

Universal Design principles shall be incorporated into all court buildings.

Component	Target Functional Lifetime (Years)
Architectural Elements: Shell and Core	
Foundations, Horizontal, Vertical Framing and Floor Structures	50–75
Exterior Cladding (Except Sealants)	50
Curtain Wall and Glazing	30
Roofing/Sloped Roofs, Metal or Tile	50
Low Slope (Flat) Roof Membranes	20
Elevator	30
Public Restrooms, Stairs	50
Interior Construction	
Permanent / Core Partitions	50
Improvements Requiring Periodic Remodeling - e.g. “Tenant Improvements”	20
Casework in Courtrooms	35
Stone, Terrazzo, Ceramic Tile Flooring	25
Other Casework	20
Vinyl Composition Tile (VCT), Linoleum, Acoustical Tile	5–10
Carpet and Wall Coverings	5–7
Heating, Ventilating, and Air-Conditioning Systems (HVAC)	
Primary Water Cooled Equipment	25
Primary Air Cooled Equipment	12
Fans, Air Handling Units	25
Distribution Systems (Ductwork)	50
Control Systems	15
Trim/Diffusers	20
Pump Seals	5
Emergency Standby Generators	25
Electric Motors	10
Electrical Systems	
Primary Equipment (Switch Gear, Transformers)	25
Distribution System	50
Fixtures	25
Low Voltage/Security/Access Control	15
Engine-Generator Set	25
Plumbing Systems	
Primary Equipment, Pumps, Boilers	15
Distribution Piping	50
Fixtures	50
Valves, Faucets, Trim	10
Fire Protection Sprinkler Systems	50

Table 1.1 Functional Life of Building Components or Assemblies

2

COURTHOUSE ORGANIZATION

Exterior
Southwest Justice Center
Temecula, CA
Cannon Design

Date of Issue: March 1, 2010

California Trial Court Facilities Standards, 2006 edition

This amendment is a change to the 2006 edition of the California Trial Court Facilities Standards. This amendment deletes or replaces existing language in the standards. This amendment is effective on the date of issue[1].

Design and Construction or Facilities Modifications projects which have reached design development completion (at effective date of this amendment) may be exempted from compliance with this amendment subject to specific approval by the Office of Court Construction and Management.

Chapter 2 COURTHOUSE ORGANIZATION - Amendment 1

On page 2-5 and 2-6 under section 2.3 AREA AND VOLUME DEFINITION; replace the sections, Net Square Feet (NSF) and Building Gross Square Feet (BGSF)with the following(retain Table 2.1) :

2.3 AREA AND VOLUME DEFINITIONS

This section defines terms used in the planning and measurement of court building size and volume, and the ratios resulting from the implementation of these standards.

Net Square Feet (NSF)

The amount of space required for or assignable to a specific employee classification or function, exclusive of interior walls or internal circulation, is the net area, expressed in net square feet (NSF). The Facilities Standards include space standards that are described in NSF. For example, a courtroom of 1,650 NSF describes the courtroom floor area measured to the face of finishes, excluding the thickness of demising walls. Functional areas to be included in the assignable NSF include but are not limited to court floor public waiting areas, weapons screening stations and the public queuing aisles serving them, server and telecommunications equipment rooms, courtroom technology closets, public entry lobby vestibules, courtroom vestibules, court floor holding, public waiting areas for all public service counters, self-help public access computer stations, elevator equipment rooms, mechanical and electrical equipment rooms, fire control rooms, security control rooms, enclosed parking spaces, vehicle sallyports, and enclosed receiving / recycling areas.

[1] This amendment is implemented under Rule of Court, Rule10.180 (b) - "*Non substantive changes to the standards may be made by the Administrative Office of the Courts:"*

Building Gross Square Feet (BGSF)

The gross area of California court buildings shall be measured in accordance with Building Owners & Managers Association (BOMA) *Gross Areas of a Building: Methods of Measurement* © 2009. Construction Gross Area (CGA) and Exterior Gross Area (EGA) shall both be computed.

Courthouses require a relatively high grossing factor because of the multiple levels of circulation, assembly spaces, and public waiting areas. For pre-design purposes, building gross square feet (BGSF) is typically 1.2 to 1.3 times the CGSF. For example: estimating the BGSF of a proposed courthouse of 100,000 CGSF would result in 100,000 CGSF x 1.25 = 125,000 BGSF.

End of Chapter 2- Amendment #1

The general organizational principles for courthouse functions are described in this chapter. Site and program constraints of each project will determine the optimum organization or configuration of a specific court facility.

2.1 PROGRAM STACKING/ZONING

Courthouse organization is segregated both horizontally and vertically. In courthouses with in-custody defendants, courtrooms are commonly provided in multiples of two, sharing one court floor holding area and a security elevator to the central in-custody defendant holding area.

Large Facilities: High-volume public spaces and services are located on the lower floors of court facilities directly adjacent to the public lobby, while courtroom functions are on upper floors. Lower floor functions typically include the offices of the court clerk, jury services and jury assembly room, child waiting rooms, records, public cafeteria, self-help centers, and other frequently visited public areas. If these functions are located on the second floor of the building, a connecting set of stairs shall be provided from the main public lobby to access these areas, in addition to public elevators. Functions requiring less public contact or quieter surroundings, including courtrooms, court administration, and judges' chambers, shall be located on the upper floors. Functions requiring higher security levels, including law enforcement waiting, in-custody receiving and holding, and security command centers, may be located below the ground level floors.

Small Facilities: High-volume public spaces and services are located directly adjacent to the public lobby, while courtroom and high-security functions are located in more remote, quieter locations.

Criminal courthouses require three separate and distinct zones of public, restricted, and secured circulation. Figure 2.1 indicates the vertical relationships of the three-part circulation system in a multilevel

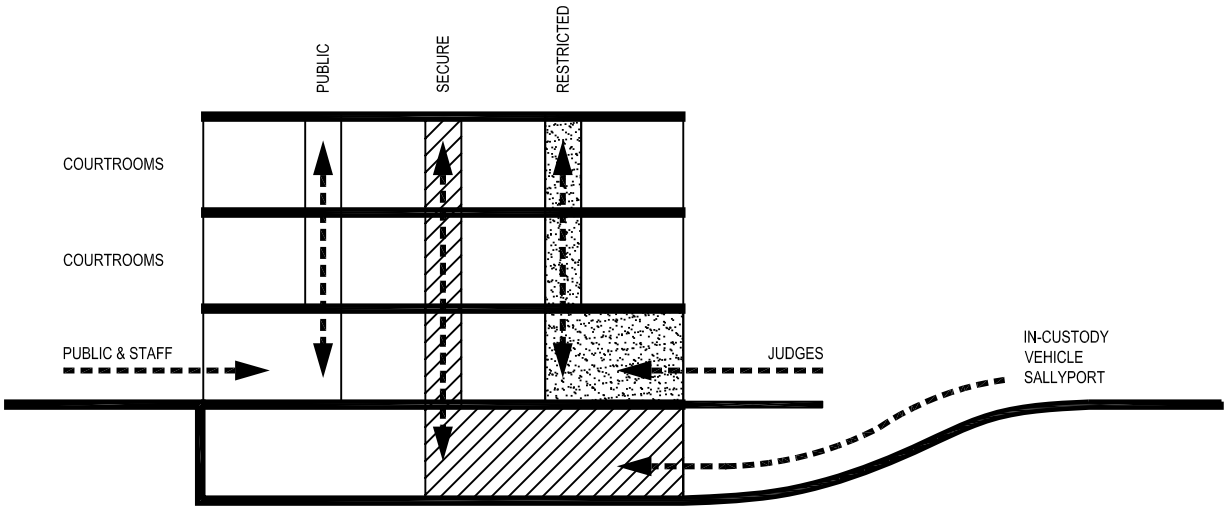


Figure 2.1 Section Showing Three-Part Circulation System

courthouse. The exact locations of these circulation systems may vary, depending on the location of departments and uses within the building. Civil court facilities may only require two dedicated circulation zones, public and restricted, because in-custody cases are not frequently processed in these facilities. Controlling unauthorized movement from a public zone to a restricted zone is a security requirement. Separate each circulation zone with access control systems, or sallyports monitored from a central security control room, and entry authorization protocols as part of security operations, as described in Chapter 4 (Courthouse Security). The three zones of horizontal and vertical circulation shall only intersect in controlled areas, including courtrooms, sallyports, and central detention. A brief description of the three circulation systems, illustrated in Figure 2.2, follows.

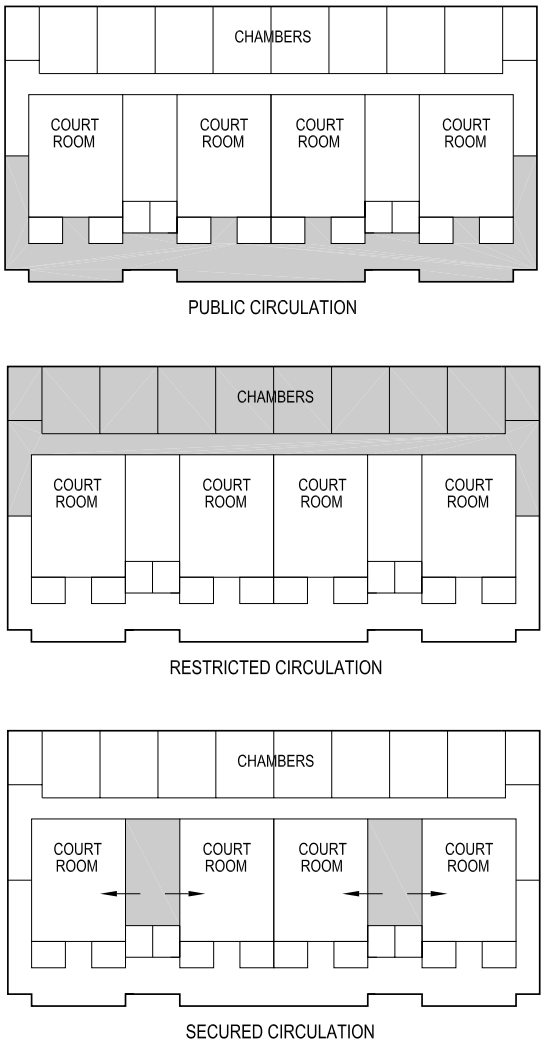


Figure 2.2 Three Circulation Zones

Public Circulation System

Provide a corridor circulation system linking the public lobby to all public parts of a court building. The overall building organization must be easily understood and be defined by this circulation system. Introduce natural light into public and restricted corridors where possible, and simplify building orientation and wayfinding to and from all public spaces and courtrooms.

The public circulation system provides access from the public point of entry to the controlled access points of restricted and secure areas of the courthouse. All areas that have a public service counter, or require access by the general public, shall be accessible from the public circulation system. These areas include the courtrooms, public counter areas, jury assembly room, mediation and Alternate Dispute Resolution (ADR) centers, administrative office, public waiting areas, food service or vending areas, children's waiting area, public restrooms, public elevators, and other public reception areas. If the court shares a building with noncourt activities, provide a separate entrance for the noncourt functions. The public circulation system also includes the public waiting areas immediately adjacent to courtrooms and attorney conference rooms. Appropriately size the public circulation corridors to allow for adequate waiting areas by providing "wide spots in the road" for benches or other breakout areas for conversation and waiting. If possible, locate the public circulation system on the perimeter of the court floors. Provide windows to these spaces, allowing natural light in and promoting a sense of the transparency of the judicial process within to the public on the outside.

Restricted Circulation System

The restricted circulation corridors provide access to court staff, judicial officers, escorted jurors, and security personnel. These corridors and vertical circulation systems connect courtrooms, chambers, support space, jury deliberation rooms, and authorized staff parking areas. The restricted circulation system cannot be bisected by the public circulation system. Building service functions, including storage, staging and loading areas, security staff offices, and other support areas, are located within the re-

stricted circulation zone. The restricted circulation system can include connecting stairs between staff areas on other floors. Depending on the location, the building's existing smoke stair system can be used for this function. Analyze the security, fire exiting, and smoke stair air evacuation system requirements before implementing this option.

Secured Circulation System

Separate the secured circulation system for in-custody defendants from the public and restricted circulation zones. The secured circulation system provides access between the secured in-custody entrance (sallyport), central holding and intake areas, secure attorney interview rooms, courtroom holding areas, and the courtrooms. The design of these areas shall prohibit unauthorized access by the public and escape by persons in custody. California Code of Regulations, title 15, section 1105(c) requires that court holding facilities have a secure path of travel for in-custody defendants that is separate from paths used by the public. Secured circulation corridors, elevators, and stairwells should minimize turns, alcoves, and other potential hiding places; secure circulation areas are monitored with video cameras supervised by the court security staff.

2.2 SPACE STANDARDS

Space Standards

The standards for the size of typical functional areas in court facilities are listed in Table 2.2.

Ceiling Heights

Table 2.1 lists the ceiling height requirements for functional areas of California court facilities. All ceiling heights are measured to the face of ceiling finish. In courtrooms and public lobbies, heights will vary and may be lower or higher than the nominal height.

Corridor Widths

The following minimum and maximum corridor widths apply:

- Public Corridors: 8'–12', depending on code requirements for occupancy loading and amount of public waiting that is provided in the corridor.
- Restricted Corridors: 6', depending on code requirements for occupancy loading.
- Secured Corridors: Minimum 6' (to be determined per space requirements of the local courthouse security provider).

2.3 AREA AND VOLUME DEFINITIONS

This section defines terms used in the planning and measurement of court building size and volume, and the ratios resulting from the implementation of these standards.

Net Square Feet (NSF)

The amount of space required for or assignable to a specific employee classification or function, exclusive of interior walls or internal circulation, is the net area, expressed in net square feet (NSF). The Facilities Standards include space standards that are described in NSF. For example, a courtroom of 1,650 NSF describes the courtroom floor area measured to the face of finishes, excluding the thickness of demising walls. Functional areas to be included in the assignable NSF include but are not limited to court floor public waiting areas, weapons screening stations and the public queuing aisles serving them, server and telecommunications equipment rooms, courtroom technology closets, public entry lobby vestibules, courtroom vestibules, court floor holding, public waiting areas for all public service counters, self-help public access computer stations, elevator equipment rooms, mechanical and electrical equipment rooms, fire control rooms, and court security control rooms.

Space	Height
Courtroom	12'
Chambers	8'–10'
Public Lobby	Varies
Open Plan	9'–10'
Private Offices	9'
Clerk's Public Spaces	9'–10'
Jury Assembly Room	10'–12'
Jury Deliberation Room	8'–10'
Public Corridors	9'–12'
Restricted Corridors	8'–9'
Ancillary Spaces	8'–10'
Secure Corridors	per BOC stds.
Holding Cells	per BOC stds.

Table 2.1 Typical Ceiling Heights

Component Gross Square Feet (CGSF)

The amount of area required by a department or component to function within a court facility is the component area, expressed in component gross square feet (CSGF). In predesign the CGSF is calculated by multiplying a department or component's total NSF by a factor, to approximate the area needed for circulation, partitions, and structural members and columns within the space. Circulation factors vary, depending on the type and size of the spaces in a component.

Building Gross Square Feet (BGSF)

The entire enclosed and conditioned space of a building is the gross area, expressed in building gross square feet (BSGF). Courthouses require a relatively high grossing factor because of the multiple levels of circulation, assembly spaces, and public waiting areas. For predesign purposes, building gross square feet (BGSF) is typically 1.2 to 1.3 times the CGSF. For example: estimating the BGSF of a proposed courthouse of 100,000 CGSF would result in 100,000 CGSF x 1.25 = 125,000 BGSF.

Figure 2.3 illustrates the relationships between NSF, CGSF, and BGSF.

Ratio of Total Building Area to Total Number of Courtrooms

The application of the space standards and the planning factors should result in approximately 10,000 BGSF per courtroom. In other words, the total area of a five-courtroom facility should be approximately 50,000 BGSF. Courts that include the relatively large ratio of office departments to court sets, unique programs, or other specialized functions may be larger than 10,000 BGSF per courtroom. Conversely, court facilities that are used part-time, have no in-custody holding capacity, or have no jury facilities may be less than 10,000 BGSF per courtroom. As the number of courtrooms increases, the overall efficiency (by this measure) of the building should increase and result in a total BGSF that is lower than 10,000 BGSF per courtroom.

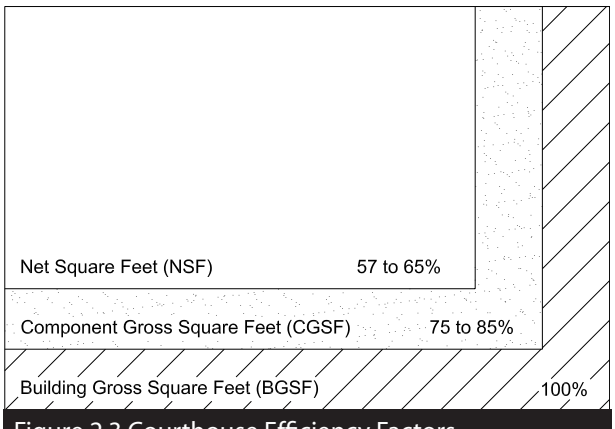


Figure 2.3 Courthouse Efficiency Factors

Courtesy of HOK

Relative Building Volume Ratios

The relative building volume ratio for California court facilities shall be in the range of 14–16 when total building gross area is divided by total interior building volume and expressed as a resultant. Court facilities typically require higher volume ratio than office buildings to accommodate the higher ceilings of courtrooms, and large assembly areas, as well as the volume needed to provide a public entry with visual orientation to a majority of public services from the lobby.

Predesign Planning Factors for Mechanical and Electrical Equipment Spaces

For planning purposes, mechanical spaces may be estimated to require 5 to 6 percent of the total estimated building gross. Electrical spaces will require an additional 2 to 3 percent of the total estimated building gross. Mechanical and electrical equipment spaces are considered functional areas that are included in the assignable NSF.

Description	Size (NSF)
Court Set	
Multipurpose Courtroom	1600–1750
Large Courtroom	2100–2400
Arraignment Courtroom	2100–2400
Chambers (incl. private toilet)	400
Reception/Waiting	50–80
Staff/Reception/Wait - 1 person	100–140
Staff/Reception/Wait - 2 person	140–200
Copy/Workroom/Supply Area	100
Court Reporter's Workstation	64
Research Attorney Work Area	80–150
Staff Toilet Room	60
Jury Deliberation Room	350
Jury Toilet Room	60
Attorney Interview Room	100
Entry Vestibule	64
Law Enforcement Waiting Room	100
Courtroom Exhibit/Evidence Storage	50
Jury Assembly Facilities	
Entry Queuing Area	14/juror (25% of jury call)
Reception/Registration	0–300
Jury Assembly Room	12–20/juror
Forms Counter	5/juror (10% of jury call)
Coffee and Snack Area	115
Mail Center	50–200
Call Center	60
Staff Toilet Room	60
Court Administration	
Public Counter Queuing	14/person
Records Viewing	24/person
Training Room	
Large	1200
Medium	800
Small	400
IS Workroom and Storage	150–300
Active Records Storage	*
Inactive Records Storage	*
Mail Center	150–300
Staff Break Area	150–300
Lactation Room	50
Private Office	
Executive/Director	240–300
Large	225
Medium	150–175
Small	100–120
Mediator	225
Workstation	
Large	100
Medium	64–84
Small	48
Counter Workstation	40–48
Conference Room	
Large (18-20 people)	360
Medium (8-12 people)	240
Small (6 people)	150
Family Law Facility/Self-Help Center	
Waiting	14/person
Reception/Sign-in	40–60
Orientation Room	150–200
Workshop	375–400
Mediation Room	250–400
Child Waiting	120 + 15/child
Security Station	50–80
Equipment Storage	100
Alternative Dispute Resolution	
Reception/Waiting	150
Mediation/Arbitration Rooms	200–400
Caucus Room	100
Related Justice Agency Spaces	
Multipurpose Rooms	150
Attorney Convenience Center	150–300
Volunteer Workstation	50–80

Table 2.2 Space Standards

**Per programmatic, technology, equipment, or code requirements*

Description	Size (NSF)
Volunteer Coordinator	100–120
In-Custody Defendant Receiving, Holding, and Transport	
Vehicle Sallyport	1500–2000
Security Vehicle Parking	350
Pedestrian Sallyport	50–100
Control Center	100–250
Central Holding Cells	10/inmate
Attorney Interview Booth	60–80
Courtroom Holding Cell	40min. (1 per courtroom)
Bail/Fine Payment Counter	48
Storage Rooms	40–100
Public Areas	
Public Queuing Area	14/person
Weapons Screening Station	250
Information Kiosk or Counter	64
Courtroom Public Waiting	220 ea.
Public Toilet Rooms	*
Building Support Services	
Janitor Closet	40
Loading Dock	*
Trash and Recycling Area	*
Media Area	150
Mailroom	160
Staff Toilet with Shower	80
Maintenance Shop	*
Furniture/Eqmt. Storage	*
Telecommunications Equip. Room	150 (min.)
Telecommunications Room	90 per 120,000 SF served
Electrical Room	*
Electrical Closet	*
Security Control Room	150–400
Security Equipment Closet	100 (min.)
Interior Media Space	150

Table 2.2 Space Standards *(continued)*

**Per programmatic, technology, equipment, or code requirements*

3

SITE DESIGN

Public Entry

Antonovich Courthouse

Antelope Valley, CA

Mosakowski-Lindsey Assoc.

Date of Issue: March 1, 2010

California Trial Court Facilities Standards, 2006 edition

This amendment is a change to the 2006 edition of the California Trial Court Facilities Standards. This amendment deletes or replaces existing language in the standards. This amendment is effective on the date of issue[1].

Design and Construction or Facilities Modifications projects which have reached design development completion (at effective date of this amendment) may be exempted from compliance with this amendment subject to specific approval by the Office of Court Construction and Management.

Chapter 3 SITE DESIGN - Amendment 1

On page 3-4 under Section 3 .3 "Integration of Building and Site", insert the following new sub-section:

"Flag poles"

" Provide two flagpoles prominently located near the public entrance and of a height scaled in accordance with the building positioned such that the flags unfurled on these poles will not interfere with the surveillance camera coverage or landscape trees; provide one pole each for the California State flag and for the United States federal flag. "

End of Chapter 3- Amendment #1

[1] This amendment is implemented under Rule of Court, Rule10.180 (b) - "*Non substantive changes to the standards may be made by the Administrative Office of the Courts:"*

3.1 OBJECTIVES

Court facility site design shall:

- Provide a safe yet accessible environment.
- Use site design to engage and reinforce the architectural design principles.
- Provide secured and public parking, and appropriate loading areas, as determined by the program.

The selection of a site impacts the building design, the building's users, and the surrounding area. In order to provide the courts with the most well-located and thoughtfully sited facilities, the design team must consider:

- Initial and life cycle costs including site development and site purchase.
- Convenience and access to public transportation, major roads, and parking: This may predetermine location in areas with existing infrastructure and transit systems.
- Utility infrastructure.
- Proximity to existing and planned future other justice agencies and detention facilities.
- Visibility and dignity of the location for an important civic building.
- Community and regional context: Local community groups' point of view must be considered in the design process. The siting of the court facility should take into consideration and ideally improve the existing context by complying with local restrictions and planning mandates, such as compatibility with neighboring land use and view corridors.
- Effect on the environment: Selection of sites requiring reclamation and cleanup, or sites with historic buildings, may reduce environmental impact and serve as successful examples of reuse.

The selection of an appropriate and successful site will serve the best interests of the courts, building users, and the community.

3.2 SITE AND BUILDING SECURITY (CPTED)

Balancing security and openness is an essential site design principle. Court facilities must be and appear to be open to those who use them. A building can provide a safe working environment without becoming a fortress, isolated from the community.

The design team must have knowledge of crime trends and their impact on the operational design criteria. Permanent, effective, and visually appealing security planning solutions are the basis of Crime Prevention Through Environmental Design (CPTED). CPTED principles reinforce the ability of design and the built environment to minimize crime and the fear of crime, and improve the quality of life. Apply CPTED principles in site and building master plans and in the early phases of architectural and landscape design. For specific security measures see Chapter 4 (Courthouse Security).

CPTED Strategies

There are three basic CPTED strategies:

- Natural surveillance: The placement of physical features, activities, and people in such a way as to maximize visibility, thus preventing the opportunity of crime (e.g., proper placement of windows overlooking sidewalks and parking lots, using transparent vestibules at building entrances to divert persons to reception areas, etc.). This strategy

can be supplemented with the use of security and police patrols and the application of closed-circuit television.

- Natural and constructed access control: Natural access control focuses on limiting and providing guided access through use of properly located entrances, exits, fencing, landscaping, sidewalks and roadways, signage, and lighting. This guidance helps deter access to a crime target and creates a perception of risk to a perpetrator.

- Territoriality: The use of physical attributes that express ownership such as fencing, pavement treatments, signage, and landscaping promotes a perception that these areas are controlled. In an area that is physically designed to protect designated space, people are more likely to challenge intruders or report suspicious activity, and the design itself causes intruders to stand out.

3.3 INTEGRATION OF BUILDING AND SITE

The following planning criteria shall apply to site design.

Orientation

Consider airflow and microclimate when siting buildings; in hot climates, maintain airflow around buildings to reduce interior temperatures. Avoid creating enclosed areas, which can block airflow. Maximize solar orientation for outdoor seating and to cool the buildings.

- Create spaces for programmed outdoor uses, scaled to the intended activity. Locate outdoor sitting areas and service areas away from building air intake units, to minimize the intake of smoke and exhaust fumes.

Figure 3.1 Public Entry, Los Angeles Courthouse

- Orient main entrances of new buildings toward pedestrian areas, to facilitate safe and barrier-free access. Orient buildings to take advantage of views, and, conversely, in new buildings do not block major view corridors.

Massing

Building shape, size, and scale contribute to a facility's architectural and visual character. To convey human scale, and not overwhelm court users, massing and scale of all new construction shall be considered during planning and design. The following shall apply:

- Building height and coverage may respect local zoning regulations, although such regulations do not strictly apply to state buildings.

- Detail architectural elements of large buildings to maintain a sense of scale and sensitivity to the neighborhood context. Consider the visual and environmental effects that new and existing structures will have on the neighborhood, and on existing buildings located in the sphere of influence caused by shading or reflectance, changes in airflow, and views to and from existing buildings.

Pedestrian Access

Access to and from the courthouse must be safe, convenient, and consistent with universal design principles. If access involves crossing of streets, provide traffic control measures. On extremely busy streets, engage local government in discussion of potential for signalized pedestrian crossing to the courthouse from the parking area.

Building Entrances

Provide a single building entrance for visitors, staff, and the public, to facilitate cost-effective security operations. See Figure 3.1. Provide a separate entrance for judges and bench officers.

- Provide natural or constructed surveillance for building access points.

- Protect buildings from vehicular threats. See Chapter 4 (Courthouse Security).

- Barrier devices, such as planters and seating walls, shall be functionally integrated into the site and

building design, but shall not be an impediment to visual surveillance by law enforcement.

Site Utilities

Design the location and visibility of utilities to minimize impact on the landscape.

- Service areas and above-grade utilities, including backflow preventors, standpipes, gas docks, and emergency generators: Locations shall accommodate long-term maintenance requirements and minimize conflicts with landscape design. Integrate enclosures with or into adjacent buildings; locate away from primary entries. If not possible, cluster components and screen from entries and primary pedestrian paths using appropriate lighting, materials, and planting material.
- Underground utilities, including electrical substations, manholes, controlled environment vaults, and steam service: If possible consolidate under roads, walks, and plazas to minimize impact on the landscape. Locate surface hatches, utility covers, ventilation, and access elements within paved areas. If planted areas are the only option, integrate into shrub and ground cover plantings to conceal their appearance. Conceal vault covers in modular paving areas.

Landscape Design

Provide a related group of landscape materials, to promote continuity throughout the site. Scale and function of landscape materials shall be appropriate to the region, site climate, neighborhood context, security, and functional requirements of a California courthouse. The following landscape design standards apply:

- Configure landscape elements per CPTED strategies.
- Provide visual focus for the public entry and the path to it with appropriate planting scale and plant placement.
- Define outdoor spaces consistently and with appropriate scale and function throughout the premises.
- Design landscaping features to not compromise video and staff surveillance of the building or create hiding places.
- Use landscaping and building configuration to shade and provide sound, sun, and wind buffering for outdoor spaces and pedestrian areas. Provide shading on southern and western building elevations.
- Provide surface parking lot shading, with a minimum of one canopy shade tree per every ten parking spaces.
- Respect sustainable performance goals described in section 1.2 (Sustainable Design) to reduce maintenance and irrigation requirements by giving preference to regionally appropriate plant species and by using natural strategies to protect and restore water resources.
- Design landscape elements to prevent unsightly damage by vandalism, birds, trash, transients, or skateboarders where necessary.

3.4 PARKING

The transportation contexts in which trial court facilities will be designed and built vary greatly throughout the state and over time. Certain communities limit the amount of parking to shift people into public transit; some communities are not served by public transit. Demand for parking spaces at court facilities is not well documented by empirical studies. Parking in surface lots or structures requires large amounts of land, funds for capital construction operation, and maintenance. The public may equate convenient access to the justice system with easy access to inexpensive parking. Therefore, parking demands and solutions must be carefully considered for each new or expanded court building.

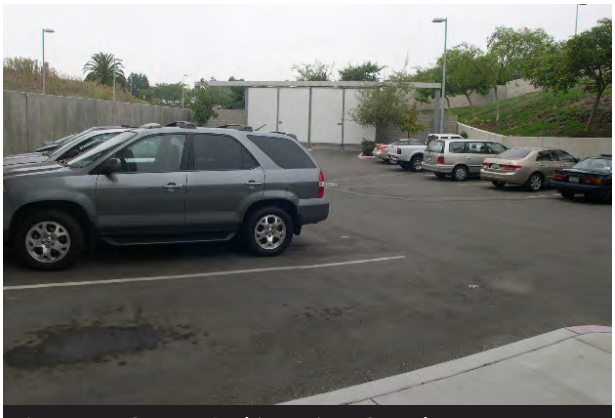


Figure 3.2 Secure Parking, Vista Courthouse

Access to and availability of adjacent public parking for staff, visitors, and jurors must be studied before determining how to provide parking for each new or expanded court building. Public transit service to the site must be studied, as parking demand may be correspondingly reduced. Shared parking agreements with adjacent property owners are encouraged, to use existing parking with demand times that might be different than for the trial court. In areas where the public typically expects to pay for parking, it is consistent to expect visitors, jurors, and staff to pay prevailing rates for parking in adjacent public or privately operated parking lots and structures.

If public parking is provided, calculate parking requirements as follows:

- The number of courtrooms and types of matters to be heard.
- Expected public transit use. Staff parking demands can be reduced through traffic-management plans, such as carpooling and public transportation programs.
- The average number of attorneys, visitors, and jurors expected daily; the expected length of stay for each type of parking user.
- Availability of parking within a three- to five-minute walk from the facility.
- The number of employees at the facility; existing employment agreements regarding provision of parking.
- The average number of official vehicles expected daily at the site.

Limited data gathered by the OCCM indicates a parking demand, for all courthouse users except judicial officers, ranging from 20 spaces per courtroom for medium to large courthouses up to 45 spaces per courtroom for small courthouses in rural or suburban areas. There is no single standard for parking.

Provide secured parking adjacent to or within the courthouse for each judicial officer, the court executive officer, and a small number of staff that may require secured parking. See Figure 3.2. Secured parking in surface lots shall be fenced, visually screened, and separated from public circulation pathways and parking. If secured parking is provided beneath the courthouse, separate restricted elevator access from the secure parking area to restricted court spaces shall be provided. Other requirements for vehicular access to security areas are provided in Chapter 4 (Courthouse Security).

Parking spaces, except for accessible spaces, shall be seven-feet six-inches by 18-feet. Provide 25-foot wide drive aisles for double-loaded 90-degree layouts. Parking space depth can overhang a planting area by one-foot six-inches. See Figure 3.3.

Provide a loading zone for delivery vehicles that do not need to use the loading dock, or where a loading dock is not provided. However, all incoming packages delivered shall go through security screening, consistent with the court security operations plan.

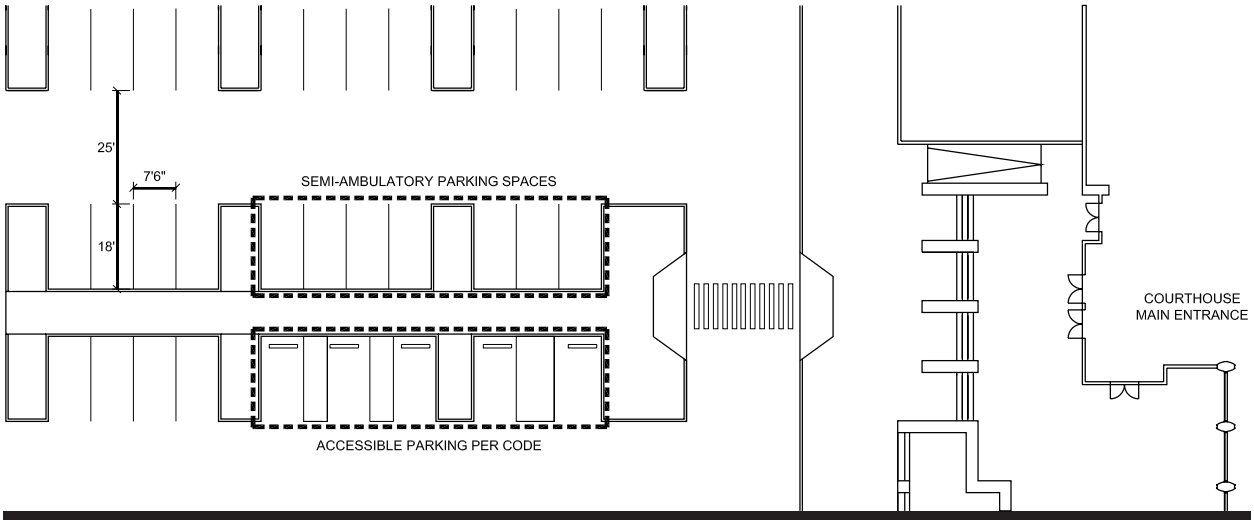
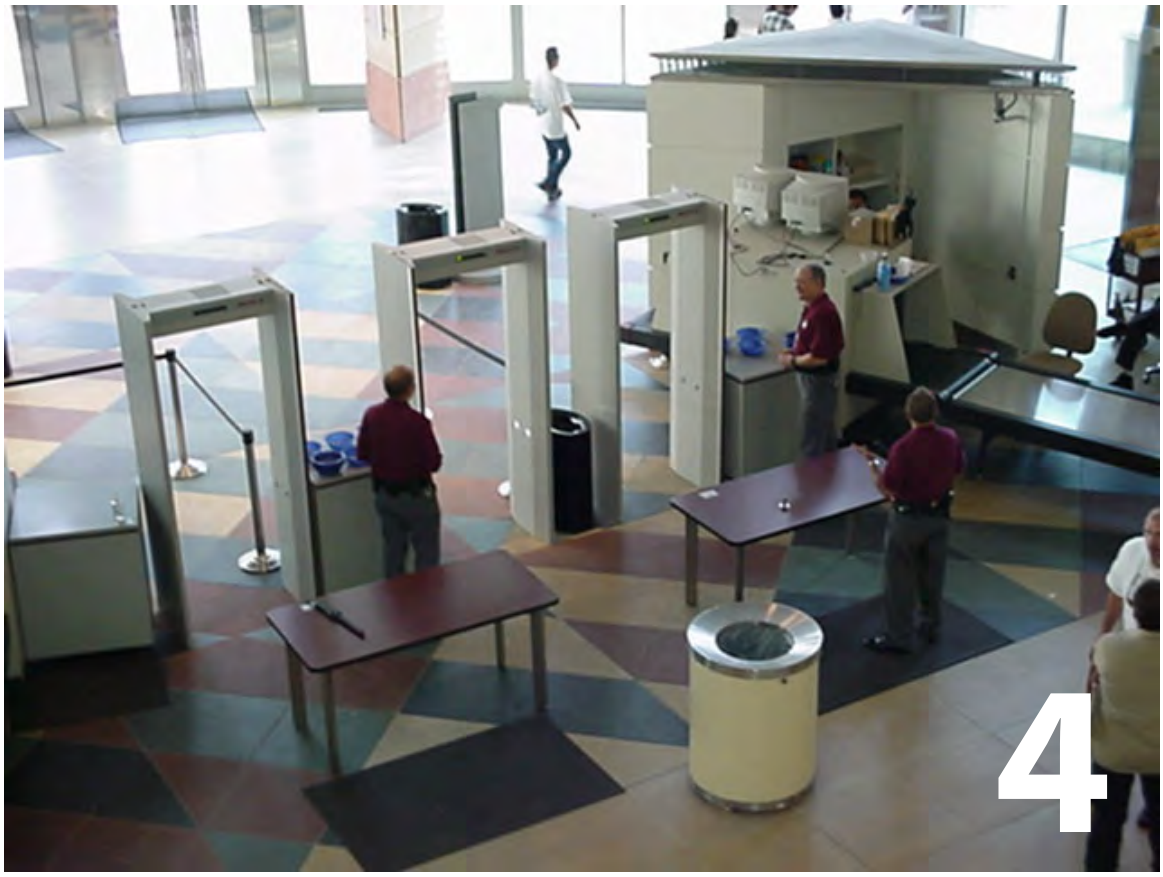


Figure 3.3 Parking Layout Showing Location of Accessible and Semiambulatory Spaces



4

COURTHOUSE SECURITY

Public Waiting Area

Phoenix Municipal Courthouse
Phoenix, AZ
HOK Architects and DMJM Architects

Date of Issue: March 1, 2010

California Trial Court Facilities Standards, 2006 edition

This amendment is a change to the 2006 edition of the California Trial Court Facilities Standards. This amendment deletes or replaces existing language in the standards. This amendment is effective on the date of issue[1].

Design and Construction or Facilities Modifications projects which have reached schematic design completion (at effective date of this amendment) may be exempted from compliance with this amendment subject to specific approval by the Office of Court Construction and Management.

Chapter 4 COURTHOUSE SECURITY - Amendment 1

On page 4-4, delete section 4.4 Threat Assessment Procedure and replace with this new section:

4.4 RISK ASSESSMENT PROCEDURES

The AOC's Office of Emergency Response and Security (OERS) shall conduct a Risk Assessment for each project. The Risk Assessment shall identify potential threats and vulnerabilities, consider the likelihood and potential consequences of an event occurring, and recommend mitigation measures. The assessment shall be used as the reference document for project specific solutions prepared by the architects and engineers, such as blast-resistant requirement. The project-specific Risk Assessment with the resulting project-specific Table 4.1, as well as the principles and security measures described in this chapter shall set the scope of security design elements for the site and the court building.

On page 4-5, delete "Figure 4.2 Threat Assessment Flow Chart".

On page 4-6, change "Parking Security" as shown below:

· Public parking shall not be allowed within or beneath the courthouse. ~~or directly adjacent to the courthouse.~~

[1] This amendment is implemented under Rule of Court, Rule10.180 (b) - "*Non substantive changes to the standards may be made by the Administrative Office of the Courts:"*

~~· Underground secure parking for judges and limited court staff requires a screening area before car entry.~~ The number of vehicular access points into secure parking areas must be minimized and controlled. ~~with operable barriers.~~

And add the following:

· Parking adjacent to the courthouse must be evaluated by the risk assessment and set back away from the courthouse a minimum of 25 feet.

On page 4-7 delete the following under "Site Security" as shown:

· ~~Provide CCTV surveillance of building entrances.~~

And replace with the following:

"Provide video surveillance of building entrances and building perimeter."

On page 4-7, delete this sentence under subsection "Courtrooms":

· ~~Provide lock-down capability for courtroom exit doors.~~

And insert words as follows:

· Delay exit devices for courtroom exit doors are permitted with approval of the authority having jurisdiction.

On page 4-7, under subsection Courtrooms, add this sentence:

· In design where windows are provided, ballistic glazing is required in courtrooms as determined in the Risk Assessment.

On page 4-8 under subsection, "Lobby and Waiting Areas", delete the words as shown and revise:

· ~~In high-crime neighborhoods,~~ Provide ~~CCTV~~ video surveillance of lobby and secured waiting areas of buildings.

On page 4-9 under subsection, "Security Control Center", delete first paragraph and replace with:

Locate security control center in a location to visually monitor the entrance screening area and to operate- monitor electronic security systems. Refer to Figure 4.4.

On page 4-9 under subsection, "Security Equipment Closet/Room", delete the first paragraph and the first bulleted item; replace with text below:

~~Provide a main security equipment closet or room adjacent to the building security control center and telecommunications closet.~~

- ~~Locate at least one secondary security equipment closet on every other floor to accommodate security equipment, wiring, pull cans, and terminal cabinets. This may be combined with the technology closet.~~

Security electronic servers, routers and other "head-end" equipment shall be located in building main and secondary electronic equipment rooms; annuciators, monitors, control panels shall be located in security control rooms.

On page 4-11 under section, "4.8 Electronic Security Systems", change the second bulleted item as shown:

- ~~CCTV~~ Video: Provide high-definition color cameras in each courtroom, with ~~audio monitoring capability~~, digital video recording and storage for all cameras with 7 days of data retention.

On page 4-11, insert a new section 4.9:

SECTION 4.9 – BULLET RESISTANT GLAZING AND PANELS

Exterior Windows (where Risk Assessment stipulates bullet resistance):

- Glazing: Glass-clad polycarbonate assembly; (see chapter 11)
- Panel in opening above or below glass: ballistic resistant starch-oil woven roving ballistic grade fiberglass panels to match the ballistic rating of the glazing
- Threat level: U.L. 752 listed level 3, 3 shots or greater as stipulated by Risk Assessment

Clerk/Public Transaction Counter outside of building weapons screening:

- Glazing: Glass-clad polycarbonate assembly; (see chapter 11)
- Panel in opening above or below glass: ballistic resistant starch-oil woven ballistic grade fiberglass panels to match the ballistic rating of the glazing
- Threat level: U.L. 752 listed level 3, 3 shots and forced entry or greater as stipulated by Risk Assessment

Clerk/Public Transaction Counter within the building weapons screening

- Laminated glass – two glass layers with PVB interlayer (thickness determined by calculation for glass size and supporting structure)
- No ballistic resistant panels
- Not ballistic or forced entry resistance

Judge/ Clerk/Witness courtroom bench

- Behind finish material: ballistic resistant starch-oil woven ballistic grade fiberglass panels
- Threat level: U.L. 752 listed level 3, 3 shots or greater as stipulated by Risk Assessment

On pages 4-12, 4-13, 4-14, replace "Table 4.1 Security Standards", with new table below:

Replace existing table with the following:

	Compliance
Mandatory As Determined by Risk Assessment	M RA
Site Selection	
Maximize setback distance to street or adjacent buildings	M
Locate building to minimize adjacency and configuration risks	M
Parking Security	
Restrict public parking locations in proximity to court building	M
Restrict and control secure parking locations	M
Co-locate parking garage and loading dock entries	RA
Provide video surveillance at parking entries and exits	RA
Site Security	
Employ CPTED principles	M
Place trash receptacles and mailboxes outside the setback distance	M
Illuminate site perimeters, walkways, and drives	M
Restrict height of landscaping	M
Protect utilities (gas, power, telephone, etc.) at entrance to site	M
Provide physical barriers to maintain building setback distance	RA
Provide video surveillance of site	RA
Building Layout	
Provide only one public entrance	M
Provide a secure path between judges' parking and chambers	M
Separate high-risk areas from occupied spaces, critical systems, utilities, and egress	M
Co-locate loading dock and mailroom toward the building exterior	M
Courtroom	
Provide silent duress alarm buttons for judge, CSO, and clerk	M
Provide bullet-resistant panels within podium/bench for judge, CSO (depending on makeup of CSO station), and clerk	M
Provide video surveillance	M
Provide bullet resistant panels and glazing to counters accessible outside of secured areas	M
Restrict vision through windows with the line of sight from exterior into courtroom	M
Provide gun locker in CSO station	M
Provide audio surveillance (microphones) of courtroom	M
Judge's Chambers	
Provide silent duress alarm buttons for judge and clerk	M
Restrict vision through windows with the line of sight from exterior into chambers	M
Table 4.1 Security Standards	

On page 4-13 replace existing table with the following:

Provide bullet-resistant glazing	RA
Jury Deliberation Room	
Provide silent duress alarm buttons	M
Restrict windows with the line of sight into jury deliberation room or provide ballistic resistant glazing	M
Payment Counter, Court Clerk Office and FCS Mediator Offices	
Provide silent duress alarm buttons	M
Provide video surveillance	M
Provide bullet-resistant panels and glazing to counters accessible outside of security screening	M
Lobby and Waiting Area	
Provide only one public entrance	M
Eliminate potential areas of concealment in the unscreened areas	M
Provide duress alarms, magnetometer, and package weapons scanner at screening station	M
Design lobby to accommodate direct visual surveillance by security	M
Design lobby to allow increased levels of security	M
Provide barriers between lobby and secured areas of building	M
Physically isolate unscreened lobby area	M
Provide video surveillance of lobby and secured areas of building	M
Current Case File Storage Areas, Evidence Storage Rooms	
Locate within private circulation; provide card reader and video surveillance	M
Provide appropriate fire protection devices	M
Loading Dock/ Mailroom	
Provide video surveillance and silent duress alarm button	M
Design loading dock with ability to be physically secured	M
Provide space and driveway arrangement to permit manual screening of delivery trucks	M
Physically isolate the loading dock	RA
Locate critical and occupied space at least 25' away from loading dock/mailroom or harden walls	RA
Provide package scanner in mailroom	RA
Security Control Center	
Provide control center to operate and monitor electronic security systems	RA
Duplicate functions of in-custody holding control room	RA
Building Envelope	
Exterior doors shall be locked and monitored by intrusion alarm system	M
Table 4.1 Security Standards *(continued)*	

On page 4-14 replace existing table with the following:

Minimize/eliminate operable windows	M
Limit windows at critical areas	M
Provide forced entry protection at the first floor	M
Monitor exterior glass with intrusion alarm system	RA
Provide blast-resistant laminated glazing and mullions to meet security requirements	RA
Structural Systems	
Minimize floor-to-floor heights	M
Minimize column bay spacing	M
Avoid overhangs with occupied space above	M
Limit or avoid large transfer girders	M
Provide redundancy and alternative load paths to mitigate blast loads	M
Provide balanced design of structural components	M
Use ductile structural systems	M
Control deflection, especially around windows	M
Harden floor and/or walls to resist package or backpack blast	RA
Use circular columns with spiral reinforcing	RA
Design structural columns to resist a package explosive located 3' away	RA
Use one-way wall elements spanning from floor-to-floor	RA
Concrete masonry unit (CMU) walls shall be fully grouted and reinforced, with connections designed to allow full development of capacity at the supports	RA
Mechanical, Electrical, and Fire Protection Systems	
Locate critical utilities far from high-risk areas	M
Locate emergency generators at least 50' from the primary electrical source	M
Avoid routing critical utilities next to parking areas	M
Protect air intakes	M
Protect critical utilities including service entrances	M
Locate main and backup systems as far apart from each other as possible, a minimum of 50'	RA
Isolate mailroom HVAC zone	RA
Provide mailroom purging system	RA
Provide redundancy of critical systems	RA
Electronic Security Systems	
Provide access control between public, restricted, and secure areas	M
Provide electronic building perimeter protection	M
Provide monitoring of intrusions and duress alarms	M
Provide door control and remote monitoring of in-custody transportation and holding areas	M
Coordinate current and future infrastructure and control systems	M
Provide video surveillance and audio monitoring in courtrooms	M
Table 4.1 Security Standards	

End of Chapter 4 –Amendment #1

Courthouses must be a safe harbor to which members of the public come to resolve disputes that often are volatile. Once courthouses themselves are perceived as dangerous, the integrity and efficacy of the entire judicial process is in jeopardy.

Ronald M. George,
Chief Justice of California

Courthouse security planning must ensure a safe and secure environment for the staff and public, and must protect the functions and assets of California court facilities. Balancing security and openness in civic buildings presents myriad challenges. Security planning and design must anticipate terrorist events, chemical and biological attack, natural disasters, emergencies, power outages, crime, and workplace violence. Building systems shall be designed and maintained to protect public health and life safety, and provide direct egress routes for rapid and safe evacuation of building occupants to the outside. These guidelines represent best practices to maximize public security and personal safety. The security planning process is most effective when integrated into the courthouse design at an early stage.

See Chapter 8 (In-Custody Defendant Receiving, Holding, and Transport) for security relating to in-custody defendants. See Chapter 17 (Telecommunications and Audiovisual Criteria) for electronic systems infrastructure.

4.1 OBJECTIVES

Courthouse security planning and design shall be based on a site-specific threat assessment and will:

- Ensure a safe and secure environment for all building occupants.
- Maintain continuous operations until building inhabitants can evacuate to a safer area.
- Provide security and confidentiality of critical information.
- Enable security and court personnel to maintain control during normal and disrupted operations.

4.2 DESIGN, TECHNOLOGY, AND OPERATIONS

A comprehensive court facility security plan integrates design, technology, and operations, including policies, procedures, and personnel. The most effective security plan is achieved when these three elements are coordinated during early project phases.

- Design: Design includes architectural elements and engineering systems, including space planning, adjacencies, user group zoning, passive physical protection; doors, locks, site perimeter barriers; exterior lighting, egress and circulation system; and all building systems relating to building evacuation.
- Technology: Technology includes electronic security systems and equipment, such as automated access controls, alarm monitoring, duress alarms, remote door and gate controls, closed-circuit television (CCTV), and cameras.
- Operations: Operations refers to policies and procedures for the court facility, and those applied for security program management, security staffing, and employee training.

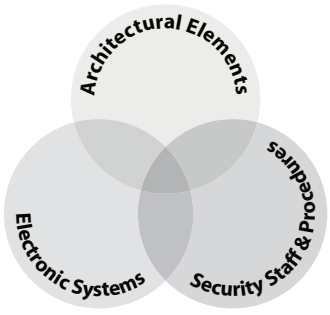


Figure 4.1 Security Plan Elements

This chapter addresses design and technology planning criteria. When developing a facility security plan, the project team must understand the essential role of operations and staffing levels, because they are directly related to the ability to provide a safe environment, and they affect annual operating costs and budgets.

Security planning must consider and reflect security staffing levels at each facility. The project team shall develop a comprehensive plan with courthouse security personnel to understand operating policies, procedures, and projected security staffing levels. Technology and electronic systems shall be coordinated with architectural and engineering systems and with building operations.

4.3 FACTORS AFFECTING SECURITY LEVELS

New court facilities vary in size, complexity, types of cases handled, threats, and geographic location. Court facilities may, in some instances, be co-located with other public or private uses. Security design may be influenced by:

- Size of court operation: Loss of the use or destruction of a facility would have a significant impact on the courts and the community.
- Types of cases: Juvenile and family courts have a high risk of confrontation, assault, and violent behavior. Criminal courts require security measures to ensure safe handling of individuals in detention.
- Threats: Past history of incidents or threats may be interpreted as a site-specific increased risk factor. Intelligence from local police, the California Highway Patrol, and the Federal Bureau of Investigation shall also be considered.
- Location: Adjacent facilities, such as federal and public buildings, symbolic targets, and landmarks, may pose a threat to a court facility. High-crime neighborhoods, as identified by crime risk survey data, may result in increased security risks. Measures may be required to mitigate substandard site characteristics such as lack of building setback distances, limited parking arrangements, and sightlines from adjacent buildings or landscapes into chambers windows.

Courthouse Risks

Identifying risks and threats to the court facility enables the project team to determine appropriate security design elements and countermeasures to mitigate potential risk and damage. Security risks for new courthouses include*:

- Violent or assaultive behavior directed against staff, judicial officers, the public, or detainees
- Damage to physical facilities
- Theft of property, including money
- Disruption of court activities
- Compromise of court process, including evidence, court records, jury sequester, and due process

Capability to Increase Security

The facility must be designed to accommodate changes in security requirements. For example, if a high-profile or celebrity case is assigned to a court located in a small county, security needs may temporarily increase to levels higher than normally encountered. National, regional, and local conditions and threat levels may also impact security requirements. Examples of increased security during heightened threat and alert levels include escalating screening capacity in the lobby and increasing building setback distances to protect against vehicular threats.

4.4 THREAT ASSESSMENT PROCEDURE

Qualified persons shall conduct a threat assessment during architectural programming. The threat assessment shall consider the likelihood of an attack occurring and the consequences. Consequences of an event are tangible and intangible costs, and include capital and operational costs resulting from an event. The threat assessment procedure is described in Figure 4.2

- During the early project planning phases, architectural programming, or site selection the principles and security measures described in this chapter and in Table 4.1 shall be reviewed in light of the threat assessment to determine the preliminary scope of security design elements for the site and building.
- A threat assessment report summarizing findings and recommended mitigation measures shall be

**Source: The National Center for State Courts*

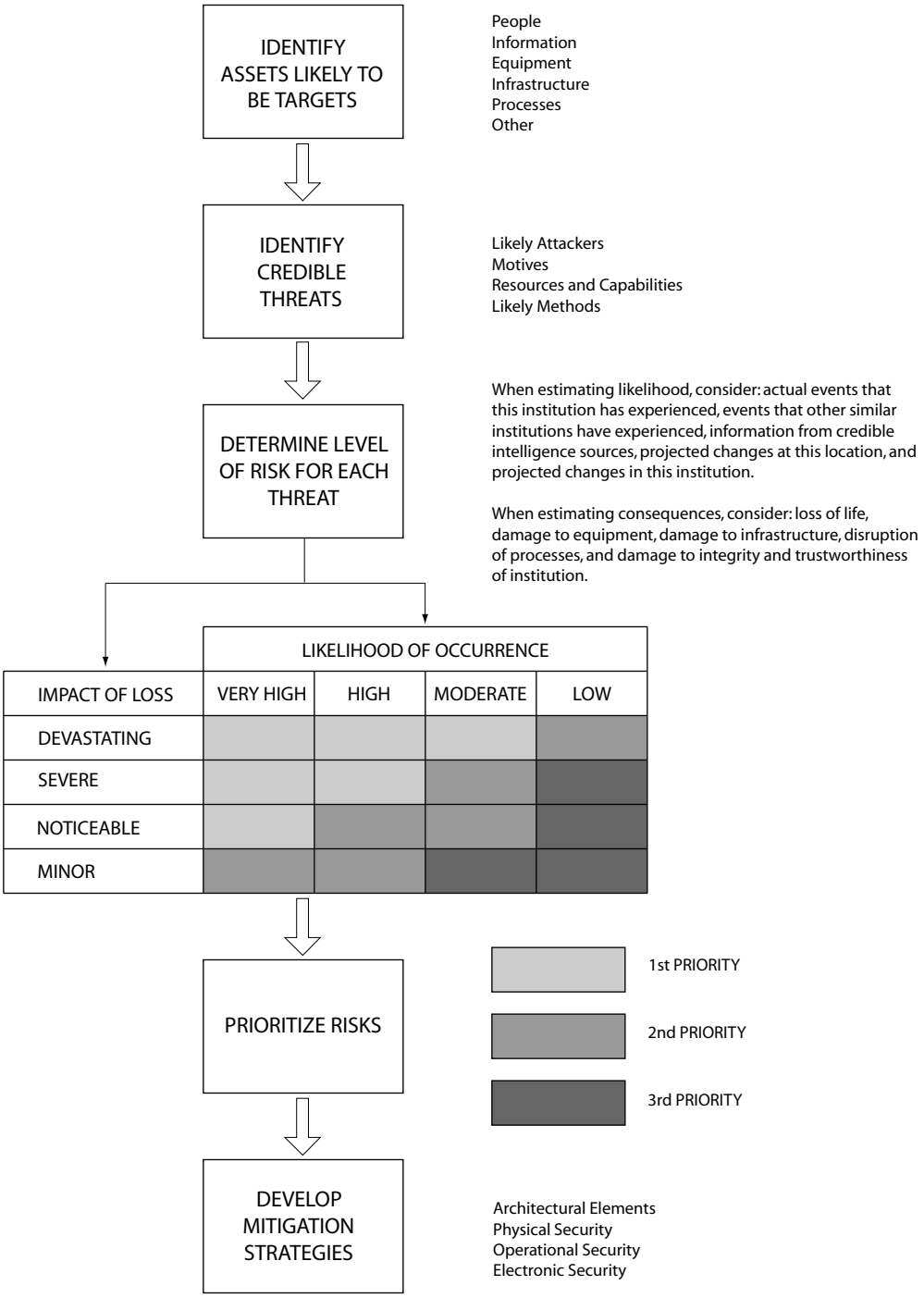


Figure 4.2 Threat Assessment Flow Chart

prepared prior to completion of the architectural program. This report shall discuss proposed project security elements, including the rationale for proposals that exceed or do not meet the Facilities Standards.

4.5 SECURITY PLANNING CRITERIA

The security planning best practices for trial court buildings are described in this section. Table 4.1 lists the elements that are mandatory for all court buildings and those that may be required by the project-specific threat assessment.

Site Selection and Design

Vehicular and adjacency threats may be a major concern at court facilities, and must be considered during site selection and site design.

- The site must have a minimum 20' setback between vehicular roadways and buildings. Setback is the distance maintained between a structure or asset and the potential location of the threat. This is measured from the secured perimeter to the face of the structure. Increasing setback distance greatly improves protection for the building and occupants, as blast pressures decay exponentially with distance. See Figure 4.3. Every foot of setback distance is critical.
- Site the building so street configurations do not create a straight, head-on approach to the facility and adjacent facilities, and so that functions do not pose significant risks or threats.
- Apply CPTED principles (see Chapter 3, Site Design).

Parking Security

- Public parking shall not be allowed within or beneath the courthouse, or directly adjacent to the courthouse. Place public parking and drop-off zones outside the defined setback distance.
- Underground secure parking for judges and limited court staff requires a screening area before car entry. The number of vehicular access points into secure parking areas must be minimized and controlled with operable barriers. Harden primary walls and floor systems surrounding these areas. Use circular columns with spiral reinforcing. Design columns to resist a package weapon, and design for a two-story unbraced length. Separate high-risk and critical or occupied areas by at least 25', or design walls and floor slabs that separate high-risk and critical or occupied areas to resist a package weapon threat.
- Exterior secure and service parking areas adjacent to the courthouse require operable barriers at en-

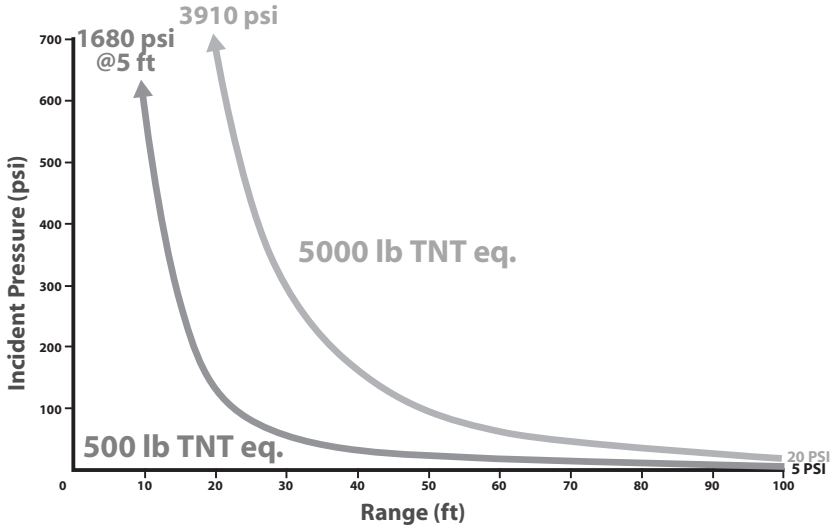


Figure 4.3 Diagram Showing Blast Decay With Distance *Source: Hinman Consulting Engineers*

tries. Place controlled parking areas between the building and uncontrolled streets. Place on-site parking as far from the building as possible; reduce or eliminate adjacencies between occupied or critical areas and spaces accessible to vehicles.

- Co-locate loading dock and parking garage entries.
- Provide CCTV surveillance with recording at all entries and exits, including vehicle gates. In multilevel parking structures, provide CCTV surveillance and emergency telephones. Monitor and response capability is required.

Site Security

- Employ CPTED principles.
- Place any trash receptacles or public mailboxes outside the setback distance.
- Illuminate site perimeters, walkways, and drives.
- Restrict heights of landscaping to maintain natural surveillance.
- Protect utilities (gas, power, telephone) at entrance to the site.
- Employ physical barriers to maintain setback distances, enhance perceived protection, and create a perception of the courthouse as a hard target. The design team must select a barrier that will stop a vehicular threat as identified in the threat assessment. Consider traffic pattern and flow relative to the site configuration.
- Provide CCTV surveillance of building entrances.

Building Layout

The building shall be planned to minimize vulnerabilities through appropriate space planning and adjacencies:

- Physically isolate vulnerable areas, such as lobbies and delivery areas. Place unsecured lobby areas outside the main structure, or in the exterior bay so that a blast will not damage the courts areas.
- Provide one shared staff and public entrance point to reduce operational screening requirements. An additional staff entry may be provided if entry is staffed and screened at beginning, lunch, and end of each workday. Provide a secure path from the judges' secure parking area to judges' chambers.
- Separate high-risk areas, including unscreened lobby, loading docks, mailrooms, and the parking garage, from occupied spaces, critical utilities, and building systems needed to ensure rapid and safe building evacuation, including electrical, mechanical, and fire protection equipment. Do not place critical utilities at exterior walls or within 25' of high-risk areas. Do not place occupied areas within 25' of high-risk areas.
- Locate emergency generators at least 50' from the primary electrical source.
- Co-locate loading dock and mailroom toward the building exterior.
- Locate all emergency egress away from high-risk areas. Provide redundant emergency egress exits but do not cluster routes.
- Place unoccupied spaces at the lower perimeter levels.
- Stack critical areas and supporting utilities.
- Provide ductile materials in emergency egress pathways to minimize debris.

Courtrooms

- Provide silent duress alarm buttons for judge, court security officer (CSO), and clerk.
- Provide bullet-resistant panels within podium/bench for judge, CSO, and clerk.
- Provide CCTV surveillance of the courtroom, including well area and public seating.
- Provide audio surveillance (microphones) of courtroom.
- Provide lock-down capability for courtroom exit doors.
- Minimize windows with direct line of sight from public areas, circulation zones, and parking garages, to prevent observation of activities, threat exposure, or communication with courtroom occupants.

- Provide gun locker in CSO station.

Chambers and Jury Deliberation Rooms

- Provide silent duress alarm buttons for judge and clerk, and jury deliberation rooms.
- Minimize windows with direct line of sight from public areas, circulation zones, and parking garages, to prevent observation of activities, threat exposure, or communication with courthouse occupants.

Payment Counter, Court Clerk Offices, and Family Court Services Mediator Offices

- Provide silent duress alarm buttons and CCTV surveillance.

Lobby and Waiting Areas

- Eliminate trash, mail receptacles, or other areas of concealment in the unscreened lobby areas.
- Provide duress alarms, magnetometer, and package weapons scanner at screening stations.
- Design lobby to accommodate direct visual surveillance by staff and security officers.
- Design lobby for increased levels of security; this may include additional screening areas or restriction of openings into secure areas.
- Limit adjacencies between occupied and unsecured spaces.
- Based on the threat assessment, the following may be required: Harden walls of an unsecured lobby to resist detonation of a package or backpack weapon located 10' away; harden the floor above unsecured lobby areas to resist a backpack explosive located at the floor level.
- In high-crime neighborhoods, provide CCTV surveillance of lobby and secured areas of buildings.

Current Case File Storage Areas, Evidence Storage Rooms

- Limit access to authorized personnel; locate adjacent to secure corridor; provide keypad.
- Provide smoke detection devices; consider fire suppression systems that minimize water damage to contents deemed essential to judicial operations.

Loading Dock and Mailroom

- Provide CCTV surveillance and silent duress alarm button. Provide intercom or telephone.
- Design loading dock area with ability to be physically secured.
- Provide space and a driveway arrangement to permit manual screening of delivery trucks.
- Place loading docks and mailrooms exterior to the main structure or in the exterior bay. If not possible, screen incoming packages and mail at a remote facility. Locate critical and occupied

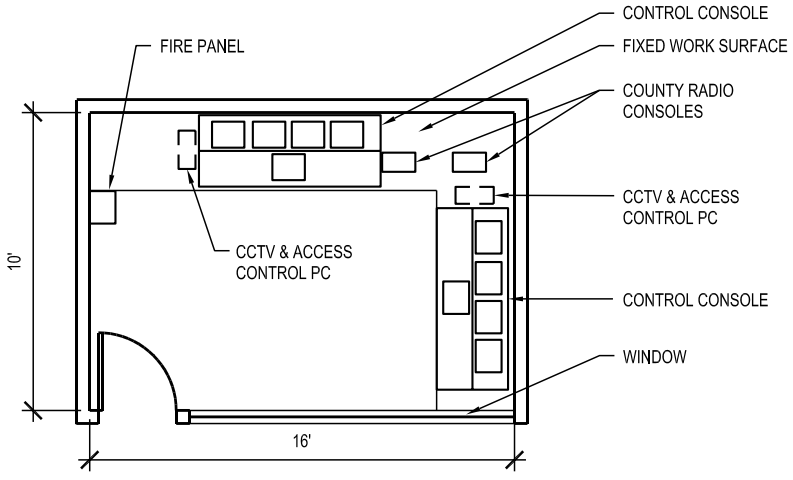


Figure 4.4 Plan of Security Control Station

space at least 25' away from the loading dock and mailroom, otherwise harden.

- Provide package weapons scanner in the mailroom.
- Provide blast-resistant storage container at screening areas for suspicious packages.

Security Control Center

A centrally located security control center shall be provided, to operate and monitor electronic security systems. Refer to Figure 4.4. This space is not required in small court facilities.

- The security control center may duplicate functions from the in-custody defendant holding control room, or may be combined with the holding control room. Chapter 8 (In-Custody Defendant Receiving, Holding, and Transport) describes systems that operate from the security control center.
- Fire control centers, required with high-rise life safety systems, shall remain separate from the security control center.

Security Equipment Closet/Room

Provide a main security equipment closet or room adjacent to the building security control center and telecommunications closet.

- The security equipment closet/room shall be an air-conditioned space with network drops and emergency power circuits. Provide a dedicated HVAC system that operates 24/7.
- Locate at least one secondary security equipment closet on every other floor to accommodate security equipment, wiring, pull cans, and terminal cabinets. This may be combined with the technology closet.
- Secondary security equipment closets shall be located directly above or below the main security equipment closet.
- Closet space shall be sized to 125 percent of equipment capacity.

Building Envelope

The exterior building envelope shall be designed to minimize vulnerabilities and protect occupants from flying debris entering the building in the event of a blast. Depending on the threat assessment, prescriptive systems or performance design to harden the façade may be required. If building hardening is required, the façade shall resist a 4-psi and 28 psi-msec air-blast loading. These criteria require that exterior glazing be designed for defined air-blast loads and mullions.

- If required by the threat assessment, use laminated glass and frames designed to meet security needs.
    - Glass: The innermost pane of all exterior glass shall be laminated. From inside to outside, the typical glazing system shall consist of: ¼" laminated annealed glass, with 30-mil inner layer, ½" air gap, and ¼" monolithic annealed glass. Ideally, the glass pane shall be as weak as possible, so as not to transmit additional load to the frames, mullions, and anchorage. Structural silicone sealant shall be used along the exterior perimeter of the pane to adhere the glass to the frame. Monitor with an intrusion alarm system.
    - Mullions, Frames, and Anchorage: Frames and anchorage shall be designed to resist the maximum capacity of the glass. This approach creates a balanced design in which the weakest element, the glass, fails first and creates a controlled, instead of catastrophic, failure of the system. Aluminum or steel mullions are preferred. Typically, curtain wall systems, including unitized systems, can be modified with deeper or thicker sections than generally used. A clear load path, incorporating balanced design, must be provided from the glass to the primary structure.
- Doors: Lock and monitor all unscreened perimeter doors. Provide intrusion alarms to monitor perimeter doors and sensitive areas after-hours.
- Windows: Limit or eliminate operable windows.
- Limit building envelope fenestration at critical areas such as courtrooms, chambers, and jury deliberation rooms, especially at the first level.

- Minimize blast effects by using convex shapes and limited reentrant corners.
- Provide bullet-resistant glazing in judicial chambers.
- Provide forced entry protection at the first floor.
- In high-crime neighborhoods or where a local threat has been identified by the threat assessment, provide motion sensors and glass-break detection in building areas accessible from grade. Provide CCTV surveillance of building exterior.
- Walls: Use ductile systems that will resist the defined loads or are designed to support the windows, and will minimize flying debris entering occupied spaces.

4.6 STRUCTURAL SYSTEMS

Protective structural design ensures that building occupants will be able to evacuate the building safely and rapidly during an emergency, especially if part of the building is damaged, destroyed, or subject to a blast. The goal is to avoid progressive collapse, by designing a structure that will not collapse if one or more structural members are damaged, fail, or are destroyed.

- Minimize floor-to-floor heights. The limit is generally less than or equal to 16'.
- Minimize column bay spacing, especially at the exterior bays. The upper limit for column spacing is generally 30'.
- Avoid overhangs with occupied space above.
- Provide redundancy and alternative load paths to mitigate blast loads.
- Minimize horizontal and vertical structural irregularities.
- Provide balanced design of structural components.
- Prevent single-point-of-failure of the building structure by limiting or avoiding large transfer girders.
- Select a ductile structural system, similar to that required for seismic design. Acceptable structural systems include moment frame steel structures, steel frames with shear walls, and reinforced concrete systems with ductile detailing. Moment frames shall be located at the exterior bays of a building for resistance to progressive collapse. Floor slabs above high-risk areas must be designed for upward forces by using continuous, symmetrical reinforcement at the top and bottom. Ensure that bottom reinforcing is continuous at the roof system beams and slabs. Use ductile detailing for connections, especially primary structural member connections.
- Control deflections around certain members, such as windows, to prevent premature failure. Additional reinforcement is generally required.
- At areas separating unscreened and occupied court areas, harden floor systems to resist detonation of a package or backpack explosive located at the floor level and one structural bay away.
- Use circular columns with spiral reinforcing in the building structural system.
- Design structural columns in high-risk areas to resist a package explosive located 3' away.
- Use one-way wall elements spanning from floor-to-floor to minimize blast loads imparted to columns.
- Concrete masonry unit (CMU) walls shall be fully grouted and reinforced, with connections designed to allow full development of capacity at the supports.

4.7 MECHANICAL, ELECTRICAL, AND FIRE PROTECTION SYSTEMS

Mechanical, electrical, and fire protection systems are critical security elements that must remain functional until all building occupants are able to evacuate safely and completely during an emergency.

Critical systems include fire protection, air-handling units to evacuate smoke, emergency communications systems, emergency lighting (especially at means of egress), and emergency power to ensure that these systems are functional in the event of a power outage.

- Locate critical utilities far from high-risk areas. Do not install utilities within 25' of parking areas,

unscreened lobby, loading docks, and mailrooms. Stack critical areas and their supporting utilities.

- Locate transformers and emergency generators away from high-risk areas and below grade. Locate emergency generators at least 50' from the primary electrical source; if emergency generators are located adjacent to high-risk areas, harden the intermediate floor and wall systems.
- Avoid routing critical utilities next to parking areas. If this cannot be avoided, consider encasing in concrete.
- To mitigate a chemical or biological attack within the building, locate air intakes at least 48' above grade or as high as practical. If air intakes are placed on the roof, secure all roof access points.
- Protect critical utilities, including service entrances.
- Locate main and backup systems as far apart from each other as possible, a minimum of 50'.
- Isolate the mailroom HVAC zone to prevent circulation into main building.
- Provide a system to purge mailroom in case of biochemical contamination.
- Provide redundancy of critical systems. Place backup systems and distribution as far from primary systems as possible.

4.8 ELECTRONIC SECURITY SYSTEMS

Electronic security systems shall be coordinated with building systems, and reflect the evolving needs of the facility. Security systems shall be integrated with each other and utilize the court's local area network. Security electronics systems shall include:

- Access control: Provide building perimeter protection and controlled separation between public, staff, in-custody areas, and other critical areas.
- CCTV: Provide high-definition color cameras in each courtroom, with audio monitoring capability, digital video recording, and storage for all cameras.
- Alarm monitoring: Provide monitoring of duress alarms, intrusion alarms, and evidence storage area alarm.
- In-custody transportation and holding areas: Provide remote door control and monitoring, intercom system, operator control panels, and CCTV cameras.
- Other systems: Provide security monitoring and control room, emergency telephones, metal detection, package scanning, secure parking controls, and audiovisual monitoring of courtroom proceedings.

	Com-pliance
Mandatory	M
As Determined by Threat Assessment	TA
Site Selection	
Maximize setback distance to street or adjacent buildngs	M
Locate building to minimize adjacency and configuraion risks	M
Parking Security	
Restrict public parking locations in proximity to court building	M
Restrict and control secure parking locations	M
Co-locate parking garage and loading dock entries	TA
Provide CCTV at parking entries and exits	TA
Site Security	
Employ CPTED principles	M
Place trash receptacles and mailboxes outside the setback distance	M
Illuminate site perimeters, walkways, and drives	M
Restrict height of landscaping	M
Protect utilities (gas, power, telephone, etc.) at entrance to site	M
Provide physical barriers to maintain building setback distance	TA
Provide CCTV camera surveillance of site	TA
Building Layout	
Provide only one public entrance	M
Provide a secure path between judges' parking and chambers	M
Separate high-risk areas from occupied spaces, critical systems, utilities, and egress	M
Co-locate loading dock and mailroom toward the building exterior	M
Place unoccupied spaces at the lower perimeter levels	TA
Stack critical areas and supporting utilities	TA
Courtroom	
Provide silent duress alarm buttons for judge, CSO, and clerk	M
Provide bullet-resistant panels within podium/bench for judge, CSO, and clerk	M
Provide CCTV camera surveillance	M
Restrict windows with the line of sight into courtroom	M
Provide gun locker in CSO station	M
Provide audio surveillance (microphones) of courtroom	TA
Provide lock-down capability for courtroom exit doors	TA
Judge's Chambers	
Provide silent duress alarm buttons for judge and clerk	M
Restrict windows with the line of sight into chambers	M

Table 4.1 Security Standards

Provide bullet-resistant glazing	TA
Jury Deliberation Room	
Provide silent duress alarm buttons	M
Restrict windows with the line of sight into jury deliberation room	M
Payment Counter, Court Clerk Offices, and FCS Mediator Offices	
Provide silent duress alarm buttons	M
Provide CCTV camera surveillance	M
Lobby and Waiting Area	
Provide only one public entrance	M
Eliminate potential areas of concealment in the unscreened areas	M
Provide duress alarms, magnetometer, and package weapons scanner at screening station	M
Design lobby to accommodate direct visual surveillance by staff and security officers	M
Design lobby to allow increased levels of security	M
Provide barriers between lobby and secured areas of building	TA
Physically isolate unscreened lobby area	TA
Provide CCTV camera surveillance of lobby and secured areas of building	TA
Current Case File Storage Areas, Evidence Storage Rooms	
Locate adjacent to restricted corridor; provide keypad	M
Provide appropriate fire protection devices	M
Loading Dock/ Mailroom	
Provide CCTV camera surveillance and silent duress alarm button	M
Design loading dock with ability to be physically secured	M
Provide space and driveway arrangement to permit manual screening of delivery trucks	M
Physically isolate the loading dock	TA
Locate critical and occupied space at least 25' away from loading lock/mailroom or harden	TA
Provide package weapons scanner in mailroom	TA
Provide blast-resistant storage container for suspicious packages	TA
Security Control Center	
Maintain separation of fire control centers and security control	M
Provide control center to operate and monitor electronic security systems	TA
Duplicate functions of in-custody holding control room	TA
Security Equipment Closet	
Locate adjacent to the building security control center and IT closet	M
Provide a dedicated, 24/7 HVAC system	M
Provide at least one secondary security equipment on every other floor	M
Size closets to 125% of equipment capacity	M
Building Envelope	
Exterior doors shall be locked and monitored by intrusion alarm system	M

Table 4.1 Security Standards *(continued)*

Minimize/eliminate operable windows	M
Limit windows at critical areas	M
Provide bulletproof glazed windows at chambers	TA
Provide forced entry protection at the first floor	TA
Monitor exterior glass with intrusion alarm system	TA
Provide blast-resistant laminated glazing and mullions to meet security requirements	TA
Structural Systems	
Minimize floor-to-floor heights	M
Minimize column bay spacing	M
Avoid overhangs with occupied space above	M
Limit or avoid large transfer girders	M
Provide redundancy and alternative load paths to mitigate blast loads	M
Provide balanced design of structural components	M
Use ductile structural systems	M
Control deflection, especially around windows	M
Harden floor and/or walls to resist package or backpack blast	TA
Use circular columns with spiral reinforcing	TA
Design structural columns to resist a package explosive located 3' away	TA
Use one-way wall elements spanning from floor-to-floor	TA
Concrete masonry unit (CMU) walls shall be fully grouted and reinforced, with connections designed to allow full development of capacity at the supports	TA
Mechanical, Electrical, and Fire Protection Systems	
Locate critical utilities far from high-risk areas	M
Locate emergency generators at least 50' from the primary electrical source	M
Avoid routing critical utilities next to parking areas	M
Protect airintakes	M
Protect critical utilities including service entrances	M
Locate main and back up systems as far apart from each other as possible, a minimum of 50'	TA
Isolate mailroom HVAC zone	TA
Provide mailroom purging system	TA
Provide redundancy of critical systems	TA
Electronic Security Systems	
Provide access control between public, restricted, and secure areas	M
Provide electronic perimeter protection	M
Provide monitoring of intrusions and duress alarms	M
Provide door control and remote monitoring of in-custody transportation and holding areas	M
Coordinate current and future infrastructure and control systems	M
Provide CCTV and audio monitoring in courtrooms	M

Table 4.1 Security Standards *(continued)*

5

COURT SET

Trial Courtroom

San Francisco Civic Center Courthouse
San Francisco, CA
RossDrulisCusenbery Architecture
Hood-Miller Associates
Mark Cavagnero Associates/ John M.Y. Lee

Date of Issue: March 1, 2010

California Trial Court Facilities Standards, 2006 edition

This amendment is a change to the 2006 edition of the California Trial Court Facilities Standards. This amendment deletes or replaces existing language in the standards. This amendment is effective on the date of issue[1].

Design and Construction or Facilities Modifications projects which have reached design development completion (at effective date of this amendment) may be exempted from compliance with this amendment subject to specific approval by the Office of Court Construction and Management.

Chapter 5 COURT SET – Amendment 1

On page 5-7 under subsection, "Courtroom Clerk's Station", add the words in bold as follows:

Behind the paneling, consider using a modular furniture work surface with adjustable height to provide flexibility. **Locate a wireless duress alarm button in a discreet location under the work surface.**

On page 5-9 under subsection, "Jury Box", add the words in bold as follows:

Provide comfortable, ergonomic jury chairs to accommodate people of all sizes. Chairs may be movable or fixed. **The height should be adjustable from 16"-20".** They must swivel and tilt, and be spaced so that the arms do not collide and the chairs do not strike the rear wall. Provide sufficient aisle space in front of each row of seats for juror legroom. Provide writing surfaces on the jury chairs. Provide a front modesty panel approximately 30" high separating the jury box from the litigation area. Handrails and foot rails may also be provided.

[1] This amendment is implemented under Rule of Court, Rule10.180 (b) - "*Non substantive changes to the standards may be made by the Administrative Office of the Courts:"*

On page 5-10 under subsection, "Court Security Officer (CSO) Station", revise the second bullet to add the words in bold and delete as shown:

• ***Depending upon the makeup of the CSO station (i.e. stationary or moveable)***, incorporate ballistic-resistant material into the paneling. **Regardless of the makeup of the CSO station, include** ~~and~~ a silent duress alarm system into the workstation design.

On page 5-11 under subsection, "Exhibit and Evidence Storage", add the words in bold and delete as shown:

Provide a secure room or closet for storage of exhibits and evidence. **For security, install a card reader entry system, camera surveillance and hard ceiling. This space shall** ~~to~~ be accessible directly from the courtroom or from the restricted corridor.

End of Chapter 5- Amendment #1

The court set includes courtrooms, judicial offices (subsequently referred to as chambers), chambers support space, jury deliberation room, witness waiting, attorney conference rooms, evidence storage, and equipment storage. A restricted corridor, with staff elevator and stairs, connects the chamber suites with staff offices and secure parking (see Figure 5.1). Specific space requirements are developed during the programming phase, consistent with area requirements described in Chapter 2 (Courthouse Organization).

5.1 OBJECTIVES

The courtroom is the focal point of the judicial process, providing a formal setting for conducting the business of the court, and is the primary place where judicial officers, court staff, attorneys, and litigants or defendants interact. The courtroom accommodates the judicial officer (judge, commissioner, or hearing officer), court clerk, reporter, court security officer (CSO), attorneys, witnesses, jury, and spectators. Special-purpose courtrooms may include some variation of these participants.

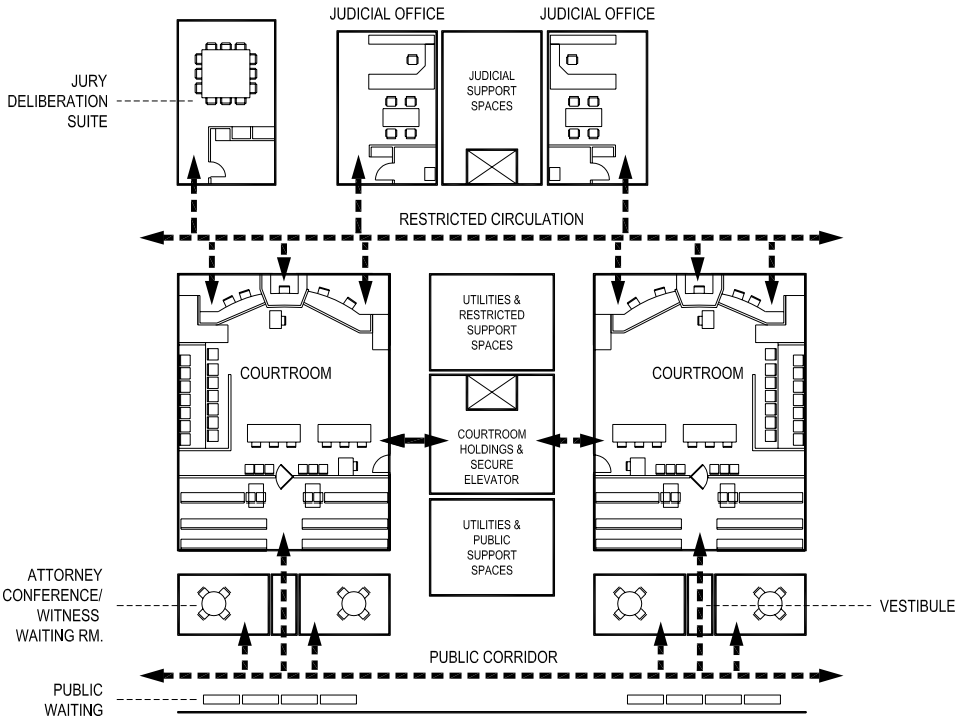


Figure 5.1 Typical Court Floor Organization

The design of each courtroom shall:

- Ensure that the participants in any proceeding are able to see and hear the witness, jury, judicial officer, court reporter, and attorneys.
- Protect witnesses and jurors from intimidation.
- Provide reasonable confidentiality for attorneys, defendants, litigants, and judicial officers.
- Provide full accessibility to all raised platforms.
- Provide spaces with sufficient flexibility to allow change in future court operations.

5.2 COURTROOM

Basic Courtroom Types

Courtrooms must function for a range of judicial proceedings. The Facilities Standards define three types of courtrooms (see Table 5.1):

- Multipurpose Courtroom is the typical trial courtroom in California. It is sized and configured to offer facilities for a variety of judicial matters, including criminal, civil, law and motion, and public hearings. The multipurpose courtroom will accommodate a jury box and other courtroom components. Refer to Figures 5.21–5.22 for diagrams of multipurpose courtroom layouts.
- Large Courtroom is typical for high-volume, high-profile, and multilitigant cases such as traffic or construction defect cases. It can also be used for special proceedings that support court operations. Refer to Figures 5.23–5.25 for diagrams of large courtroom layouts.
- Arraignment Courtroom is the same size as the large courtroom. An arraignment is a court appearance in which the defendant is formally charged with a crime and asked to respond by pleading guilty, not guilty, or nolo contendere. Other matters handled at an arraignment include arranging for the appointment of a lawyer to represent the defendant, and setting bail. The courtroom must accommodate large numbers of in-custody defendants in a secure arraignment area directly connected to the holding area and secure circulation system. Refer to Figures 5.26–5.27 for diagrams of arraignment courtroom layouts.

Special Courtrooms

There are exceptions to the basic courtroom types for family, juvenile, mental health, domestic violence, high security, traffic, and drug courts, or for cases requiring multiple juries. Such courtrooms may require alternate fixtures or special configurations within the boundaries of multipurpose or large courtrooms.

Courtroom Entries

All courtrooms, regardless of whether in-custody proceedings occur there, require three distinct points of entry:

- Public, for spectators, attorneys, parties, witnesses, and press through a vestibule from the public corridor
- Restricted, for judicial officers, jurors, court personnel, and designated court participants through two doorways from a restricted court staff corridor
- Secure, for prisoners, detention officers, and CSOs through a controlled, secure entry near the CSO's station and defense attorney table from the secure circulation system

Courtroom Adjacencies

- Locate courtrooms adjacent to court floor holding cells (or area reserved for the future addition of secure holding cells). In some instances, multipurpose courtrooms are used for civil proceedings and do not require access to court floor holding facilities.
- Locate courtrooms for easy access from judicial chambers. Group judicial chambers and related

CourtroomType	Square Feet	Spectator Seating	Structural Bay Width
Multipurpose	1,600–1,750	45–48	32'–36'
Large	2,100–2,400	96–100	32'–36'
Arraignment	2,100–2,400	96–100	32'–36'

Table 5.1 Courtroom Types

support space adjacent to the restricted corridor, providing judges and staff quick courtroom access.

- Courtrooms may be assigned to an individual judge. When courtrooms are not dedicated for use by one bench officer, chambers can be located remote from the courtroom.
- If chambers are co-located in an area remote from the courtrooms, such as on adjoining floors, a robing room and conference area may be necessary adjacent to the courtroom.

Corner Bench or Center Bench Layouts

California courtrooms may use either a corner bench or center bench configuration. Each offers different design and operational opportunities. Selection of either is a project decision, to be based on the following design and operational criteria:

- Optimum sightlines among the judge, jury, attorneys, and witness
- Ease of accommodating two courtroom clerks
- Ability to move paper documents between clerk and judge
- Sightlines to projected images
- Full accessibility to the bench, other raised platforms, and areas of courtroom
- Dignity and formality
- Accommodation of courtroom technology and computer equipment
- Space efficiency

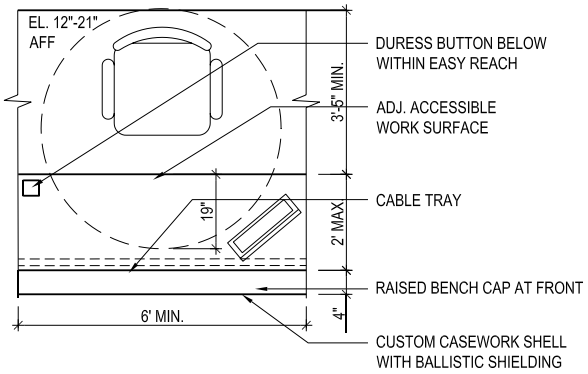


Figure 5.2 Judge's Bench Plan

5.3 COURTROOM ACCESSIBILITY

Floor levels of courtroom components vary. Maintaining sightlines among all components, while providing full accessibility, shall be a priority. The accessible path of travel to the judge's courtroom workspace (bench), courtroom clerk's workspace, witness box, and jury box must address the recommended floor heights discussed in Table 5.2. Separate paths of travel for persons with disabilities shall be avoided. The judge's circulation path must never be in front of the bench. Level changes can be achieved as follows:

- Ramps are the preferred solution for providing universal access and operationally functional spaces. However, a long ramp may be required in the restricted corridor, or the restricted corridor may be constructed at an elevation above that of the primary courtroom floor elevation.
- Ramps to the witness area, the clerk at the courtroom floor level, and a two-stop lift to the judicial officer's bench are another approach. A multipurpose courtroom litigation area may accommodate up to 18 people, along with exhibits and a court reporter. Ramps to the courtroom clerk, witness box, and the first level of the jury box shall not create a hazard or encroach into the litigation area.
- A three-stop lift to the witness's and judge's level of the bench may be the only choice where space is extremely limited, but lifts are the least preferred method because their use focuses attention on the person with disabilities, may require staff assistance to function properly, and require servicing and testing.

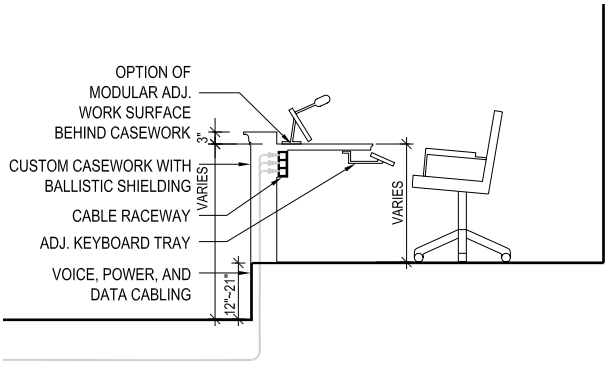


Figure 5.3 Judge's Bench Section

- A courtroom mockup is required before beginning casework construction documents, to ensure that sightlines and both functional and accessibility requirements are satisfied.

5.4 COURTROOM COMPONENTS

The following design criteria shall apply to courtroom components.

Judicial Officer's Bench

The size, location, height, area, and design of the bench reinforce the role of the judicial officer as the administrator of justice, and as the principal controller of order in the courtroom. Design the bench to be the focal point of the courtroom without favoring any one party.

- Design the bench size and height to be proportionate to the courtroom and to ensure an unobstructed view from the entire courtroom. Raise the bench so that the judicial officer's eye level when seated is higher than that of any standing participant or spectator.
- Provide a work surface 72" to 84" wide by 24" deep with a 3" high privacy screen in front. This area must be of sufficient size to keep paperwork and reference materials within reach and accommodate a computer monitor. Provide adequate bookshelves behind or under the bench. Provide an area for conferences between the judicial officer and attorneys at the sidebar. (Sidebars are typically conducted on the side of the litigation area opposite the jury.) Provide built-in or movable under-counter storage drawers. Refer to Figures 5.2–5.3.
- Provide a minimum of 3'-5" between the edge of the judicial officer's desk and the wall behind. This will accommodate a wheelchair or mobility device and allow the judicial officer sufficient work area. Design the front and sides of the bench to facilitate transfer of documents and verbal communication between the judge, the courtroom clerk, and the court reporter.
- Design the bench with a custom casework wall, compatible with the courtroom design. Line the wall with ballistic-resistant material UL Standard 752, Level III. Provide under-desktop accessible cable raceways to accommodate voice, data, power, and courtroom technology cabling.
- Consider an ergonomic adjustable desk system behind the casework shell in lieu of custom millwork. This component can be made from modular furniture, providing adjustable heights and angles of desktop.
- Provide areas for computer equipment, a printer, storage, telephone, and outlets for data transmission. The bench requires a microphone with a mute button, and may include the courtroom audio controls. Refer to Chapter 16 (Lighting Criteria) and Chapter 17 (Telecommunications and Audiovisual Criteria).

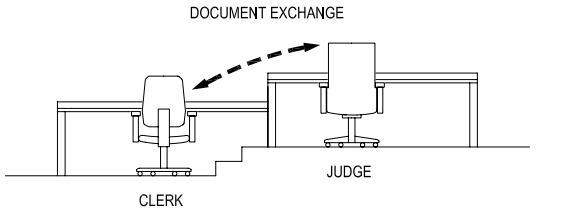


Figure 5.4 Bench and Clerk Elevation

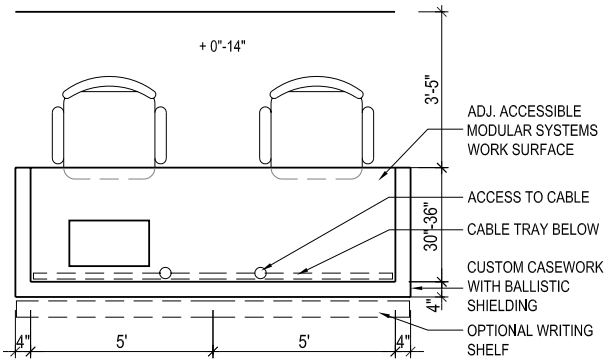


Figure 5.5 Clerk Station Plan

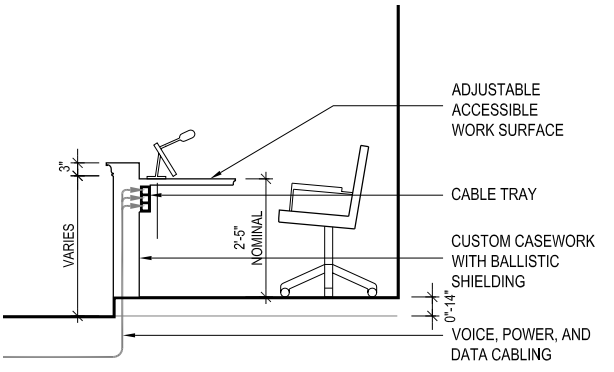


Figure 5.6 Clerk Station Section

Courtroom Clerk's Station

The courtroom clerk is responsible for maintaining a record of case actions and files and for receiving and labeling exhibits. The courtroom clerk must be close to the judicial officer, to transfer exhibit papers and files by hand and to communicate privately, and must be accessible to counsel for marking and introducing documents. The height difference between the clerk's station floor and the judge's bench floor should not exceed 12"; the constant transfer of files creates an ergonomic problem with a greater difference. See Figure 5.4. The clerk's station is located on the same side as the CSO and near a doorway to the restricted corridor.

- The clerk's workstation requires a 120" wide by 30" deep work surface and must accommodate two clerks. An optional 8" to 12" deep shelf in front of the workstation may be added to provide a writing surface and additional screening of documents on the clerk's desk. The clerk's workstation requires substantial area for placement of files, forms, supplies, and other material. Refer to Figures 5.5–5.6.
- Design the clerk's station similar to the judge's bench, compatible with the courtroom design. Provide a custom casework low front wall with ballistic shielding. Behind the paneling, consider using a modular furniture work surface with adjustable height to provide flexibility. Since this work area is used for all office functions, such as typing and writing, this area must meet all requirements for ergonomic office work spaces.
- The clerk's workstation must be cable-ready for electronic equipment and requires multiple telephone, data, and electrical outlets, and audio controls. Provide concealed, accessible raceways to incorporate voice, data, power, and audiovisual cabling.
- The clerk's workstation must be designed with space for a printer and possibly a fax/copier. Provide under-counter file drawers for files and forms, and provide file storage behind the workstation.

Witness Box

Locate so that the witness has a clear facial view of the judicial officer, jury, court reporter, and counsel tables. The witness box shall be located between the judge and the jury.

- Design the witness box to comfortably seat the witness and interpreter (if required) and to accommodate a wheelchair or mobility device. The witness chair shall be height adjustable and movable, and in certain buildings shall be fixed. Refer to Figures 5.7–5.8.
- The witness box must accommodate many people throughout the day. Ramps are the most common and preferred means to provide wheelchair access to this area.
- Provide a low wall with a flat top area on which attorneys can rest files or evidence. Provide bullet-resistant material behind the paneling of the witness box, similar to the judicial officer's bench.

Court Reporter's Area

The court reporter provides verbatim recording of all court proceedings. Locate the court reporter's area so that anything said by participants can be heard by the court reporter. Ensure sightlines to the judge,

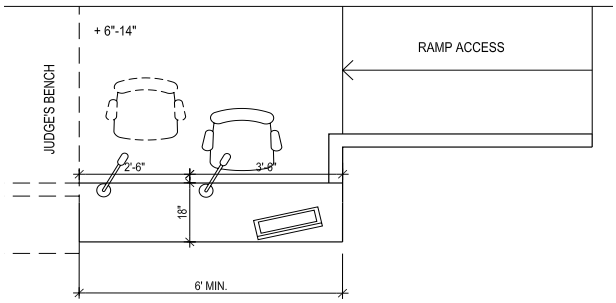


Figure 5.7 Witness Box Plan

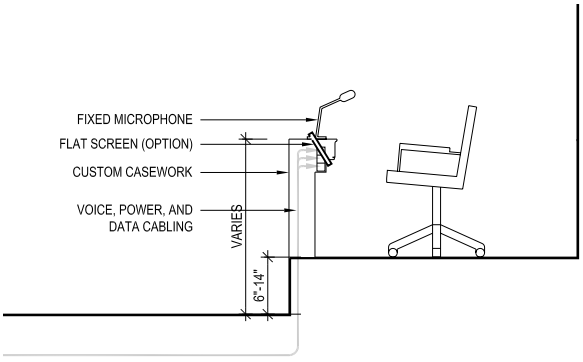


Figure 5.8 Witness Box Section

Element or Workstation	Furniture/ Casework		Height Above Floor	No. of Occupants	Area S.F.
	Width	Depth			
Judicial Officer	6'–7'	24"–30"	12"–21"	1	64–80
Courtroom Clerk	10'	30"–36"	6"–14"	2	75–85
CSO	4'	30"	0	1	25
Court Reporter	4'	30"	0	1	25
Witness Stand	6'		6"–14"	1–2	33–43
Jury Box	N/A	N/A	(1st tier) 0"–7" (2nd tier) 7"–14"	14	144
Counsel Tables	7'–10'	3'–4'	0	2 ea.	90–110
Lectern	38"	2'	0	0	

Note: Heights of judge, clerk, witness must be in strict relation—judge highest; clerk within 12" of judge; and witness at least 6" lower than judge.

Table 5.2 Court Component Information

witness, and attorneys.

- Provide a mobile (preferred) or stationary workstation that includes a work surface at least 24" deep, with a lockable drawer for storage and a modesty panel.
- The workstation shall be cable-ready for in-courtroom electronic recording and computer-assisted transcription. Provide concealed, accessible raceways to incorporate data, power, and audiovisual cabling.

Jury Box

Provide clear sightlines from each juror to the witness, attorneys, judicial officer, and evidence display areas. The jury box cannot extend past either the witness box or the attorneys' tables. Provide direct access into the jury box from the restricted corridor to the deliberation room so that the jury does not have to pass in front of the bench or litigant tables. Refer to Figures 5.9–5.10.

- The jury box shall be two-tiered, accommodate people with disabilities, and sized to accommodate 14 people. The dimensions shall be approximately 8' by 18'. The first row of jurors may be at floor level, or raised 6" to 7" above the floor. If the first row is raised above the litigation well floor, additional space will be required for wheelchair maneuvering and ramps. Designers must weigh the advantage of locating the first juror tier at the courtroom floor level, against the disadvantage of attorneys literally speaking down to the jurors. When locating accessible seating space, provide sightlines equivalent to other jury seating.
- Design the jury box to prevent communication between jurors and the spectators, and to guard against juror harassment. A space of 6' between

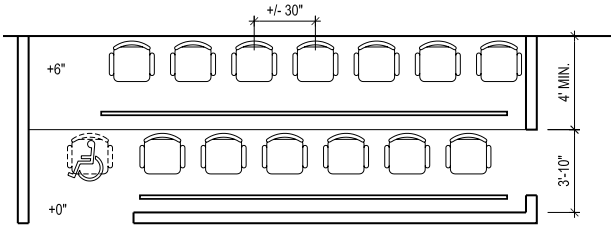


Figure 5.9 Jury Box Plan

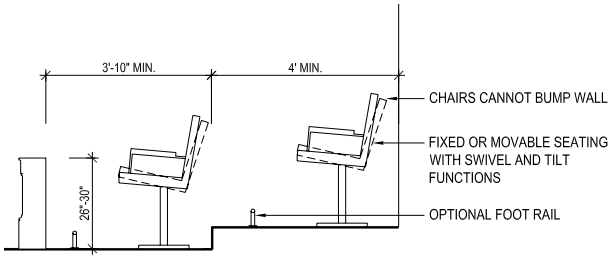


Figure 5.10 Jury Box Section

jurors and the spectator area railing is recommended. This area may be used to accommodate prospective jury members sitting on movable, stackable chairs while a jury is being impaneled. Where space is insufficient, provide a physical separation such as a transparent panel between the jury and spectator seating.

- Provide comfortable, ergonomic jury chairs to accommodate people of all sizes. Chairs may be movable or fixed. They must swivel and tilt, and be spaced so that the arms do not collide and the chairs do not strike the rear wall. Provide sufficient aisle space in front of each row of seats for juror legroom. Provide writing surfaces on the jury chairs. Provide a front modesty panel approximately 30" high separating the jury box from the litigation area. Handrails and footrails may also be provided.

- High-security courtrooms may incorporate additional elements in the jury box, such as glass panels, to secure the safety of the spectators, staff, and court personnel, and to ensure secure prisoner movement. Verify these requirements during the programming phase. Prisoners may not pass in front of the jury box on the way to and from the court floor holding area.

Litigation Area

The litigation area, or well, provides space for primary participants in activities of the judicial proceeding. Size varies, depending on courtroom type, and components within the well vary by the type of proceeding.

- Counsel tables: Locate counsel tables in the courtroom so that attorneys can be seen and heard by other attorneys, the judicial officer, the witness, the court reporter, and the jury. Provide at least two movable, accessible counsel tables with space for comfortable, ergonomic, movable chairs. The counsel tables shall be either custom casework or pre-designed tables and shall have either recessed outlets or concealed cable raceways for voice, data, power, and courtroom technology. Tables shall include a modesty panel to conceal defendant restraint devices. Provide an area behind the counsel tables and between the spectator area for a row of chairs along the railing for staff, paralegals, or other involved parties. Refer to Figures 5.11–5.12. If special counsel is required, particularly in juvenile and domestic cases, provide additional tables or seating at one of the counsel tables.

- Lectern: A movable, height adjustable, universally accessible lectern shall be provided for each courtroom. The lectern shall be floor supported (not tabletop mounted). Provide shelf and space for a microphone and for an attorney's laptop. A separate rolling cart will contain a digital evidence presentation system (DEPS), a VCR, and a DVD player. Provide recessed floor boxes with outlets for voice, data, power, and courtroom technology near the lectern and equipment cart.

Exhibit Display Area

Provide space for exhibit display and a large ceiling-mounted projection screen, located to be clearly visible to all court participants. An alternative projection screen will be located behind the witness,

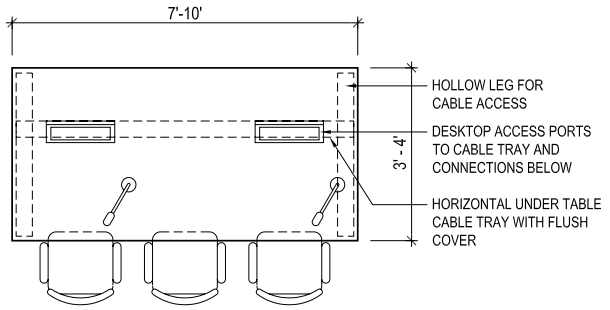


Figure 5.11 Counsel Table

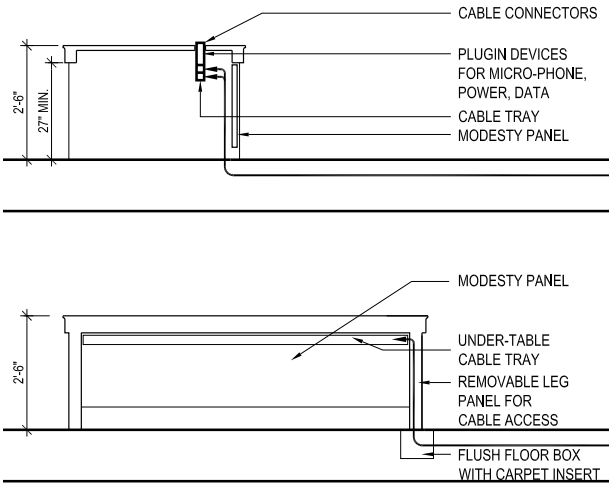


Figure 5.12 Counsel Table Section

ceiling mounted, if the witness box is provided with a display monitor (see Chapter 17, Telecommunications and Audiovisual Criteria, for screen size standards). Evidence boards shall be provided next to the witness box.

Court Security Officer (CSO) Station

Locate the CSO's station within the litigation area to the rear, and in front of the spectators' barrier. In criminal courts, the CSO is typically located near the door to the in-custody holding area, and requires easy and quick access to the defendant's table.

- Provide the CSO station with a small work surface, modesty panel, and lockable desk suitable for storage of firearms and ammunition. A telephone equipped with a flashing light rather than a ringer is recommended. An electronic signaling system, connecting the CSO's station and the jury deliberation room, is required.
- Incorporate ballistic-resistant material into the paneling, and a silent duress alarm system into the workstation design. In large-volume courtrooms, workstations may be provided for two or more CSOs.

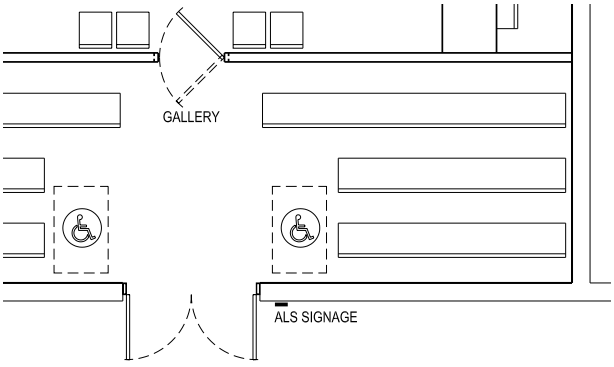


Figure 5.13 Bench Type Spectator Seating

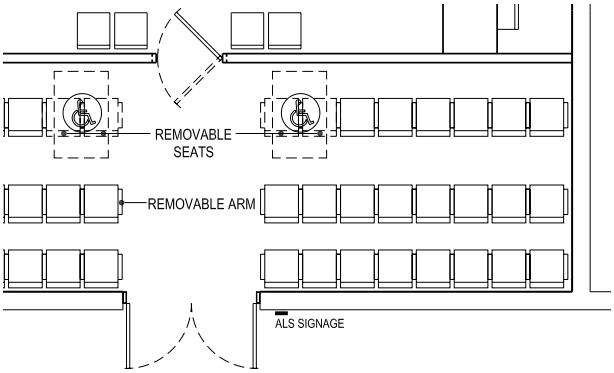


Figure 5.14 Theater Type Spectator Seating

Spectator Area and Litigation Area Separation

The spectator area shall be separated from the litigation area to control movement and reinforce the hierarchy of the participants. This element, commonly called the "rail." may be custom millwork or pre-designed and manufactured; it shall have a minimum 32" wide clear opening, with or without a swinging gate. The rail may be relocatable to allow (together with removable spectator seating) the litigation area to be expanded. In high-security courtrooms, the spectator and litigation areas may be separated by security glass or a folding glass partition.

Spectator Area

The spectator area provides seating for prospective jury panels, witnesses, and interested parties. The number of seats shall be planned to accommodate voir dire panels for jury selection. Typical panels consist of 75 people. A multipurpose courtroom has seating in the spectator area for the majority of the jury panel; additional movable chairs can be provided inside the litigation area, and the jury box seating can be utilized during jury selection.

- Bench seating is preferred to individual theater-style seats, because more people of various sizes can be accommodated, and because bench seating is low maintenance. Benches shall be contoured and proportioned to provide comfortable seating; hardwood veneer and solid wood construction is preferred. Benches shall be anchored to the floor but removable for relocation. Individual theater-style seating system may be an alternative, with AOC approval. See Figure 5.13–5.14.
- Provide wheelchair spaces, companion seating, and semiambulatory seating in ratios required by law. Refer to Figures 5.13–5.14.

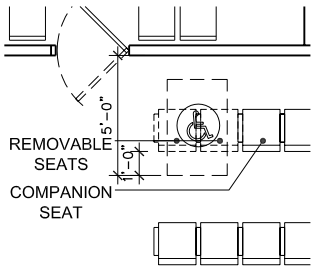


Figure 5.15 Companion Seating Adjacency

- In multipurpose courtrooms, accessible seating can be located in one area, generally toward the rear. In large courtrooms, accessible seating areas shall be provided in several locations to equalize sightline advantages. A wide central aisle allows flexibility to persons with disabilities.
- A companion seat must be located adjacent to the wheelchair space. The wheelchair space must align with the companion seat. Refer to Figure 5.15.
- Provide space in front of and behind the wheelchair space for the spectator using a wheelchair or mobility device to roll forward or backward to allow other spectators to exit a row. The wheelchair or mobility device cannot permanently block exit from an aisle.
- Temporary seating may be placed in wheelchair spaces when not occupied.

Sound Lock/Entry Vestibule

Provide a vestibule between the courtroom and public circulation that will be a transition space and control noise. Place glass panels in one or both sets of doors. The doors to the courtroom shall be lockable.

Exhibit and Evidence Storage

Provide a secure room or closet for storage of exhibits and evidence, to be accessible directly from the courtroom or from the restricted corridor.

5.5 COURTROOM SUPPORT SPACES

Jury deliberation rooms and other support spaces off the restricted corridor may in the future accommodate staff offices or functions different than the original program. Therefore, the configurations and fixtures in these spaces must be flexible.

Chambers

Chambers are the personal office/conference areas for the judicial officers. Separate chambers shall be provided for each judicial officer to conduct legal research and case study, and hold meetings with attorneys or judicial personnel. Since each judicial officer requires a quiet work environment to perform these tasks, distraction-free surroundings are required.

- Depending on the number of judicial officers in a facility, one or more additional chambers for use by judicial officers who are not regularly assigned to the court may be provided.
- The chambers shall be designed with a private restroom. Provide adequate sound control between

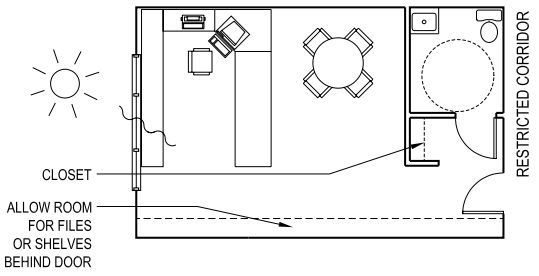


Figure 5.16 Judges' Chamber Plan

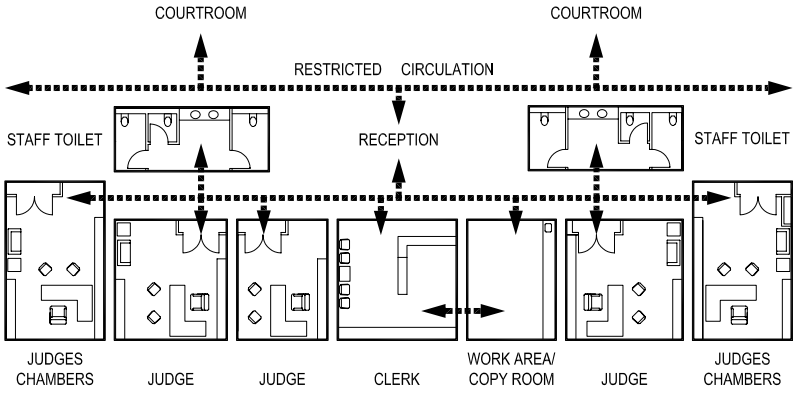


Figure 5.17 Combined Chamber Layout

the chambers and the staff and reception areas to reduce sound transmission during sensitive conference sessions. Provide natural lighting to the chambers. Refer to Figure 5.16.

- Judicial chambers may be clustered for improved collaboration and to share support functions. If chambers are clustered, a common restroom may be shared among judges and staff to lower costs and conserve space. Refer to Figure 5.17.

Support Staff Workstations, Reception, and Waiting Areas

The judicial office may be adjacent to and entered through an anteroom that contains space for support staff who perform clerical functions, receive and screen visitors, and maintain legal files for one or more judicial officers. In some cases this area may function as an unstaffed waiting area. The size of this area depends on related functional requirements.

Copy, Workroom, and Supply Area

Provide a copy, workroom, and supply area, containing photocopy and facsimile machines to be accessible to judicial support staff, research attorneys, attorneys, and CSOs. A ratio of one copy workroom for every five to eight judicial officers is required.

Court Reporter's Work Area

Court reporters transcribe court proceedings and review transcripts. Provide a separate court reporter's work area; grouping multiple court reporter workstations in a larger area is allowed. Locate on the restricted corridor on the same floor as the courtroom covered. Provide an area for locked transcript storage and general office supplies inside or adjacent to the court reporter's work area.

Conference Room and Law Library

A conference room and law library may be provided at a ratio of one room for every five to eight judicial officers. This area shall include bookshelves for reference materials. In small courts, this area may be combined with the jury deliberation function, provided that legal books are not accessible to jurors.

Research Attorney Offices and Workstations

Space may be provided for research attorneys, who review case files and perform legal research for one or more judicial officers.

Jury Deliberation Room

Provide jurors a private deliberation room that is free from distractions and outside interference, accessible from the restricted corridor. Refer to Figures 5.18–5.20.

- Provide juror deliberation rooms on the ratio of not more than one for two courtrooms, and consider one deliberation room for every three courtrooms. Verify this ratio during programming.

- Design the jury deliberation room to accommodate a table allowing all jurors, including persons with disabilities, to participate equally without hierarchy. Round or square tables are preferred to long rectangular tables.

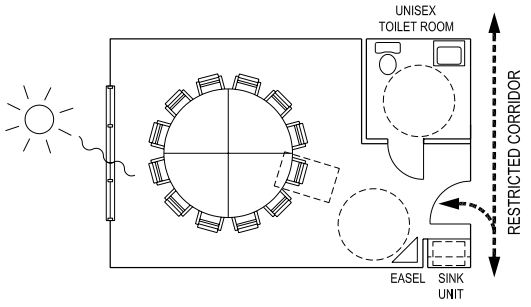


Figure 5.18 Jury Deliberation Room 400 SF

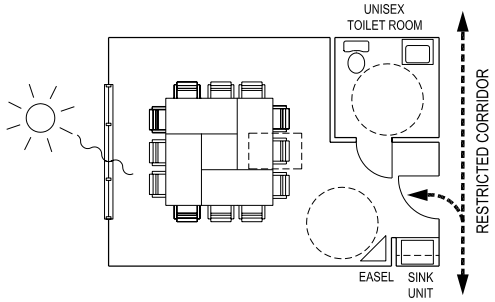


Figure 5.19 Jury Deliberation Room 345 SF

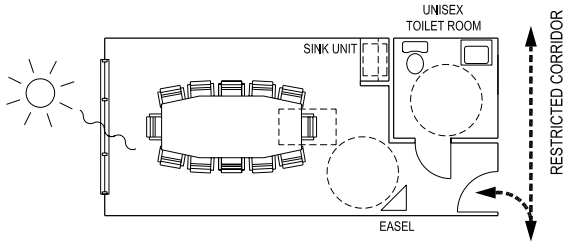


Figure 5.20 Jury Deliberation Room 341 SF

- The jury deliberation room shall comfortably accommodate 12 jurors and allow use of charts, mounted exhibits, and mobile video monitors for evidence.
- Provide one accessible toilet room positioned so that the door opens from a vestibule. Provide a vestibule for sound attenuation and to provide reasonable privacy to the toilet room.
- Provide a sink, water, and counter with lower cabinet. Provide space for coat storage. The room shall have natural light; ensure that windows do not allow jurors to communicate with people outside the court facility.

Attorney Interview/Witness Waiting Rooms

Provide interview rooms for attorneys and clients, and for conferences with victims and witnesses.

- Provide two attorney interview rooms for every courtroom. In larger court facilities, the ratio of interview rooms may be reduced.
- Interview rooms may be accessible from the public corridor (if consistent with the court's security and operational procedures), or may be reached through the courtroom entry vestibule if access can be provided but controlled when the courtroom is not occupied.

Law Enforcement Waiting

A waiting room, located off the public corridor near the courtrooms, may be provided in criminal, traffic, and juvenile courts for law enforcement officers to wait in before court appearances and during court recesses. The waiting room shall be accessible from the public corridor.

Notes:

- Numbered seats indicate accommodation of a 75-person jury panel for voir dire.
- Courtroom as diagrammed is 1,700 SF.
- Restricted corridor is at same elevation as courtroom floor.

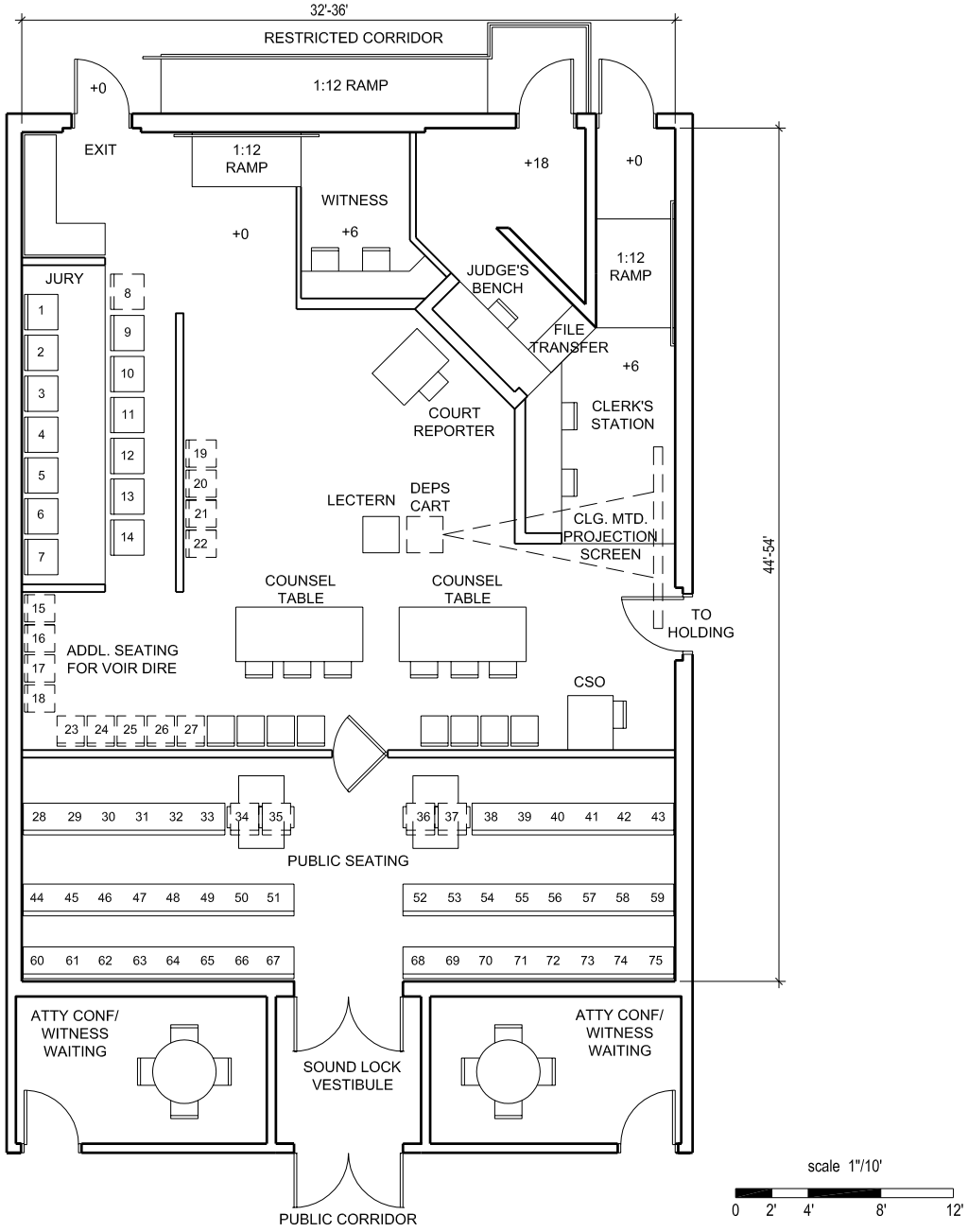


Figure 5.21 Multipurpose Courtroom (Corner Bench, seating for jury panel)

Notes:

- Additional seats can be added to accommodate jury panel of 75 (see Figure 5.21).
- Courtroom as diagrammed is 1,700 SF.
- Ramps outside courtroom.
- Restricted corridor is at same elevation as courtroom floor.

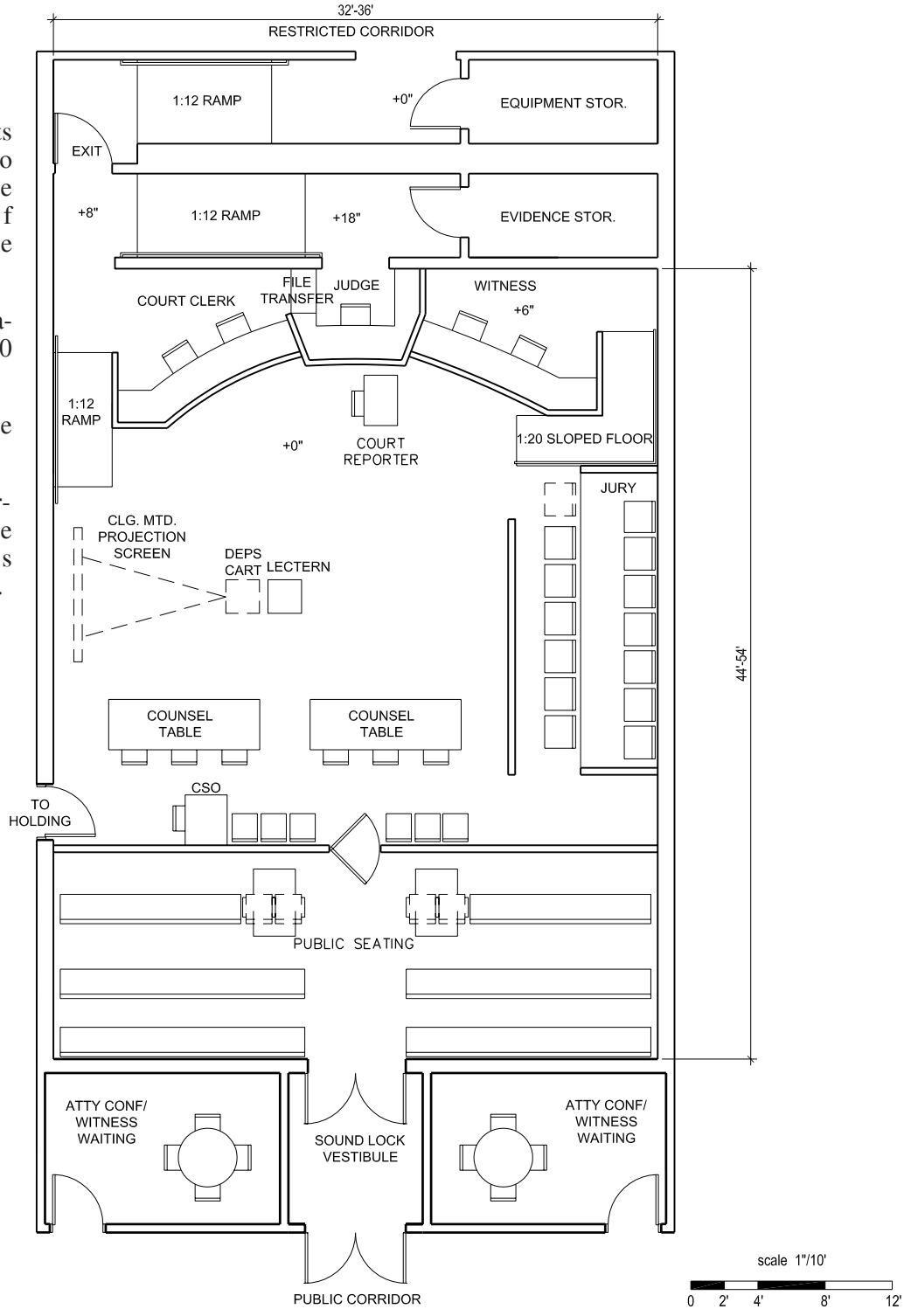


Figure 5.22 Multipurpose Courtroom (Central Bench—symmetrical)

Notes:

- Courtroom as diagrammed is 2,400 SF.
- Ramp to judge is partially outside courtroom.
- Restricted corridor is at same elevation as courtroom floor.

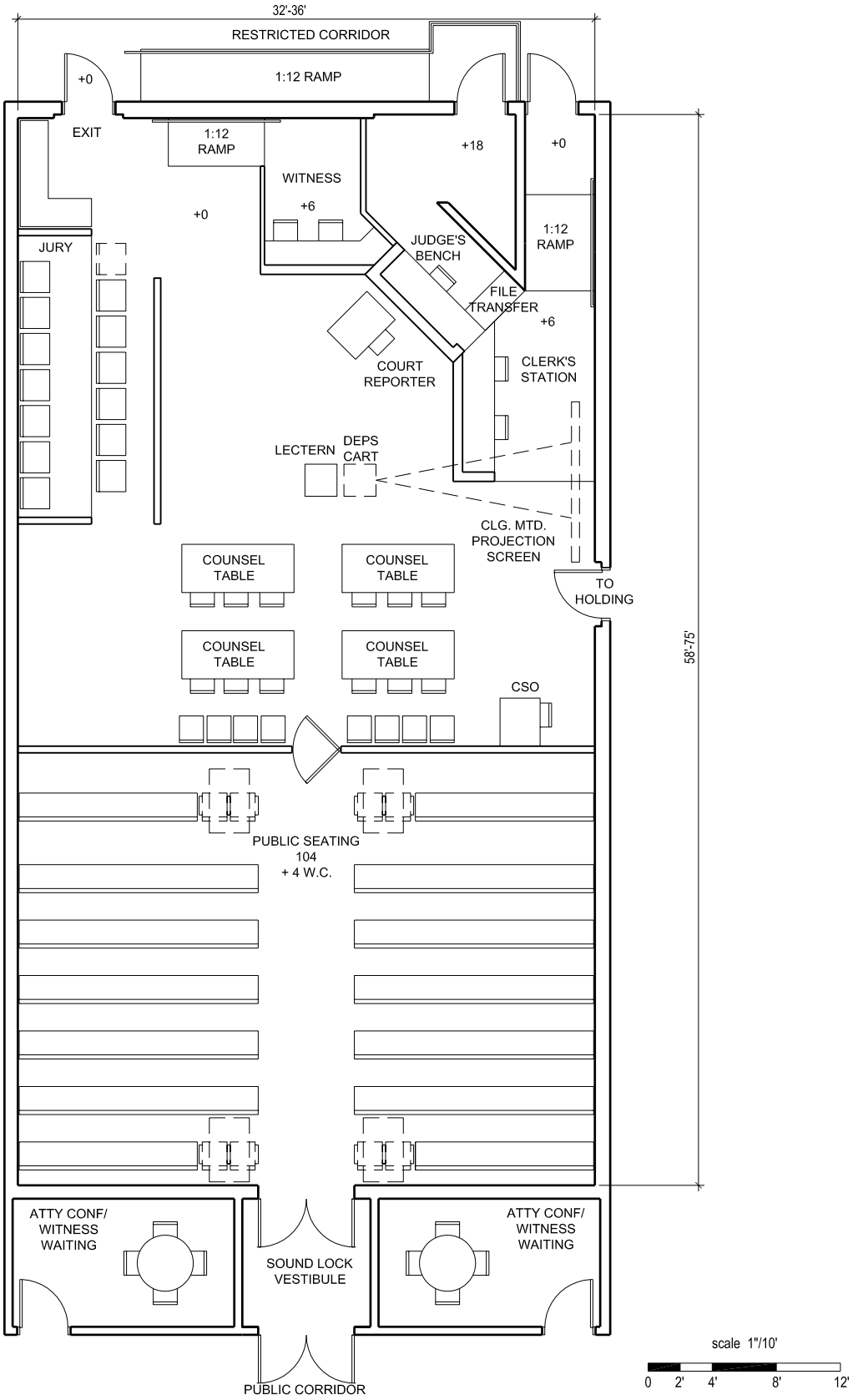


Figure 5.23 Large Courtroom (Corner Bench)

Notes:

- Courtroom as diagrammed is 2,400 SF.
- Restricted corridor is 6" above courtroom floor.

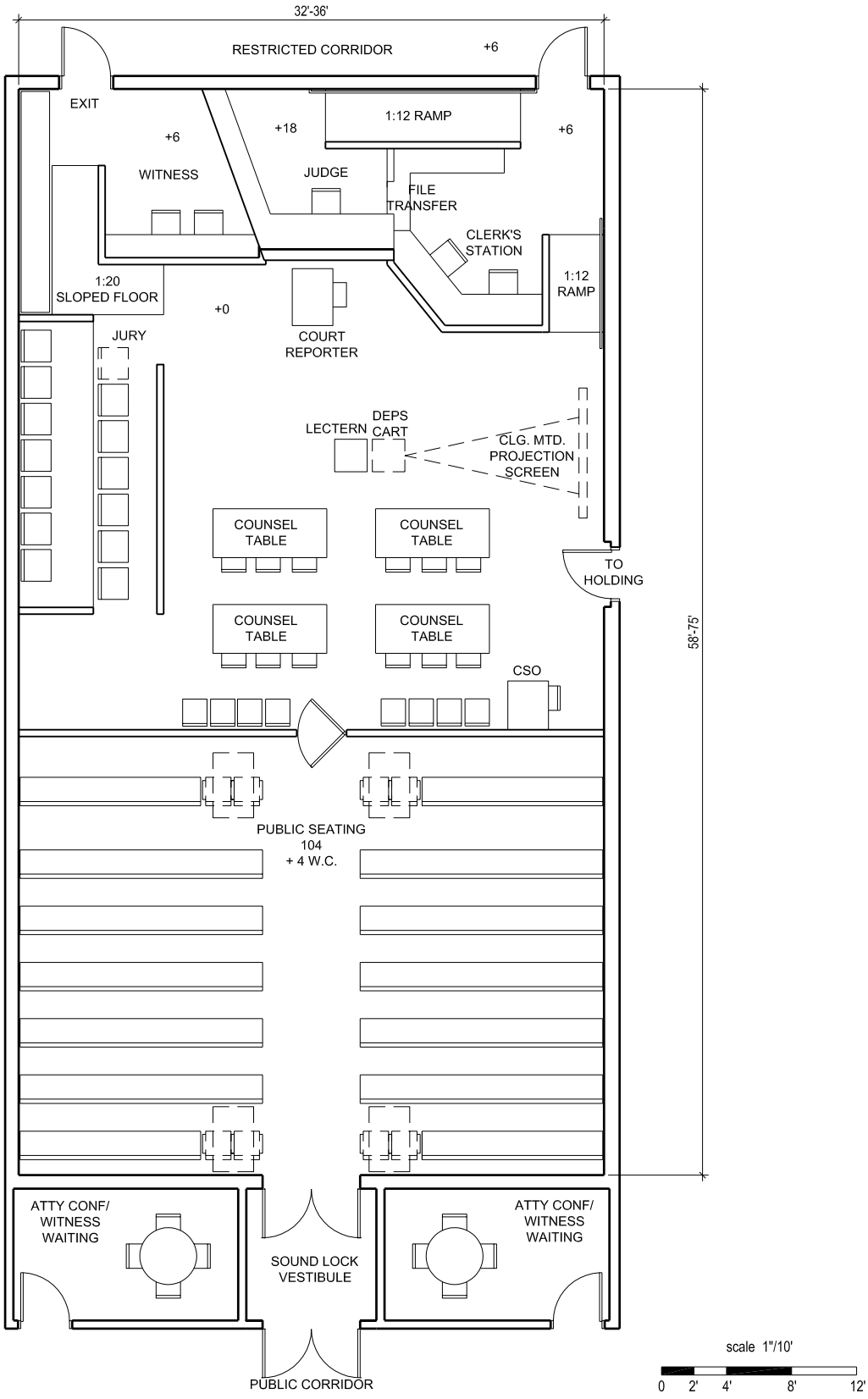


Figure 5.24 Large Courtroom (Central Bench)

Notes:

- Courtroom as diagrammed is 2,400 SF.
- Restricted corridor is at same elevation as courtroom floor.

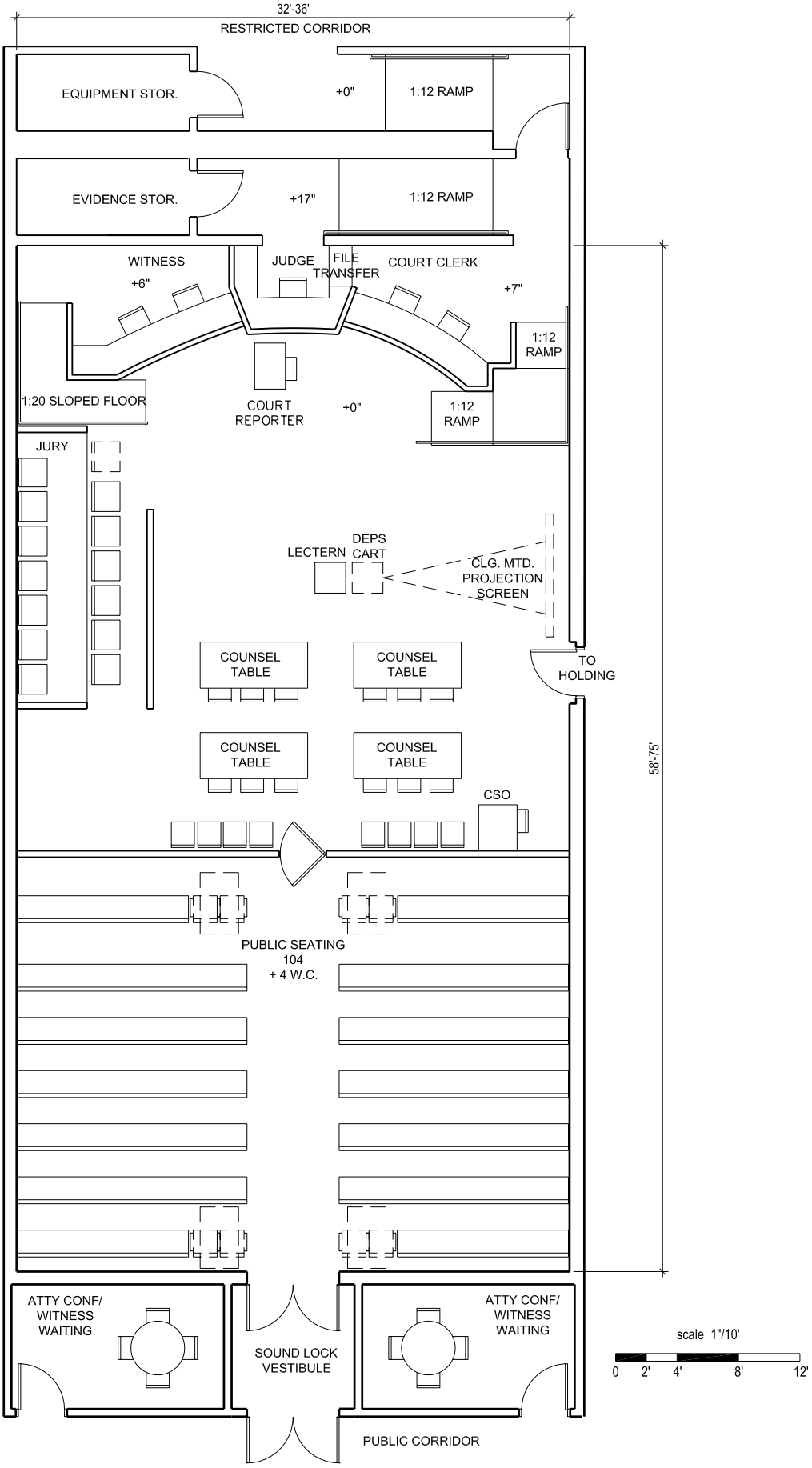


Figure 5.25 Large Courtroom (Central Bench - symmetrical)

Notes:

- Courtroom as diagrammed is 2,323 SF.
- Restricted corridor is 6" above courtroom floor.
- Ramp to judge is outside courtroom.

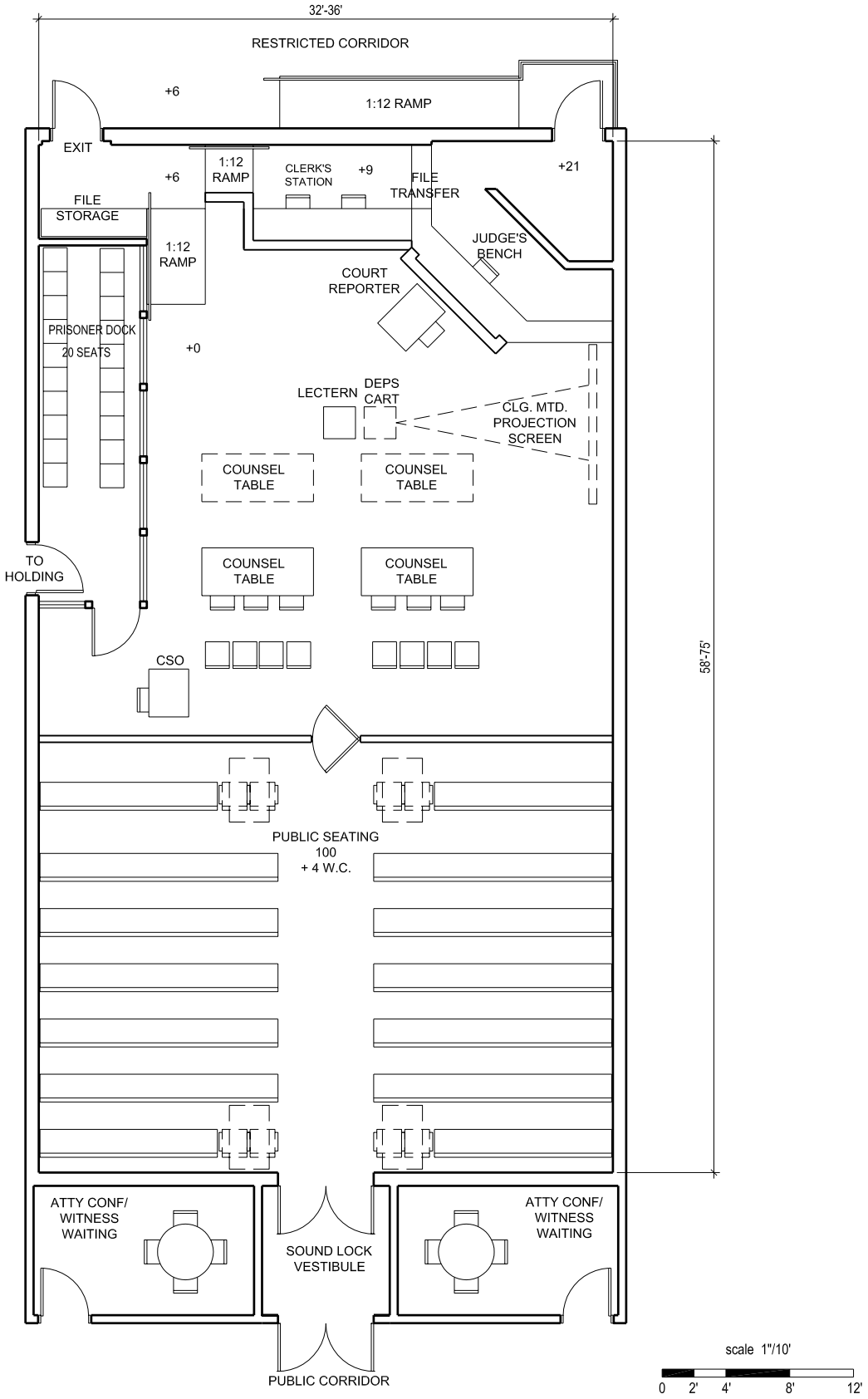


Figure 5.26 Arraignment Courtroom (36' bay, Corner Bench)

Notes:

- Courtroom as diagrammed is 2,325 SF.
- Restricted corridor is 6" above courtroom floor.

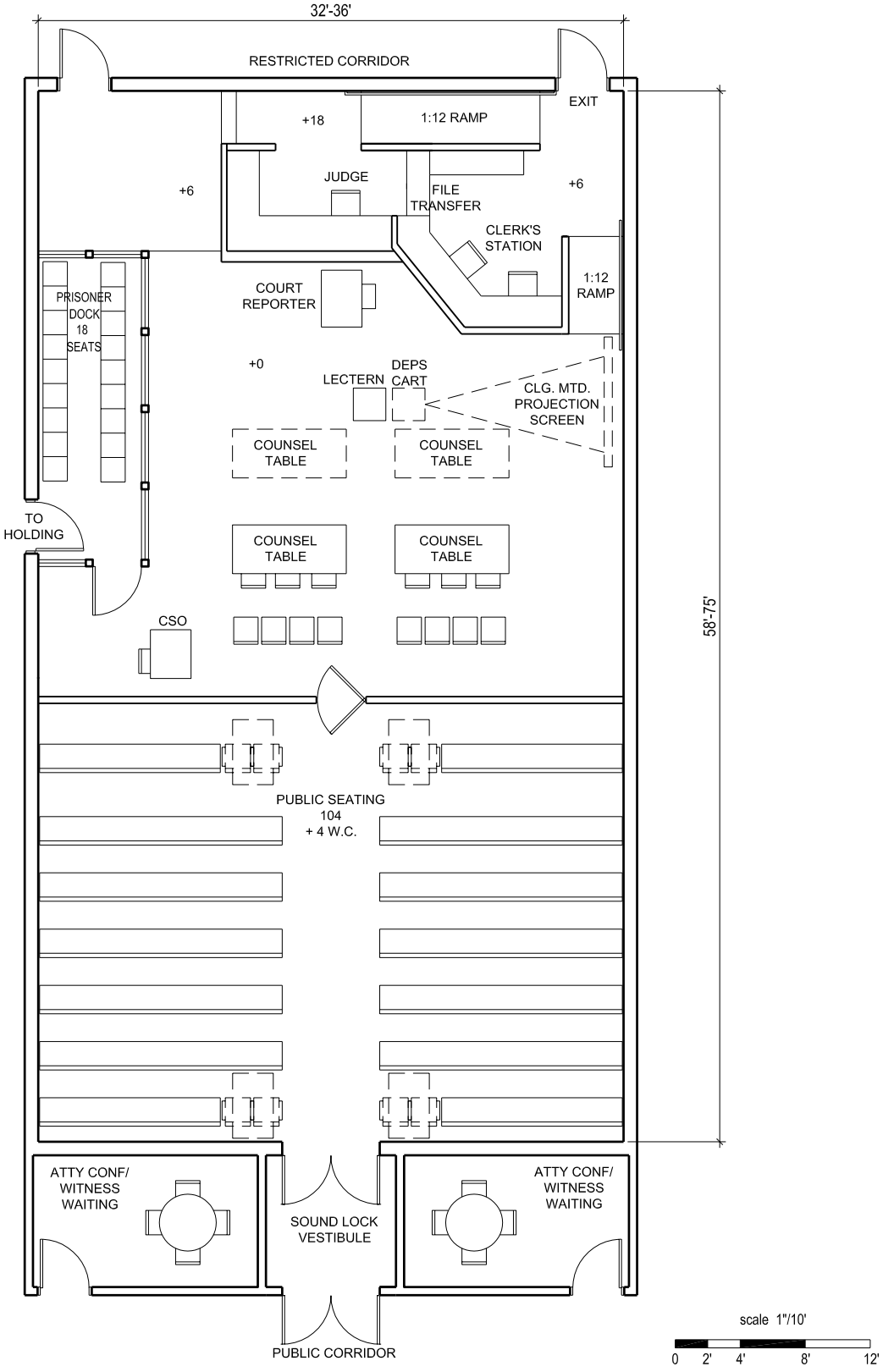


Figure 5.27 Arraignment Courtroom (Central Bench)

6

JURY FACILITIES AND COURT ADMINISTRATION

Jury Assembly Room

San Francisco Civic Center Courthouse
San Francisco, CA
RossDrulisCusenbery Architecture
Hood-Miller Associates
Mark Cavagnero Associates/John M. Y. Lee

Jury duty is a public service obligation. For many, jury duty is the citizen's only contact with the judicial system. The jury assembly area presents potential jurors with a physical symbol of the importance of their duty, and orients them to the process of the courts.

The trial court's administrative organization combines the traditional public and case management functions of the clerk of court with the financial and administrative services of a modern business. Clerk responsibilities include case filing and tracking, records administration, calendar management, fines, fees collection, jury services, and public information. Business services include staff personnel functions, budget management, information services, statistical reporting, and purchasing. For jury deliberation room standards refer to section 5.5 (Courtroom Support Spaces).

The number of court staff varies by jurisdiction. Variables influencing court staffing include the number of judicial officers, number and type of case filings, number of court locations, and extent to which business services are provided internally or are contracted with other entities.

6.1 JURY FACILITIES OBJECTIVES

- Plan and design the jury assembly rooms to be comfortable, efficient, and safe.
- Locate, size, and configure the spaces appropriately to facilitate use by potential jurors.
- Ensure that all jury assembly areas can be monitored by jury staff in case of illness or intrusion of non-authorized persons.

6.2 JURY ASSEMBLY SPACES

The jury assembly area shall be located near the main court entrance near elevators or a communicating stair. All prospective and selected jurors must enter through the screening station. The entrance to the jury area must be immediately identifiable upon entering the courthouse and easily accessible from public corridors. Jury staff shall be able to control the entry into the jury assembly area.

Ensure that traffic to the jury assembly room does not interfere with or impact the security screening process, or block public circulation paths.

Plan movement of jurors to minimize juror contact with attorneys and litigants, and to preclude intimidation by and contact with the public.

Protect assembly area from exterior viewing.

The jury assembly area consists of the following components.

Entry Queuing Area

Prominently placed signage shall provide clear directions to the jury assembly area. Jurors arrive simultaneously, so queuing areas will be required for prospective jurors waiting to sign in. Queuing area can be co-located with a lobby, waiting area, or building circulation.

Reception, Check-in, Registration

The reception, check-in, and registration area shall be immediately visible at the entry of the jury area. The size of this area will depend on the number of courtrooms and peak volume of anticipated jurors expected at sign-in times.

Provide medium-sized clerical support workstations (refer to Table 2.2).

Jury Assembly Room, Information Presentation Area

- Sufficient seating shall be provided for all prospective jurors. Provide movable ganged seating and lounge seating. The minimum number of seats will vary by the size and location of the facility. Provide wheelchair spaces, companion seating, and semiambulatory seating in ratios required by law.
- Provide areas for reading, studying, working, and watching television, designed as acoustically separated rooms or alcoves adjacent to the jury assembly area. Work areas shall include study carrels with infrastructure for Internet service, if allowed by the court, and power connections for personal computers. See Figure 6.1.
- Rooms may serve as multipurpose community rooms in smaller facilities.
- Provide sufficient restroom facilities adjacent to the jury assembly area.
- Provide a podium and infrastructure for wireless or cell phone access.

At the information presentation area, provide for use of audiovisual equipment, computer data lines, and telecommunications systems to accommodate programs such as video orientation, automated jury management systems, and juror call-in programs.

Outdoor areas may be provided if jurors are prevented from public contact.

Forms Counter

Provide counters for filling out forms. Plan this area to accommodate 10 percent of the daily jury call at 5 SF per juror.

Coffee and Snack Area

Provide space for a minimum of three to four vending machines, table, chairs, and space for water and coffee. Room size shall be proportionate to the number of people served; in larger facilities the area may be increased commeasurably. Space for a vendor may be provided in some facilities.

Jury Commissioner Office and Jury Staff Area

A small private office may be provided for the jury commissioner.

In larger courthouses, space for additional support staff not located in the jury reception area may be required. The size of the support space area will be proportionate to the size of the court facility. The office will be readily accessible to the reception counter. Provide sufficient space for storage of jury records and files. See Figure 6.2.

Figure 6.1 Work Carrels in Jury Assembly Room, San Francisco Civic Center Courthouse

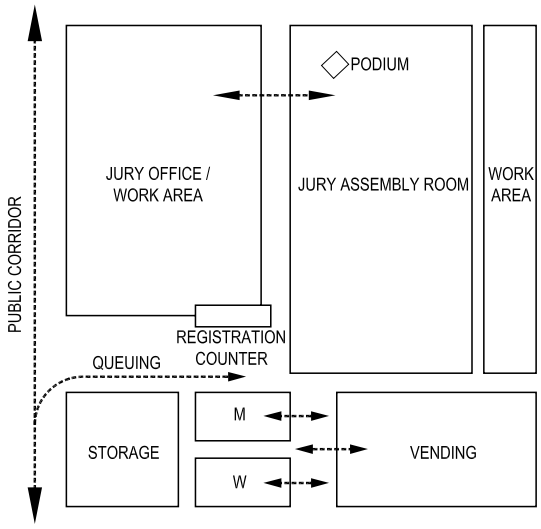


Figure 6.2 Jury Assembly Suite Adjacency Diagram

Mail Center

Provide a work area where staff can prepare juror summons, scan summons return information, and print checks. Most courts outsource printing and mailing, or centralize this function with other mail activities.

Call Center

Provide a work area where staff can answer telephone queries. Larger facilities use call centers or interactive voice response (IVR).

Grand Jury

The grand jury is not a state court function but often shares superior court spaces.

6.3 COURT ADMINISTRATION OBJECTIVES

- Co-locate court administrative functions and provide convenient public access to areas with high public contact. These areas should be located on lower floors near the main entry and public elevators in a multistory building. Provide staff areas with easy access to the private circulation system. Connect the court administrative offices to private and public corridors, allowing controlled access to judicial officers, court personnel, attorneys, and the general public.

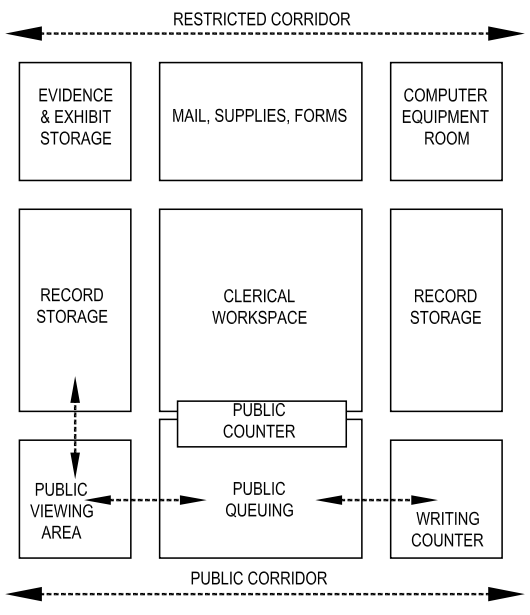


Figure 6.3 Clerk's Adjacency Diagram

- The appearance of the court administration and case management area shall be consistent with the rest of the courthouse. The public side of the counter area must have high-quality, durable finishes. The counters, workstations, and public viewing stations shall use modular furniture to enable complete ergonomic and expansion flexibility. The court clerk's office shall be an open-office environment with modular furniture, architectural details, finishes, furniture, wall coverings, paint, and carpet appropriate for administrative offices in a public agency.

- Consider making rooms more flexible by providing telephone, data, and power outlets in areas that may be converted to workstations, offices, or conference areas. Electronic case management will affect future record storage areas that may be required, and these areas must remain available for other program needs.

- Provide security to ensure the safety of the public, staff, records, and exhibits. Integrate security duress alarm notification systems into the courthouse security system. Consider security elements in the public service lobby. Incorporate glass and closed-circuit TV cameras at the public counter area. In locations not protected by a public entry weapons-screening station, provide bullet-resistant glass barrier systems and counter casework. Provide the evidence storage room and vault with locks and intrusion alarms, located in an area that allows constant supervision. Court clerk staff access shall be restricted by use of key cards or other devices.

6.4 COURT ADMINISTRATION SPACES

The court administration area consists of the following spaces. See Figure 6.3 for a typical layout.

Public Counter and Counter Workstation

Design public service counters to encourage access to the judicial system, while providing security for office personnel. Counters allow sufficient work area to transact case filing activities, and they separate private staff office areas from public areas. Design spaces to ensure efficient and secure acceptance, exchange, review, and reproduction of high volumes of public documents.

Counters must be universally accessible, with the ability to accommodate wheelchair users on each side. Counter workstation design options include:

- Option 1: Staff workstations shall be designed at an elevation above the public floor that allows for seated, eye-level interaction with customers standing at the counter. Refer to Figure 6.4. An accessible writing surface is required on the public side, with depth to equal the length of the longest court form. A raised solid barrier between openings screen view of computer and desktop items. The divider height is limited by reach distance. If a raised platform is provided, consider the ability of clerks to obtain records easily.
- Option 2: Staff and public sides shall be accessible at a seated level. Refer to Figure 6.5. Provide a single-height writing surface meeting accessible height and depth requirements. This height will accommodate people standing and those in wheelchairs. Sightlines and sound levels when speaking must be considered in this model. For longer transactions, such as probate, movable seating may be provided for the public; they may stand for short transactions.

Staff assignments to workstations may be permanent, rotating, or walk-up counters.

- Each permanent counter position will include the counter, staff work space on the private side, and standing area on the public side.
- Workstations shall accommodate communication and data processing equipment and storage space. All counter stations will be configured and provided with power and data to allow cash and credit card transactions. Include outlets for credit card swipe, printer, cash drawer, and cameras. Locations shall facilitate communication and passage of documents between clerks and the public.
- Provide a silent duress alarm at each clerk counter position.
- See Chapter 16 (Lighting Criteria) for lighting suggestions.
- Provide permanent counter positions with a means of blocking the view from the public side when the staff member is off duty but still working in the position. Pull-down shades or movable screening devices are acceptable.

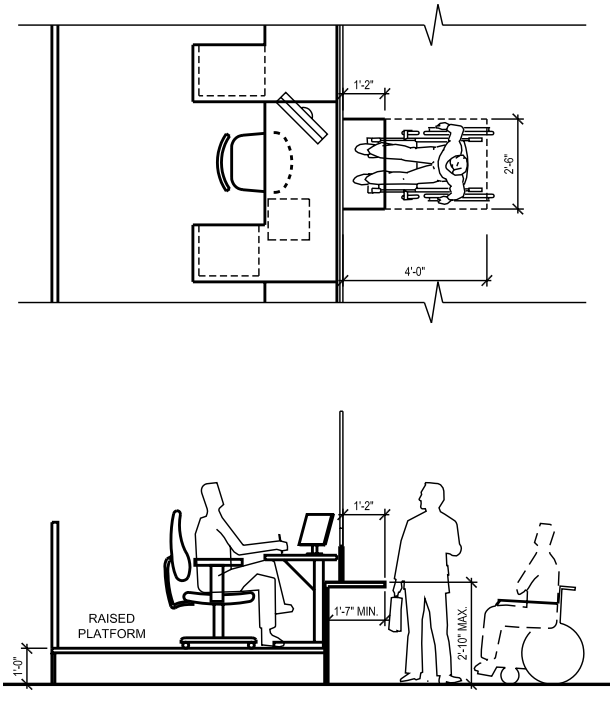


Figure 6.4 Transaction Height Counter

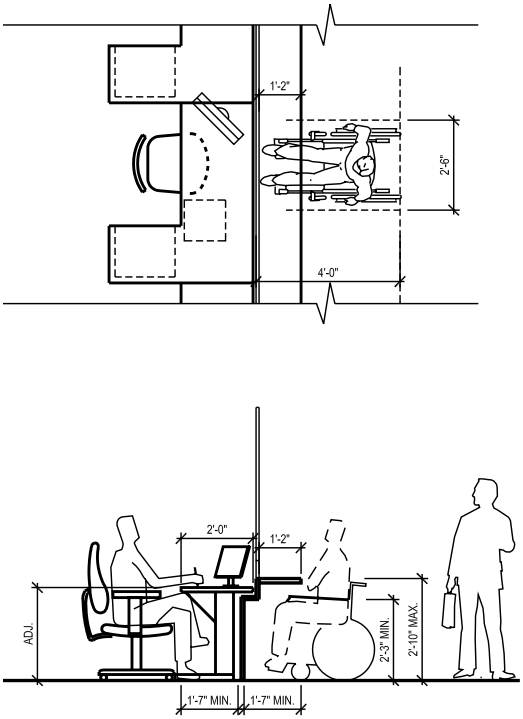


Figure 6.5 Universal Height Counter

- Provide security with glass enclosures. The glass presents a less friendly appearance but is preferred by staff to provide a layer of defense against the public.
- Provide voice transmission through 1¼" vertical slots on either side of the window. Provide a pass-through tray. If a glass barrier is not included, the design must include other means for defense, such as a restricted opening width, raised clerk station, or wider counter.
- Provide a queuing area in the public area outside the counter. Allow 10' minimum between the public entrance and the counter for the public queuing area. Provide additional space near the queuing area for a public writing counter for forms preparation.
- Some public counters may be located on the non-secure side of the security screening station. If counters for fast transactions, such as traffic and attorney filing, are located in the public lobby queuing area or outside, they must be protected with a glass barrier and cameras. Outside counters must be located under an overhang.
- Locate and design drop boxes for convenient public use. Locate drop boxes outside the building at curbside, in a drive-through, or within the courthouse public spaces. Review location and design of all drop boxes, regarding safety and security issues.

Records Viewing

Provide an area adjacent to the public service counter for public viewing of records. This area must be secure and visible to the staff at all times to prevent tampering with or theft of records.

- Provide public computers, copier, facsimile machine, microfilm readers and printers, inquiry terminal, and electronic devices designed to make records available for public review and duplication of court documents. Consider providing a turnstile to control passage into and out of this area.
- Provide coin-operated self-service duplication equipment in the public area. Establish a reasonable ratio of public computers to the number of counter stations.

Court Executive Officer's Suite

Office needs for the court executive officer's suite include an office for the court executive officer (CEO); a reception area seating two; offices for assistant court executives; a conference room adjacent to the CEO office; workstations for staff; and 40 to 60 NSF per staff member for files and office equipment. A separate restroom for the CEO is not required. This suite can be separate from the main clerk's office, but shall be located in the restricted area.

Offices and Workstations

Workstations and office furniture shall be modular furniture to enable complete ergonomic and expansion flexibility. Provide medium workstations with overhead storage. Low partitions, at 42" height, are encouraged for part of the enclosure to promote communication and visibility to the public counter area. Some stations can be combined into a shared work area and shared central small conference area.

See workstation size standards in Table 2.2 in Chapter 2, and planning criteria below for office area requirements. Provide space for:

- Office equipment, files, storage, counters, and special work areas
- Visitors, meetings, training, reception, and waiting areas
- Dedicated conference and meeting rooms, unless staff can share other meeting spaces

Case Management and Assignment

Workstations in the case management division will range from small to large, depending on the staff position. This area includes counter workstation positions to assist attorneys, court clerks, and the public. Provide 40 to 60 NSF per staff member to accommodate files and office equipment.

Information Systems (IS)

Information systems include systems development, programming, information management, technical support, planning, and research operations. These functions are primarily nonpublic and require office and workstation environments. Larger jurisdictions maintain technical libraries, computer server equipment rooms, computer workrooms, and, occasionally, large mainframe computer operations. Provide an IS

workroom and storage space with a 32" counter on two sides. Provide a 14" shelf 21" above the counter. This casework shall be plastic laminate finish. Above the counters, provide a continuous plugmold electrical unit.

Purchasing

Office space needs for purchasing staff include small to large workstations for buyers or other support staff, and a medium office for management. Consider a small conference space for meetings or negotiations with vendors.

Revenue and Collections

The revenue and collections office area requires small to large workstations. Provide a public reception area and counter space for information and payment transactions.

- Provide counter workstation positions, and 40 to 60 NSF per staff member for files and office equipment.
- Provide space for multiple file cabinets for records and files and a small conference space within or adjacent to the revenue and collections functions.
- Provide acoustical separation of any public space and staff areas where confidential telephone and personal conversations occur.
- Consider providing separate storage with restricted access and a security camera for safety.

Human Resources

The human resources office area requires large workstations. Provide space for multiple file cabinets for records and files and a small conference space within or adjacent to the workstations. Provide duress buttons at public counters and at any staff work area used for employee termination.

Records Storage

Provide space for microfilming and scanning documents for storage, and to accommodate future records storage and retrieval technologies.

Floors must be designed to accommodate file weight. Provide minimum aisle widths of 36". Consider providing nonliquid fire suppression protection of file storage areas. See Chapter 16 (Lighting Criteria) for lighting suggestions.

Some jurisdictions distinguish between active and inactive records for file storage purposes. Active records include open or regularly accessed files that are generally stored adjacent to the court clerk work areas. Active records are often maintained in indexed, open shelving units for easy access. Inactive records are often stored at a more remote location. Assume 70 percent of records will be active. Typically three to four years of records are maintained on-site. Records must be maintained, pulled upon request, routed, and interfiled. A microfilm and destruction program, if available, can help control growth of records storage.

Active Records Storage

Verify the functional and space requirements for active record storage in order to provide sufficient space. Active records must be easily accessible from the court clerk work areas and in a secure location. Functional requirements and policies of each courthouse will influence the location of the active file storage area; locate on the ground floor because of structural load issues.

- Adequate workspace must be included adjacent to the file storage equipment.
- High-density record storage is preferred for most active file storage because of the smaller footprint, but cannot be used in departments requiring constant file retrieval. Manual systems are preferred over electric because of maintenance and failure rates. Design with some fixed aisles so several aisles can stay open for staff access. A locking feature may be used to secure confidential files. Specify record storage seven shelves high.
- Optical disk processing substantially reduces file storage space while increasing file input and viewing capabilities.

Inactive Records Storage

If inactive files are stored on-site, an adequate and accessible storage area must be provided. Spatial requirements will vary in accordance with the number of records and the length of file retention schedules.

- Warehouse shelving is recommended.

- The inactive record storage area must not fluctuate in temperature or humidity. Protect the file storage medium, whether paper, microfilm, or optical disk, against deterioration or damage from flooding or moisture.

Conference and Training Rooms

Provide conference rooms as specified by the program. Judges must be able to gather regularly for bench meetings or education purposes, and staff must be able to gather for meetings. The three conference room sizes listed in Table 2.2 do not preclude larger conference rooms in large court buildings or combining multiple rooms with folding walls.

Provide a training room, located for easy accessibility by staff. Design for flexibility with multipurpose furniture and a projection screen to accommodate training, conferences, and other meetings. See Chapter 16 (Lighting Criteria) for lighting requirements and Chapter 17 (Telecommunications and Audiovisual Criteria) for audiovisual requirements. Provide small conference rooms adjacent to workstation areas.

Mail Center

Provide an area for intake, sorting, and mail distribution. Large facilities may require additional area for mechanical and electrical components to support HVAC biofiltration systems.

Other Support Areas

Other support areas may include copy facilities, supply rooms, restrooms, and break areas.

- Provide copy areas to accommodate high-volume copying. They must be ventilated to dissipate copier heat and fumes, and located to minimize noise disruption of other work areas. Depending on the size of the court facility and workload, convenience copiers may be located throughout the building.
- Provide an area with adequate shelving and work areas for storing office supplies.
- Allocate space for employee restrooms. Consider current and projected future staff composition when determining the number of toilet fixtures. Additional restroom facilities for female employees may be required.
- Provide a staff break room with a sink, disposal, and casework. Employees shall provide appliances.
- Provide a lactation room for employees.

Equipment Storage

Provide a locked area for equipment storage, including computer equipment.

7

SPECIAL SERVICES

Exterior

Peter L. Spinetta Family Law Center
Martinez, CA
RossDrulisCusenbery Architecture

Family law facilitators, self-help centers, family court services (FCS), juvenile dependency mediation, child waiting, and alternate dispute resolution (ADR) programs increase the efficiency of certain types of court cases. The litigant has better information, issues are settled more frequently, court appearances are minimized, and using these services reduces paperwork. Related justice agencies (i.e. District Attorney, Public Defender, Probation, Child Protective Services) have significant business each day within the Trial Court, therefore accommodations for the agencies shall be determined during the programming phase. Spaces for related justice agencies may be multipurpose rooms for brief use, or larger suites serving as the primary office for multiple staff and with public service function.

7.1 OBJECTIVES

The following group of spaces must be convenient to the public and must be located off the public corridor or public waiting. These areas must also have access to private circulation systems.

Since many family court services and ADR services are conducted after regular court hours, access to these offices and restroom facilities during noncourt hours must be available without compromising the security of the remainder of the courthouse.

Provide safety and security in the event of physical confrontation by means of duress alarms and sidelights at doors. Provide future flexibility by providing these features in all spaces. Duress alarms shall be inconspicuous but convenient to the user.

7.2 FAMILY LAW FACILITATORS AND SERVICES FOR SELF-REPRESENTED LITIGANTS

Family Law Facilitators

Family law facilitator programs are a mandated ser-

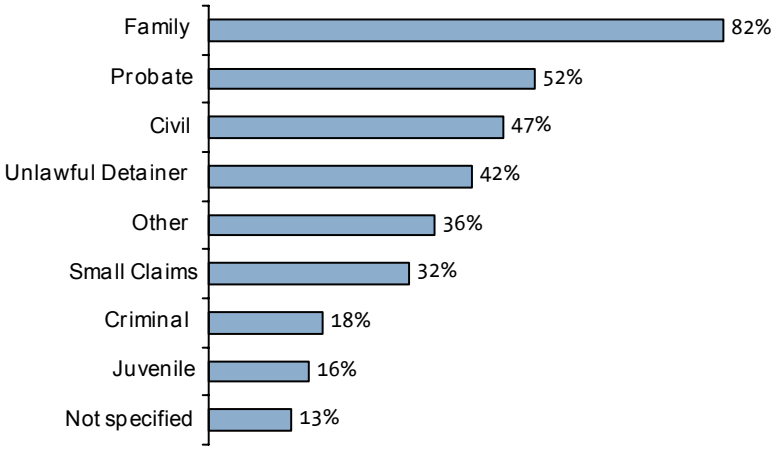


Table 7.1 Self-Represented Litigants' Needs (by Case Type) (From *Highlights from the report of the Task Force on Self-Represented Litigants*)

vice. Supervised by experienced family law attorneys, they provide self-help assistance to litigants with child support issues.

The following description indicates the role of the facilitators in the litigation process.

> *Family Law facilitators guide litigants through the forms and procedures related to child support, spousal support, and maintenance of health insurance. They assist with cases involving the local child support agency, many of which are cases requiring reimbursement for public assistance. Many facilitators are involved in community outreach programs. Facilitators provide mediation services, in which they meet with both parents and help work out child support issues. Some courts have enlisted volunteer attorneys or provided additional funding that enables facilitators to assist self-represented litigants in other family law areas, including divorce, custody and visitation.*
>
> *Task Force on Self-Represented Litigants, highlights from report*

Table 7.1 shows a breakdown of self-represented litigants by case type.

Most courts have expanded their family law facilitator's activities to provide other self-help assistance in family law, and a growing number of courts provide self-help in other areas. In the *Statewide Action Plan for Serving Self-Represented Litigants,* approved by the Judicial Council in 2004, attorney-supervised, staffed self-help centers are recommended for every court.

Figure 7.1 Self-Help Center, San Francisco

Family law facilitators and self-help centers provide assistance and practical information about court procedures for pro per litigants (representing themselves in litigation) visiting or using the court. Locate self-help centers near the clerks' offices, off a public corridor. See Figure 7.1.

Reception, Waiting, and Triage Areas

- Provide public waiting for users and children, with child waiting, reception counter, and triage area. The volume for these services is extremely high. In large courts, seating should be available for 40 to 50 people.
- Furnishing and equipment needs include: small tables for filling out forms or conferencing that can be reconfigured for classes, computer terminals located against the wall, brochure racks, shelving, storage, video monitors, and a coin-operated photo copier.
- Provide staff workspace with file storage, work counters, and equipment. Public counters and reception areas may be integrated into the work areas.
- Provide a duress alarm at counters.

Workshop Rooms

In jurisdictions with more than one family law facilitator, provide a workshop room. The room must accommodate reference materials, audiovisual equipment for workshops, and computers to allow litigants to complete typewritten forms. See Chapter 16 (Lighting Criteria) and Chapter 17 (Telecommunications and Audiovisual Criteria) for technical requirements.

- In jurisdictions with at least one full-time facilitator, provide two small conference rooms for services to be provided by volunteer attorneys, paralegal, and other staff supervised by the attorney facilitator/self-help center attorney's office.
- Provide one private office per facilitator and staff attorney. The office shall accommodate up to five people to allow for mediation.
- Provide a duress alarm in offices and at counters.

Small Courthouse Model

Provide one room designed so one staff member can provide supervision and control.

Impact on Courtroom

Provide brochure rack and video outside the pro per courtroom to instruct users on courtroom procedures.

7.3 FAMILY COURT SERVICES

Courts are required to set contested child custody and visitation issues for mediation. Family court services (FCS) provides mediation, which must include mandatory orientation as well as a mandatory intake process that screens for, and informs staff about, any restraining orders, dependency petitions under Welfare and Institutions Code section 300, and other safety-related issues affecting any party or child named in the proceedings. Rule 5.215 of the California Rule of Court requires FCS to conduct differential domestic violence assessments; make reasonable efforts to ensure the safety of victims, children, and other parties when they are participating in services provided by family court services; and, consistent with Family Code sections 3113 and 3181, offer separate mediation sessions at separate times when there is a history of domestic violence, or when a protective order as defined in Family Code section 6218 is in effect, or if domestic violence is discovered while mediation or evaluation services are in process. A domestic violence support person may accompany a party protected by a restraining order to mediation and orientation. In child custody and visitation cases, FCS may also offer appropriate services as available, such as child custody evaluation, parent education, relevant education programs for children, booklets, videotapes, or referrals to community resources. FCS offices also commonly offer such services as step-parent adoption, conservatorship, and guardianship investigations.

The family court services mediation area can generate considerable traffic flow. Locate FCS on a lower floor close to the main lobby, or near elevators on an upper floor. Other civil mediation and arbitration services do not generate the same traffic load as FCS and may be located away from the main lobby. Parties using FCS often also use family law facilitator/self-help services; locating these services nearby would be helpful to the public. If possible, provide more than one exit from FCS, to provide alternate access for domestic violence victims who are participating in mediation.

The family court services consists of the following areas; for sizes refer to Table 2.2 in Chapter 2:

- Public counter and workstation space
- Mediator and evaluator offices
- Reception and waiting areas
- Orientation room
- Mediation room
- Conference and training room
- Children's waiting area
- Security station
- Equipment storage

Mediator's Office

Provide a private office for each mediator. The office shall accommodate up to six people.

- Provide sidelights at office doors.
- Provide acoustical treatment of office walls and doors.
- Provide a duress alarm in each office, because of the potential for physical confrontation.

Reception and Waiting Areas

Provide reception and waiting areas with seating sized for the court's needs.

Figure 7.2 Child Waiting Room, San Francisco

- Provide a vision panel at the suite entry door
- In large jurisdictions, provide a reception counter and sign-in area, with a counter position.
- Provide duress alarms in support staff areas and at counters.
- Provide an area for copy and fax machines adjacent to clerical staff and mediators.
- Provide space for FCS files and records adjacent to clerical staff.
- Reception area shall provide sufficient space to accommodate mandatory screening, intake, and differential assessment. Private space should be available to safely consult with vulnerable parties, such as victims of violence.
- If possible, provide separate waiting areas for different parties in mediation. One or two reception and waiting areas will serve several mediation offices. Separate FCS waiting areas should be available for domestic violence victims, so that they do not have to be in the same area as the alleged perpetrators.

Orientation Room

Provide an orientation room with seating for four to six people, for orientation sessions before participation in mediation or other ADR services.

In large facilities provide larger areas, with a television monitor for video orientation at one session, and seating for 30 people.

Mediation Room

Provide a mediation room. In some jurisdictions, a combination of large and small mediation rooms will accommodate large family groups and allow involvement of social workers and other staff.

- Provide acoustical treatment of office walls and doors, because of the confidential and sometimes vocal exchanges associated with these discussions.
- Provide a duress alarm.
- Provide video cameras to allow remote observation of proceedings.

Conference and Training Room

In jurisdictions with more than eight FCS mediators, provide a conference and training room of 200 NSF, and increase size proportionate to the number of mediators. The room must accommodate reference books and related materials needed by mediators to conduct their business. See Chapter 16 (Lighting Criteria) and Chapter 17 (Telecommunication and

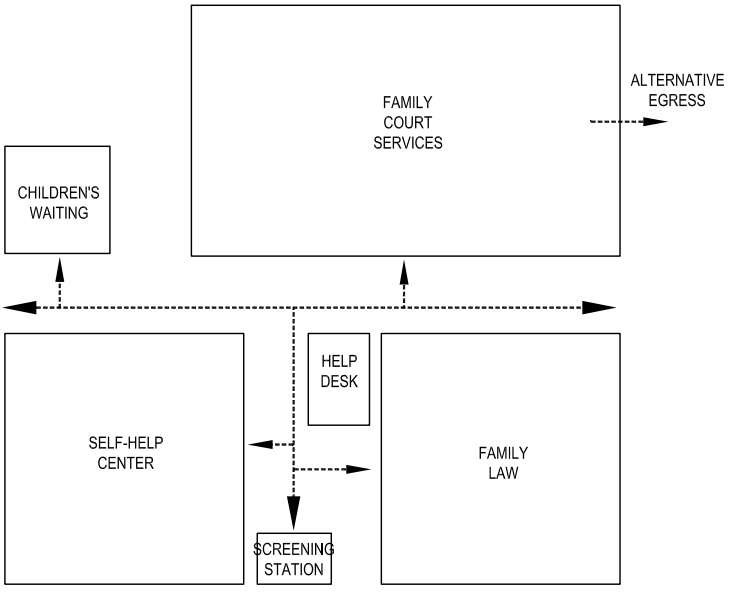


Figure 7.3 Special Services Adjacency Diagram

Audiovisual Criteria) for audiovisual requirements.

- One room may be used for mediation, orientation, conference, and training.
- Provide a duress alarm.
- Room also may be used for case conferencing and staff meetings.
- Provide access to the public corridor to allow non-court users to use the space for multidisciplinary training without incurring security risks.

Children's Waiting Area

If no other children's waiting area is available or convenient, provide a separate children's waiting area near FCS to be used when children or their parents or guardians are involved in court proceedings. See Figure 7.3 and refer to section 7.4 for standards for this area..

Security Station

Security provisions for the FCS area vary based on the size and location of the function. If remote from the court security staff, the FCS area may require a separate security post. If security staff is stationed at FCS, provide a post with workstation and security equipment. If the FCS area is not within the secure perimeter, a separate security screening station may be required.

Equipment Storage

Provide an area near the mediation rooms for storage of equipment and furnishings, such as video monitors, used in mediation.

7.4 CHILD WAITING

Standards of Judicial Administration recommended by the Judicial Council require provision of a safe place for children to play while their parents conduct their court business. Provide a child waiting room in all court facilities. These spaces are required under the rules of court listed below:

> *Each court should endeavor to provide a children's waiting room located in the courthouse for the use of minors under the age of 16 who are present on court premises as participants or who accompany persons who are participants in court proceedings. The waiting room should be supervised and open during normal court hours. If a court does not have sufficient space in the courthouse for a children's waiting room, the court should create the necessary space when court facilities are reorganized or remodeled or when new facilities are constructed.*
>
> *California Rules of Court Section 1.3, Children's waiting room*

- Provide an area of 120 NSF for two to three children, increasing in area by 15 NSF per child. The waiting area must be located near the security station but in a semiprivate corridor. Space needs will vary with court caseloads. Consider providing separate areas for adolescents.
- Provide a check-in workstation with a duress alarm, and view of entire room, to allow supervision by one staff person; design must facilitate safe check-in and check-out of children. Provide file storage for administrative records, forms, and brochures.
- Do not allow outside visual access or windows; the public shall not be able to look into the room. The children must be in a controlled situation. Access doors shall be locked with a remote buzzer operated from the check-in workstation.
- Provide one or two restrooms, one with child-sized fixtures and a changing table.
- Provide a second door into a secure corridor. Small facilities can use a multipurpose room.
- Provide space for child-sized tables, chairs, couch, and floor games.
- Provide storage space for toys and games.
- Provide space for information racks about community resources for service referrals and community resources (housing, health care, child care, literacy, and education).
- Provide a quiet room with glass walls, sink, locking cupboards, a refrigerator, and a microwave.

7.5 ALTERNATIVE DISPUTE RESOLUTION

Alternative dispute resolution (ADR) services are an increasingly important part of the judicial process. In the civil case context, ADR includes the traditional civil case settlement process involving a judicial officer, attorneys, and the litigants; mediation, involving a facilitator and the parties, sometimes without

attorneys; and arbitration, involving an arbitrator, attorneys, and the litigants.

In family court, ADR commonly takes the form of court-mandated mediation provided by family court services (FCS) involving a mediator, family members including children and occasionally others, such as social workers. Family court services mediation generally occurs in court facilities.

Civil case mediation and arbitration services may be provided privately and occur outside the court facility. Civil case settlement conferences often take place in a courtroom or conference area. Court-sponsored mediation and arbitration services may increasingly be provided in court facilities.

Provide space for civil case settlement conferences and mediation and arbitration services within the court facility when required by the program. Requirements for these functions may vary considerably depending on anticipated volume of usage. In larger jurisdictions with formal ADR programs, consider multiple rooms of various sizes and capacities. For sizes refer to Table 2.2. If provided, space for these functions may include the following:

Mediation and Arbitration Rooms

Provide one or more conference rooms for mediation, arbitration, and settlement conferences to accommodate a minimum of six participants. Each room must accommodate a mediator, parties, and attorneys. In addition provide a caucus room. Provide a duress alarm in each room and at the reception counter.

Mediator's Office

Provide area for a workstation, file storage, and a small conference table or seating area. Positioning of the elements is per mediators' collective preference for security and comfort.

Mediation and Arbitration Coordinator's Office

Provide area for a workstation for the individual responsible for scheduling and coordinating attorneys and clients.

Reception and Waiting

Provide an area with seating for six to eight people, where attorneys and litigants can be seated while waiting for a mediation room. This area can serve one to four mediation rooms and may be increased in size according to the number of additional mediation rooms required.

7.6 MULTIPURPOSE ROOMS AND OFFICES

Provide multipurpose rooms, to be assigned by the trial court to related justice agencies or others, the character and quantity of rooms shall be determined during programming. Locate rooms adjacent to the public corridor, potentially with controlled access to the restricted circulation system; provide keypad locking so the Superior Court can re-assign the use easily; provide telecommunications infrastructure separate from the trial court's LAN. Representative uses of multipurpose rooms include:

- Related justice agency drop-in offices: rooms suitable for installation of modular workstations, for staff use while at the courthouse. Staff may use the room to prepare and read court papers, make telephone calls, and conduct other court-related activities.
- On-site drug testing room: a room used for drug testing adjacent to the courtroom.
- Attorney convenience center: a work and waiting area, with power and data communications for laptop connections, similar to drop-in offices for related justice agencies
- Multi-agency and volunteers convenience center: workstations for volunteers. In larger counties with comprehensive or centralized volunteer programs, provide a coordinator's office. May be located on a semiprivate corridor.
- Law enforcement and waiting: Law enforcement waiting areas must be located off public corridors near courtrooms. Access to the law enforcement waiting area must be secure. Provide couch, chairs, and a table.
- Victim waiting: Victim waiting areas must be located off public corridors near courtrooms. Provide chairs and a table. This room may be used for remote testimony to the courtroom. Provide power, lighting, and configuration to allow audiovisual equipment to obtain proper images for victim to testify remotely.
- Court interpreters convenience center: Interpreter waiting areas must be located off public corridors

near courtrooms. Provide bullpen with lockers, carrels, tables, manager's office, shared phones, secure storage, and a TTY machine.

- Blood draw/DNA swab room at family court: Provide a chair and locked cabinet.
- Fingerprinting: Provide a pass-through to the family law clerk's area. Provide a desk and a camera area to take headshot photos. Locate adjacent to criminal court, with a secured door.
- Government attorneys: Local child support agencies often meet with litigants before and during child support calendars to try to reach stipulations. Given the high volume of these calendars, a large conference room should be with computers and printers available to calculate child support and print out agreements.
- Paralegal: A drop in center to assist families with child support issues requires room for a desk, file storage and 3-4 guest chairs.
- Resource room for Social Services: Locate near courtrooms so that litigants who are referred to social services can get immediate assistance for problems such as substance abuse.

7.7 OFFICES FOR RELATED JUSTICE AGENCIES

Certain trial court buildings may include office suites for related justice agencies to improve access to justice, trial court efficiency and public service. Such office suites may accommodate multiple administrative and professional staff as well as public services, are in general differentiated from the trial court, to reinforce the independence of the judicial branch, and shall use the public circulation system, and the main public building entrance, not the restricted or secure circulation systems.

These office areas shall have the same structural dimensions as other parts of the building, to allow future conversion to court space; the telecommunications LAN and infrastructure shall be separate from that of the trial court. The amount of public visitation to a related justice agency shall be considered in determining the location of the suites in the building and in the elevator service calculations.

These Facilities Standards shall not apply to the interior development of the related justice agency offices; however the Architectural, Structural, Mechanical, Automatic Controls, Electrical, and Fire Protection sections shall apply to the basic building infrastructure and services for these suites.

8

IN-CUSTODY DEFENDANT RECEIVING, HOLDING, AND TRANSPORT

Control Room

Kane County Judicial Center
St. Charles, IL
HOK Architects

Criminal courts must have secure facilities to receive, hold, and transport in-custody defendants to and from the courtroom. In small court facilities, this may amount to a few holding cells and a secure corridor to the courtrooms. In urban criminal court facilities, this consists of a large receiving and detention facility accommodating hundreds of in-custody defendants. Similarly, family and juvenile court facilities must maintain safe and secure movement of in-custody defendants.

8.1 OBJECTIVES

Provide safe and secure transportation for in-custody defendants to courtrooms by means of a system of secure elevators and corridors.

8.2 DESIGN CRITERIA

The functional components of in-custody defendant receiving, holding, and transportation areas include: vehicle sallyport, security vehicle parking, pedestrian sallyport, initial holding cells and search area, control center, central holding cells, booking station, kitchen and lunch storage, dress-out, property and clothing storage, attorney interview space, secure elevators and corridors, courtroom holding cells, bail and fine payment counter, and storage rooms. See Figure 8.1.

Many in-custody spaces are addressed in California Code of Regulations (CCR), title 24. All in-custody areas must meet the requirements of, and obtain approval from, the State Board of Corrections. Since these regulations are subject to change, this section shall be reviewed along with the most recent edition of title 24 before beginning project design.

The following planning and design criteria shall apply.

Vehicle Sallyport

Provide an entry point into a secured vehicle parking area to allow access and egress of vehicles transporting in-custody defendants. Provide a secure access gate, and a second egress gate. An officer in the control center shall electronically activate the gates. The gates shall accommodate a bus or a large van.

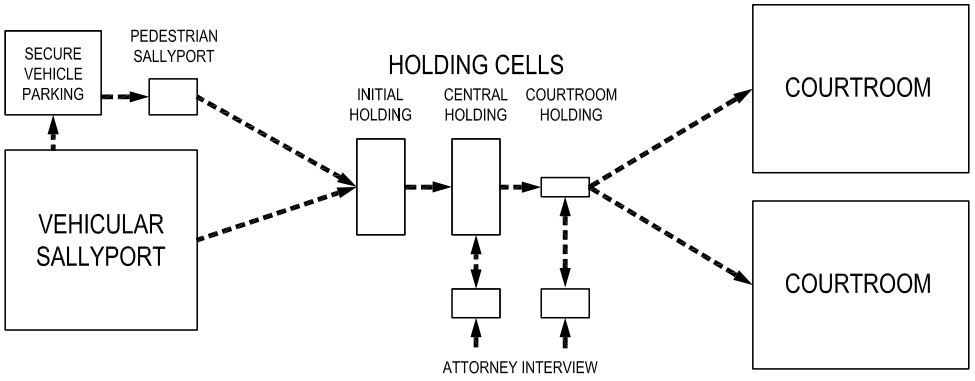


Figure 8.1 Diagram of Holding Areas

Security Vehicle Sallyport and Parking

Provide a security vehicle parking area to allow law enforcement vehicles to park and unload in-custody defendants. This area shall include a wall-mounted gun locker, a temporary hold cage, and a handcuff rail.

- The size and configuration of this area will vary depending on the number of in-custody courtrooms. If the primary detention facility is joined to the courts by a tunnel or a secured walkway, this area may include parking for one or two sedans. If the jail is some distance away and the facility is a major criminal court, the area may require parking for several large-capacity buses, vans, and sedans.
- Provide CCTV camera, duress alarm, and voice monitor.

Pedestrian Sallyport

The security vehicle parking area is entered and exited through a pedestrian sallyport. Provide a sallyport to hold two to six individuals. This area shall contain two electronically controlled doors, one of which is closed before the other is opened. These doors shall be remotely controlled with voice and video connection to the control unit.

Initial Holding Cells and Search Area

The initial holding cells and search areas for in-custody defendants shall include a counter for filling out forms, metal detector, railing to secure handcuffed defendants, and benches for defendants to sit. One or more cells shall be provided to house defendants. These cells must be designed in accordance with the current requirements of CCR, title 24.

- Provide voice monitors, closed-circuit television cameras with optional event recording, and silent duress alarms with video enhancement in these areas. Cameras must be located where the inmate will not be shown in the restroom area.

Control Center

The control center will vary in size, depending on the size of the court facility and holding areas. This area may be the security control center for the entire facility.

- In large court facilities, a fixed-post control center may be required to monitor the flow of in-custody defendants through sallyports, cell doors, and controlled access and egress points. Locate the control center to visually monitor lockup area corridors.
- The control center shall include electronic door control panels, video monitors, and related equipment necessary to maintain supervision of the holding area and the court facility.
- In large court facilities, the control center monitors all cameras throughout the facility, as well as the duress alarm system.
- Provide security-glass windows to enable staff to observe the holding areas.
- A temporary detaining area, separate from offices, may be required.

Weapons Locker

A secure weapons locker shall be located outside the security perimeter of the facility such that no officer shall bring any weapon into the security area. Such weapons lockers shall be equipped with individual compartments, each with an individual locking device. Weapons lockers are required in temporary and court holding facilities.

Central Holding Cells

In-custody defendants awaiting a court hearing or trial may be held in a central holding area before being transported to the courtroom or holding rooms adjacent to the courtrooms. The central holding area will vary from a few cells to a large number of single and multiple occupancy cells. Holding cells shall be designed to prevent visual contact between in-custody defendants in holding cells across from or adjacent to each other. Number of cells will be based on the court calendar and the number of cases per courtroom per day, adjusted for required separation of males, females, gang members, and special care defendants. Separate holding areas for males and females shall be provided. If juveniles are held in the facility, their cells shall have sight and sound separation from the adult section. These cells must be designed in accordance with the requirements of CCR, title 24. However, the most recent version of applicable code requirements shall be used during design.

- Group cells accommodating up to 16 people shall be provided. In accordance with CCR, title 24, holding cells must contain a minimum of 10 NSF of floor area per inmate and be no smaller than 40 NSF, with a clear ceiling height of 8' minimum. Each holding cell must have a water closet, washbasin, floor drain, drinking fountain, and adequate seating for all inmates. Individual cells must include a toilet, sink, and drinking fountain. A clear ceiling height of 8' must be provided in all holding cells.
- Cells shall have structural glazed-concrete block walls with an antigraffiti coating. Single and group cells shall have wall-mounted metal or concrete benches. The sink and water closet unit may be combined and have modesty panels. Plumbing fixtures shall have antiflood devices. Provide acoustical security ceiling, security sprinkler heads, security light fixtures, and a separate HVAC zone.
- Voice monitors and color closed-circuit television cameras with optional event recording shall be provided in the central holding area. Consider providing threshold monitoring tied into the control center.
- Large court facilities may have an attorney interview space (see criteria below) accessible from the central holding area.
- Consider providing an outside area for inmates in case of an emergency. This area must be secured in the event of an evacuation.

Booking Station

Provide a booking station in the central holding area or central security administration area for formal booking of an individual who is not in custody.

- Provide detention facility finishes and furniture.
- Provide space for a digital photography unit, fingerprint scan station, booking terminal, and equipment utilized by the law enforcement agency.

Kitchen and Lunch Storage Areas

Provide an area to store lunches for defendants who are spending a full day at the court facility. This area may serve the food services needs of security staff.

- Provide refrigerated storage, a sink, and a general storage area. Area size shall depend on anticipated occupancy of the holding cells and number of staff.
- In large facilities, this area may include tables and chairs for staff breaks and lunch, vending machines, a coffee area, and storage.

Dress-out, Property, and Clothing Storage

Provide an area for the defendant to obtain civilian clothing and dress-out. An in-custody defendant may need to dress in nondetention clothing for a court appearance. Usually dress-out occurs at the jail before transportation to the court facility. Occasionally, clothing may be delivered to the court, or other circumstances may require dress-out at court. An adjoining storage area shall be provided for detention clothing.

Safety Equipment Storage

A secure area shall be provided for the storage of safety equipment such as fire extinguishers, self-contained breathing apparatus, wire and bar cutters, and emergency lights.

Janitor's Closet

At least one securely lockable janitor's closet, containing a mop sink and sufficient area for the storage of cleaning implements, must be provided within the security areas of the facility. In court holding facilities, the closet need not be in the security area.

Attorney Interview Space

Provide private and secure rooms for attorney and defendant interviews and conferences. Locate spaces at the central holding area and on court floors adjacent to courtroom holding cells. Entrance on the attorney side shall be from the nonsecure public side. The room shall be divided by a security panel, with contact space to permit review and signing of documents. Separate the in-custody side of an interview booth with a door from holding cells to promote confidentiality. See Figure 8.2.

- Provide acoustical treatment to minimize sound transmission, since conversations held in these rooms are confidential.
- Provide phone for attorney/defendant communication.

- Provide detention work surfaces and stools, structural glazed-concrete block walls, vinyl floors, and vandal-resistant lighting fixtures and ventilation openings.
- Provide closed-circuit television cameras with optional event recording in these rooms.

Secure Elevators and Corridors

Access from central court holding to courtroom holding can be either through a secure corridor or by a secure elevator. In medium to large court facilities, a number of secure elevators may access holding cells between courtrooms on multiple floors. See Chapter 2 (Courthouse Organization) for vertical and horizontal circulation system descriptions.

- Provide voice monitors and closed-circuit television cameras with optional event recording.

Courtroom Holding Cells

Each criminal courtroom shall have access to one in-custody holding cell directly adjacent to the courtroom. Arraignment and high-volume criminal courtrooms may need several single and multiple occupancy cells. The court security officer shall be able to access these cells from a separate courtroom entry point. Similarly, in civil court facilities, at least one holding cell shall be provided in a secure area.

At least one holding cell in the court facility shall be equipped with a loudspeaker to allow auditory monitoring of courtroom proceedings. This cell could be used for disruptive defendants unwilling to participate appropriately in the trial process.

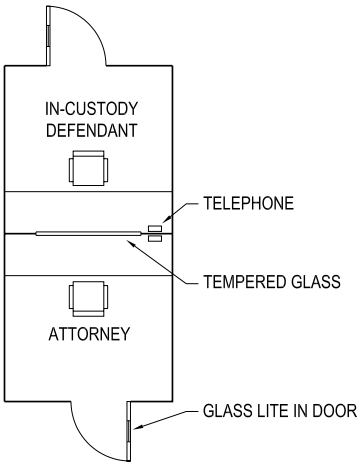


Figure 8.2 Attorney Interview Area

Bail and Fine Payment Counter

Provide a counter for payment of fines and posting of bail for individuals to be released from central holding. In many jurisdictions, this occurs at the court clerk's office. Sometimes central holding maintains the counter. This area shall be accessible from a public corridor, have a secure window, and include a terminal, printer, and cash deposit unit. Security provisions shall include a closed-circuit TV camera, monitor, and silent duress alarm.

8.3 FUNCTIONAL RELATIONSHIPS

A secured vehicle sallyport and a pedestrian sallyport shall be the primary means of access and egress for defendants entering or leaving the court facility. Access into secured corridors for transport of detainees to and from court shall be by remotely controlled electronic locks. The in-custody defendant holding areas shall be centrally located between the defendant receiving area and courtrooms.

In multistory courthouses, holding facilities may also be located between courts and accessible by secured corridors, stairs, or elevators. A separate secure exit stair for courtroom holding occupants is not a requirement; operational procedures for existing in-custody defendants during an emergency must be determined for each court building to confirm that a separate exit pathway is not required. Courtroom layout, function, and security requirements determine proper placement.

Consider providing an exit area for released inmates. Provide CCTV and voice monitor to control inmate departure.

8.4 DESIGN CHARACTERISTICS

The materials selected for in-custody defendant receiving, holding, and transportation areas shall be extremely durable.

- All furniture, lighting fixtures, and ventilation shafts inside holding cells shall be vandal-resistant and secured in place. Seating must be designed to the level of security. When bench seating is used, 18" of bench is required for one person.

- All surfaces that are accessible to defendants, except stainless steel, shall be treated with an antigraffiti coating.
- Walls shall be constructed of solid, impenetrable construction such as structural glazed-concrete block with solidly grounded rebar. Ceilings shall be an impenetrable security acoustic panel system.
- Lighting: Lighting shall not be less than 20 footcandles at desk level. Lighting shall be centrally controlled or occupant controlled in housing cells or rooms, with no light switches in secured corridors or holding areas.
- Audio or video monitoring system: In court holding facilities housing inmates classified higher than minimum security, there must be an inmate-actuated or sound-actuated audio monitoring system that is capable of alerting personnel stationed in a central control point. When visual electronic surveillance is used, it shall be located primarily in hallways, elevators, corridors, or at points on the security perimeter such as entrances and exits.
- Emergency power: There shall be a source of emergency power in all detention facilities capable of providing minimal lighting in all housing units, activities areas, corridors, stairs, and central control points, and to maintain fire and life safety, security, communications, and alarm systems. Such an emergency power source shall conform to the requirements specified in title 24, para. 13, article 700, California Electrical Code, California Code of Regulations.
- Plumbing fixtures: In temporary holding cells or rooms, and in temporary staging cells or rooms, water closets shall be available on a ratio of 1 water closet to every 16 inmates or fraction thereof, but not less than 1 water closet to serve any holding cell or room, and washbasins shall be available on a ratio of 1 washbasin to every 16 inmates or fraction thereof, but not less than 1 washbasin in any holding cell or room. One urinal or 2' of urinal trough may be substituted for each water closet up to one-third of the total number of water closets required, except in those facilities or portions thereof used for females. Plumbing fixtures shall be vandal resistant.
- Drinking fountains: Provide a minimum of one drinking fountain in every single-occupancy cell and dormitory. Additional drinking fountains shall be located in other areas of the facility so that drinking water will be available to inmates and staff.

9

PUBLIC SPACES

Courtroom Public Waiting

Southwest Justice Center
Temecula, CA
Cannon Design

ADMINISTRATIVE OFFICE
OF THE COURTS

Date of Issue: February 24, 2010

California Trial Court Facilities Standards, 2006 edition

This amendment is a change to the 2006 edition of the California Trial Court Facilities Standards. This amendment deletes or replaces existing language in the standards. This amendment is effective on the date of issue[1].

Design and Construction or Facilities Modifications projects which have reached schematic design completion (at effective date of this amendment) may be exempted from compliance with this amendment subject to specific approval by the Office of Court Construction and Management.

Chapter 9 Public Spaces – Amendment 1

On page 9-4, under subsection "Security Screening Station", add this sentence after the second bullet:

- Where multiple screening lines are required, a ratio of one magnetometer per pair of package screening units (1:2) shall be standard; subject to confirmation with a project–specific security operations program.

End of Chapter 9- Amendment #1

[1] This amendment is implemented under Rule of Court, Rule10.180 (b) - "*Non substantive changes to the standards may be made by the Administrative Office of the Courts:"*

Public spaces provide courthouse visitors with a first impression of the justice system and the court facility.

9.1 OBJECTIVES

Strategically placed, clear, and legible graphics and signage, visible upon entry, will provide first-time visitors with information about where to find various functions and how to get there. Wayfinding techniques shall provide visual cues about location of important public spaces and services.

The court facility must maintain a safe and secure environment for all people and property within the courthouse spaces. Court security includes active and passive measures, encompassing design, technology, and operations. See Chapter 4 (Courthouse Security).

9.2 PRIMARY BUILDING ENTRANCE

The front door of each court building has important symbolic and functional attributes. This main ceremonial entrance is the single point of entry for staff, visitors, and the public.

- Provide a single primary entry with universal access. In a very large courthouse a dedicated staff entry may be feasible.
- Provide an attractive and user-friendly environment as a first impression to court visitors and staff.
- Design the entrance and entrance doors to accommodate peak hour lines of prospective jurors and courthouse visitors. Lines may extend out the door. Provide a canopy covering outside. Some climates may require a vestibule. Refer to Chapter 11 (Architectural Criteria).
- Building entries, especially the main public entry, must accommodate persons with disabilities in the same manner as the general public. Entry doors shall meet the closer requirements of applicable codes. Power-assist doors or balanced doors shall be provided. Power-assist doors are preferred because they can be used only when needed, but are a universally accessible solution.

9.3 PUBLIC LOBBY

The public lobby serves as the focal point for the building and provides visual orientation to the other areas through visual cues and signage. See Figure 9.1.

- Provide a public lobby sized to accommodate a queuing area and weapons screening station(s).
- Provide clear signage and graphics immediately upon arrival in the courthouse public lobby.

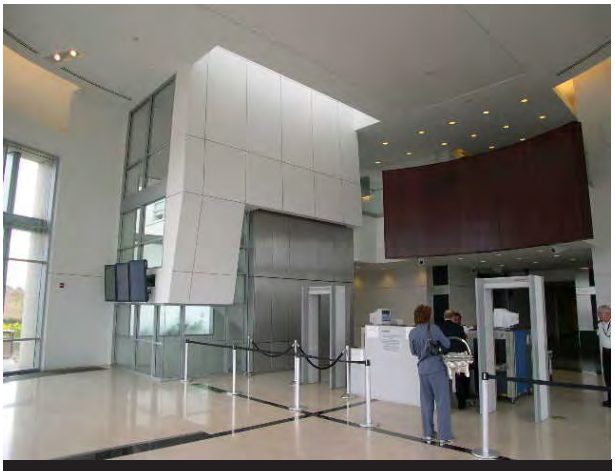


Figure 9.1 Public Lobby, Southwest Justice Center, Temecula

Many courthouse visitors will require directions to courtrooms or hearing rooms. Provide large, easily readable court calendar monitors. Areas where courtroom assignments are posted must be accessible without impeding the security screening process or blocking public circulation paths.

- Provide climate and glare control.

Security Screening Station

Building users and nonexempt staff shall enter the facility through a public entry screening station. See Figure 9.2. Screening of the public occurs between the exterior entrance and interior rooms, corridors, elevators, or stairwells. Provide one security screening station, or lane, for full-time operation. See Figure 9.3. Provide additional lanes as required to operate during peak usage, in mornings and after lunch. Screening stations shall include space for the following:

- An interior or covered area for queuing of the projected peak volume of people entering the building, between the security screening station and the building entrance, not less than 20 linear feet.
- A magnetometer, or metal detector, through which visitors pass for detection of metal objects.
- An X-ray scanner for screening contents of visitor briefcases, handbags, and personal possessions.
- A table or counter for secondary inspection of scanned items.

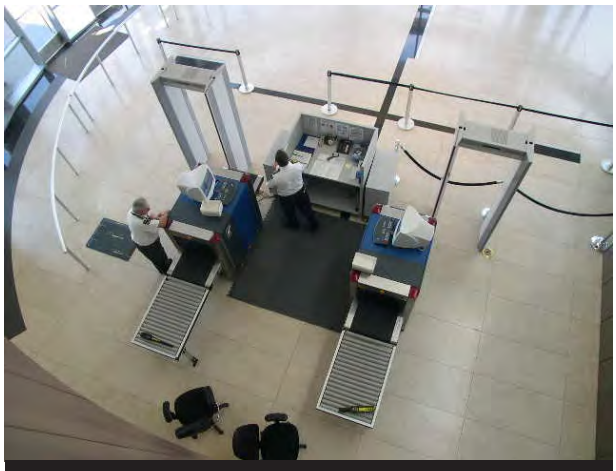


Figure 9.2 View of Screening Station, Southwest Justice Center, Temecula,

- A magnetic wand inspection area.
- Security staff posts to assist individuals through the magnetometer screening and X-ray scanning. In multiportal screening areas, a third security post may be needed to oversee the screening process and assist security staff. Provide power, data, and voice communications to the security post.

Design the screening area to be consistent with the court public spaces and project a positive first impression to court visitors. Do not make screening equipment the main focus of the space. Provide a casework screen for the scanning position, constructed of durable materials to withstand the stress of a high-traffic area, and lined with nonricochet, bullet-resistant material, which will absorb multiple firings of a large-caliber handgun.

The accessible path of travel shall include the lobby security screening area. Wheelchair users shall not travel a separate and unequivalent path through the screening process and area. Persons with disabilities will pass through a magnetometer, along with the general population. The magnetometer's 32" clear opening will accommodate wheelchairs and scooters.

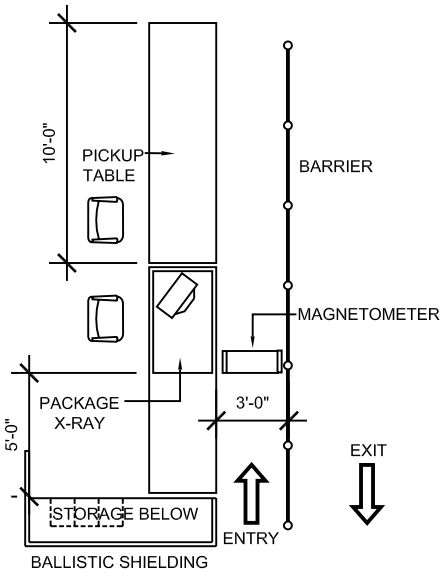


Figure 9.3 Single Lane Screening Station Diagram

Involve the sheriff's department or court security officers during the early planning and design phases, to ensure compliance during equipment installation.

Provide gun lockers for law enforcement officers entering the facility, consistent with local security procedures.

Design each security screening area to allow visual observation by security staff of all public exits to ensure that individuals entering the building do not circumvent the screening process. Directionally sensitive motion-detection systems may be used to provide an alarm notification of the entry of individuals through the exits.

Staff-only exits not located at staffed security screening stations shall be electronically monitored and alarmed. Use video cameras to continuously record activities at the public exits and to provide secondary monitoring by the command center security staff. Position power and data outlets for each camera location, considering lighting and glare to ensure that the user is not silhouetted and that picture quality is effective.

9.4 INFORMATION KIOSK OR COUNTER

A clearly identified information kiosk or counter may be used to provide direction and basic information to individuals unfamiliar with the court facility or court system. Refer to Figure 9.4. The kiosk or counter must be located in a highly visible place near the main entrance but beyond the screening area. Design the information area consistent with the public spaces.

The information area must be used in conjunction with directional signage to provide courthouse visitors information about referrals to and location of services.

If a kiosk is used, it may be an automated system with touch-screen technology, or a combination of automated signage with a staff member so that the kiosk still provides information if the staff member is not present. If the counter is staffed, provide adequate accessible workspace. Staff may be volunteers.

9.5 COURTROOM PUBLIC WAITING AREAS

Public waiting areas shall include sufficient comfortable seating and be located near areas of highest public use, with easy access to restrooms and water fountains. Waiting areas shall be proportional to the population served. Provide natural light in waiting areas when possible.

- Corridors may be used as public waiting areas if they are wide enough to accommodate bench seating and if a vestibule with a sound lock is provided at courtroom entrances.
- Provide sufficient space and power for a temporary magnetometer to be located in each vestibule at each courtroom entry.
- Family law, arraignment, traffic, and juvenile courts require larger public waiting areas.

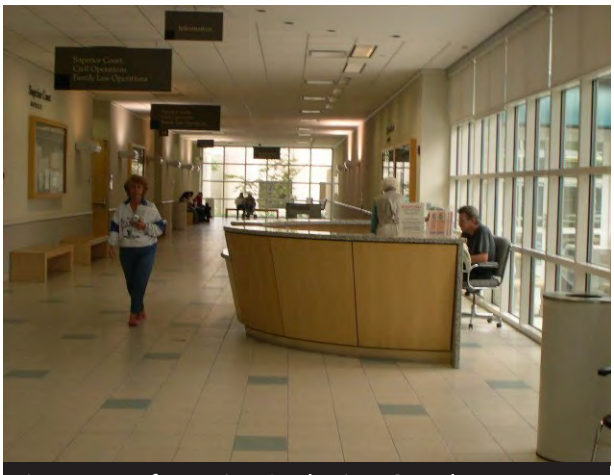
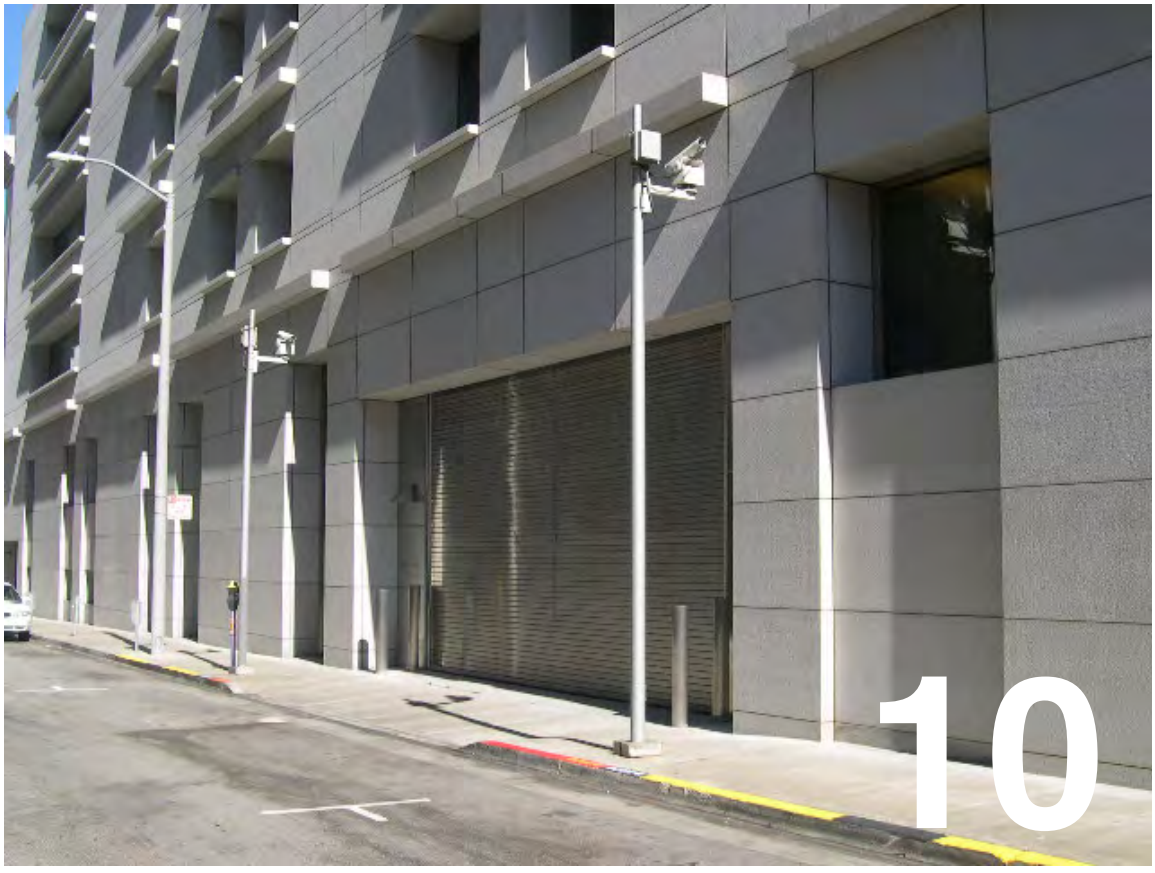


Figure 9.4 Information Desk, Vista Courthouse, San Diego



10

BUILDING SUPPORT SERVICES

Loading Dock

San Francisco Civic Center Courthouse

San Francisco, CA
RossDrulisCusenbery Architects
Hood-Miller Associates
Mark Cavagnero Associates/John M.Y. Lee

Date of Issue: March 1, 2010

California Trial Court Facilities Standards, 2006 edition

This amendment is a change to the 2006 edition of the California Trial Court Facilities Standards. This amendment deletes or replaces existing language in the standards. This amendment is effective on the date of issue[1].

Design and Construction or Facilities Modifications projects which have reached design development completion (at effective date of this amendment) may be exempted from compliance with this amendment subject to specific approval by the Office of Court Construction and Management.

Chapter 10 BUILDING SUPPORT SERVICES - Amendment 1

On page 10-4, add Section, "10.8 MECHANICAL EQUIPMENT ENCLOSURES" as follows:

Mechanical and electrical equipment, outside of the nominal building envelope, shall be protected from weather and environmental elements within an architectural equipment enclosure which allows suitable access for maintenance personnel. Equipment enclosure on a building roof shall be integrated with the overall building design and comply with other sections of these standards. Equipment enclosures on a building roof shall be accessible via a stair from the top occupied building floor to the roof. It is preferable but not required for the stair to terminate inside the equipment enclosure. Such stair shall be wide enough to afford access for maintenance personnel carrying hand tools or small parts. Ladders, ships ladders or similar steep angled assemblies shall not be employed to provide access to equipment enclosures.

The following assemblies or equipment are generally exempt from the above enclosure standard if the equipment is in the building or vault:

- Cooling Towers
- Emergency Generator sets – see section 15.3

Equipment located outside shall be screened, but not enclosed per above:

- Water backflow & detector check valves
- Irrigation controllers
- Utility Company electrical transformers

End of Chapter 10 – Amendment # 1

[1] This amendment is implemented under Rule of Court, Rule10.180 (b) - "*Non substantive changes to the standards may be made y the Administrative Office of the Courts:"*

Building support services ensure that necessary routine maintenance and operational functions occur on a daily basis within the court facility. Support services include deliveries, collection and removal of trash or recycled materials, and storage of fixtures and equipment.

The character and size of building support spaces shall be determined during programming and early design phases, with input from the Office of Court Construction and Management (OCCM) building operations staff.

10.1 OBJECTIVES

Plan service spaces to improve efficiency and lower court building operational costs.

10.2 JANITOR CLOSETS

Provide janitor closets on each floor of the court building, except for small facilities or on floors with limited occupied spaces. Provide a service sink, tool racks, and wall-mounted shelving.

In large facilities, provide a janitorial storage room for central inventory of supplies. Locate near staff locker rooms and management office.

10.3 LOADING DOCK

Large facilities require a raised loading dock to accommodate deliveries, trash, and recycling trucks. Interstate large trailer rigs need not be accommodated in the loading dock. The building location shall allow easy delivery and efficient distribution of goods throughout the facility.

- Locate the loading dock near the freight elevator but away from general office areas of the court.
- Locate air intake ducts to avoid intake of fumes from idling trucks.
- Provide a staging area so that all deliveries can be scanned or examined before entering the building.

Access from the street must be through a restricted vehicle circulation system. The driveway, loading dock, loading dock apron, and any exterior staging areas must be within the security perimeter and fully enclosed by fencing.

Provide closed-circuit television to monitor the driveway, loading dock, loading dock apron, and exterior staging area. Provide telephone or other annunciation system at the gateway to the service driveway. If the gate is remotely operated, provide a manual backup system. Refer to Chapter 4 (Courthouse Security).

Paper and office supplies can be delivered on an as-needed basis. Provide space for pallet delivery and storage near the loading dock.

Dedicate one truck bay within a secure loading area to trash and recycling. This area will include collection and compaction bins, and locked, covered roll-off containers. This bay will include a covered area for temporary storage of delivered supplies, equipment, and recyclable materials.

- Provide a file shredding area near the loading dock. If this process is contracted out, provide a secure area to store materials awaiting pickup.
- Provide a 10' by 10' area for used copier/printer cartridge storage.

10.4 NEWS MEDIA FUNCTIONS

The courthouse must accommodate the media, inside and outside the facility. For technical requirements refer to Chapter 17 (Telecommunications and Audiovisual Criteria).

Interior Media Area

Provide an interior space off a public corridor, not necessarily near the courtrooms, with appropriate power, data, and telecommunications support systems, including audio, video, or other feeds to the main distribution frame. The media room may be multipurpose, but must be available for the news media in courthouses, especially during high-profile cases.

Exterior Media Area

Designate an exterior area with parking for multiple satellite trucks. The area must face south for satellite exposure. The location can be beyond building security standoff. For urban areas where no parking can be designated for satellite trucks, provide an exterior connection box for video and audio accessibility on the south side of the building or at the loading dock.

10.5 MAILROOM

Most facilities receive daily packages and mail through the public entry, where an X-ray machine may scan them. A large facility may require a dedicated mail opening room with biohazard control capabilities.

Locate the mailroom and mail opening room near the central receiving or loading dock and near a service or freight elevator, to allow staff to transport mail to other parts of the building.

10.6 MAINTENANCE SHOPS AND OFFICE

Provide an office for court-based maintenance staff. The office shall be sized to accommodate workstations for project and facilities management staff, and space for visitors. Provide furnishings for storing and reviewing building plans, and for reference catalog shelving. Locate a staff restroom for easy access by maintenance staff. Locate the office in the basement or in a nonpublic location.

In large facilities, locate a maintenance shop on the ground floor, near the freight elevator. Provide walls to minimize noise transmission.

In large facilities, provide a lunchroom for custodial workers.

10.7 STORAGE

Provide a furniture storage area in medium and large facilities, near the freight elevator. Building supplies and materials, such as carpet, shall be stored there.

11

ARCHITECTURAL CRITERIA

Courthouse Entry
Robert A. Christensen Justice Center
Castle Rock, CO
HOK Architects

Date of Issue: March 1, 2010

California Trial Court Facilities Standards, 2006 edition

This amendment is a change to the 2006 edition of the California Trial Court Facilities Standards. This amendment deletes or replaces existing language in the standards. This amendment is effective on the date of issue[1].

Design and Construction or Facilities Modifications projects which have reached completion of design development (at effective date of this amendment) may be exempted from compliance with this amendment subject to specific approval by the Office of Court Construction and Management.

Chapter 11 ARCHITECTURAL CRITERIA – Amendment 1

On page 11-5 after, " · Windows and Doors" and before "· Shading and Glare Control", add the following new subsections:

- Overhead or Bi-Fold Doors at Parking and Vehicle Sallyport

  Doors at entrances and exits to secure parking and detention vehicle sallyport must operate quickly and close behind each vehicle to maintain security. Therefore at these locations provide high-speed, overhead or bi-fold doors with hydraulic operators, pre-engineered for the specific application with a minimum manufacturer's rating of 1 million cycles. Detention vehicle sallyport door panels shall be security grade steel. Provide a security grade pedestrian door adjacent to each detention vehicle sallyport door.

- Ballistic Resistant Glazing and Panels

  Windows and openings, which are required by a project specific Risk Assessment to be ballistic resistant shall have factory manufactured, and tested glass-clad polycarbonate insulated glazing assemblies consisting of: exterior lite of high performance glass (to match non-ballistic resistant exterior glass on building), laminated to multiple polycarbonate layers (determined by the U.L. ballistic rating), airspace, interior glass (usually clear). Glass lite thicknesses are determined by calculation.

[1] This amendment is implemented under Rule of Court, Rule10.180 (b) - "*Non substantive changes to the standards may be made by the Administrative Office of the Courts:"*

Ballistic resistant glass must be retained in a framing system that has also been certified capable of stopping the potential threat and retain the glazing system during an attack.
Panels in window openings or in curtain walls which are required by a project specific Risk Assessment to be ballistic resistant shall have (behind the finish surface) starch-oil woven ballistic grade fiberglass panels to match the ballistic rating of the adjacent glazing

On page 11-6 under subsection "Building Maintenance", immediately before the first bullet point- "Window Washing Equipment", add the following:

- All roofs that will have predicted or regular maintenance, or on which window or exterior maintenance equipment will operate, shall have parapets or guardrails around the entire perimeter, which comply with the building code.
- All elevated areas (roof, balconies) without parapets or guardrails shall have safety anchorages [2] within 6 ft. of the edge, which comply with the building and safety codes.
- Roofs with a slope greater than 1:4 shall have safety anchorage integrated into adjacent eaves or gable end walls to facilitate maintenance work.

End of Chapter 11- Amendment #1

[2] Anchorage: a secure point of attachment for lifelines, lanyards or other fall protection deceleration devices, which comply with the State Building and Safety Codes

The architectural criteria provide performance standards for selected architectural components, building assemblies, and finishes.

11.1 OBJECTIVES

The performance standards and criteria listed in this chapter provide functional solutions to objectives listed in Chapter 1 (General Principles): design excellence, sustainability, physical durability and functional lifespan, and energy efficiency.

11.2 ARCHITECTURAL CRITERIA

California court facilities shall use quality materials and finishes in all elements, and exhibit consistency in the design throughout. The performance of architectural elements shall be consistent with the functional lifetime defined in Table 1.1 (in Chapter 1), and the selection of elements, systems, or materials shall be consistent with the construction budget.

11.3 BUILDING ELEMENTS: EXTERIOR CONSTRUCTION

Design the exterior building envelope, including roofs, exterior walls, foundations, retaining walls, and door and window assemblies, to be weatherproof. Design to exclude leaks and other defects for all moisture protection systems, including: exterior sealants, vapor barriers, under slab moisture barrier systems, exterior cladding systems, roofing, and waterproofing. All window design must anticipate water infiltration and condensation, and provide means to direct water to the exterior.

Wind Analysis

The forces of wind and weather shall be considered in architectural design. A pedestrian level wind analysis may be required to determine wind effects, on the court building and surrounding buildings, sidewalks, plaza, and entrances, to determine the need for a main entry vestibule. The recommendation of a wind analysis shall be addressed by the architectural design. Snow and ice accumulation analysis may be required for court buildings in cold regions of the state. An air quality wind analysis may be required to determine the optimum location of air intakes and exhaust stacks.

Exterior Building Walls

The exterior wall design shall present a consistent image, character, and permanence. The design shall include architectural detailing, including use of different materials, textural inlays, wall plane articulation, and pedestrian level detail. Scoring, control joints, and other wall plane relief shall be considered and incorporated into the design. The building cladding system requires high-quality, long-lasting, durable components that can accommodate movement, are designed for low maintenance, and have a functional lifetime defined in Table 1.1.

- Moisture and Damp Proofing

  Provide an exterior envelope system, including roofing, that is a complete weather and moisture proof assembly that will prevent infiltration into the building's occupied or unoccupied areas. Design the building to prevent the introduction or long-term growth of mold or other pathogens that could adversely affect the indoor environmental quality or work environment. Provide a complete moisture and damp-proofing system at all concrete slabs on grade, retaining walls, and other below-grade structures. No wooden elements shall be exposed to rain.

- Barrier Walls and Drainage Plane Walls

  The defining feature of a barrier wall is that protection from sun, water, and wind is provided at the single outermost surface of the wall; the system repels water at the same surface that faces the environmental forces. In contrast, a drainage plane or cavity wall has a primary water-resistant layer behind the exterior surface, which provides the environmental protection, and a secondary water barrier.

  Traditional barrier walls rely on mass to absorb moisture and evaporate it slowly to the exterior and on physical shielding, such as roof overhangs, window setbacks, and drip edges, to protect vulnerable joints from weather exposure. Typical exterior materials include cast-in-place concrete and cubic stone.

  Contemporary surface barrier walls rely on the surface material or coatings, and sealant joints, to keep water at the exterior. Such walls have little mass, physical shielding, or redundancy. Typical exterior materials include: thin stone or ceramic tile, brick, precast concrete panels, concrete masonry units, and composite metal panels. The reliance of contemporary barrier walls design on a single water-resistant barrier and on superior construction craftsmanship has made their performance problematic. Since the consequences of leakage thorough the exterior of court buildings are unacceptable to AOC, exterior walls of new court buildings shall be designed as drainage plane or cavity wall systems, regardless of the primary exterior surface material.

  Drainage plane walls shall provide internal drainage by using separate surfaces, or planes, for water protection and for environmental protection. The water protection layer, made up of a weather resistive barrier (WRB) and flashings inside the wall behind the exterior finish, provide an initial weather protection barrier. These walls recognize the inevitability of water entry past the outermost exterior plane.

  Components of a drainage plane wall are:

  - Exterior veneer and seals: Sheds most water; protects the WRB from sun and excessive water exposure.
  - Air space: Separates the inner and outer walls, provides a drainage pathway, and drying of veneer anchors and weather barriers.
  - Flashings: Interrupts the downward flow of water and directs it to the outside; flashings are located at all wall penetrations; are transverse to the WRB, extending to beyond the veneer, sloped to drain, and panned-up at inboard edges.

- Cement Plaster Cladding Systems

  Cement plaster exterior walls can function as modified drainage plane walls. The following standards and criteria shall be used for the design of cement plaster cladding for building envelopes. This system can be expected to have a service life similar to that of other cladding systems.

  Conventional exterior portland cement-based plaster cladding is an allowable cladding system for a court building of one or two stories. Use of cement plaster cladding for buildings greater than two stories requires special considerations and AOC approval.

  Cement plaster cladding for court buildings shall consist of three layers of cementitious material with a total thickness of 7/8", applied to lath that is installed over a weather-resistive barrier. The exterior plaster functions as a modified cavity wall. Water that penetrates through the exterior plaster is captured by a secondary weather barrier and drained to the outside through weep screeds, drainable control joints, and flashings. Plaster protects the secondary weather-resistive barrier from direct exposure to environmental elements and degradation. The cement plaster cladding shall inhibit the majority of moisture covering the exterior from reaching the secondary weather-resistive barrier. The secondary weather-resistive barrier (WRB) and the flashings are intended to accommodate only incidental amounts of moisture. A building clad with exterior plaster must be completely weather-resistive before the installation of cement plaster. Completely weather-resistive barriers include all surfaces that are to be covered by the plaster; all penetrations, such as windows and doors; and all terminations, such as parapets and the base of walls. Two-layer WRB for exterior plaster cladding is required. The choice of WRB

material will depend on project conditions, including sheathing material. Before specifying a WRB material, the designer shall perform a computer-aided check of the transitional moisture vapor flow through the wall for a minimum two-year cycle, beginning at the end of construction, to ensure that the vapor-impermeable barrier will not cause the accumulation of moisture in the wall cavity, leading to interior condensation.

(The above is adapted from a paper: Kenneth E. Klein P.E, "Cement Plaster Cladding Systems for Building Exteriors," Simpson Gumpertz & Hager Inc., Consulting Engineers, 2005.)

- Flashing

  Concealed flashing systems that cannot be easily replaced shall be permanent, stainless steel, copper, or other metal flashing systems not subject to corrosion. Provide flashing systems consistent in material, detail, scale, and quality with the facility design. If flashings are exposed, they shall be designed utilizing materials consistent and harmonious with the design intent.

- Expansion Joints

  Develop the structure to limit movement and suit the requirements for expansion joints. Where required, design expansion joints to be minimally visible and watertight. Joint cover assemblies shall meet all code requirements for impact, loading, and fire protection.

- Windows and Doors

  Provide the best-proven institutional-grade window systems. Glazed entry systems shall be constructed of colored or finished aluminum or other metal systems. All glazing shall be insulated units for optimum thermal and acoustic performance tinted or coated as required. Windows shall be fixed or operable, consistent with sustainability standards.

  Architectural curtain walls are a special class of drainage plane wall with pathways, flashings, and sealants internal to the framing elements. For this reason, the engineering, detailing, testing, and construction of glass and metal curtain walls for California court buildings shall follow the highest recommended industry practices.

  Consider operable windows for certain areas to support a sustainable design objective. Small operable windows may not significantly impact mechanical system performance, depending on size and quantity. Large operable windows may adversely impact building and space pressurization and temperature. The use and specification of operable windows shall be coordinated with HVAC system design and be consistent with the court facility security plan.

  Public entrances require doors that are easy to operate in a variety of environmental conditions. Balanced swinging doors, power-assisted swinging doors, or power-activated sliding doors are appropriate for courthouse public entries. Certain site environmental conditions may require vestibules or revolving doors to address site environmental conditions and to maintain interior comfort and cleanliness.

  Provide aluminum, stainless steel, or other approved metal institutional-grade door systems with matching frames for public entries. Painted aluminum frames and doors are not allowed for high-volume entrances. Provide flush panel metal doors with welded steel heavy-duty matching frames and institutional quality hardware and finishes at service and staff doors and frames. Hardware on exterior doors shall be stainless steel.

- Shading and Glare Control

  Control glare and heat gain at all work areas and public spaces. The glazing in the public lobby shall be mitigated for temperature and glare control so that security screeners and any other staff can work and see monitors in comfort, and security cameras can produce quality photographs.

- Protection of Building Entrances

  Protect building entries from exposure to weather. Provide exterior canopies, building recesses, or overhangs at all exterior entrances to protect doorways from exposure to rain and snow.

- Exterior Stairs and Ramps

  Often the entry levels of court facilities are raised above street level, which require universal access via permanent stairways and ramps serving all

courthouse users. Provide a system of guardrails and handrails of stainless steel, bronze, or other permanent material that has a design and finish consistent with the facility design. Steel with epoxy finish coating can be used for guardrails and handrails not subject to high-volume use.

- Walk-off Mats

  Walk-off mat systems are required to improve indoor air quality through the reduction of dirt and dust tracked into the building, and to reduce the maintenance of indoor floor coverings. Provide a system of exterior and interior walk-off mats flush with the floor surface directly in front of the main entry doors and immediately after entering the public lobby. Mats shall be removable, cleanable, and replaceable. Minimum dimensions of walk-off mats shall be the width of doorway, and 9' in the direction of travel, on each side of the entrance doors.

- Exterior Flagpoles

  Provide two flagpoles, to accommodate a State of California flag and a United States flag, near the courthouse public entrance.

Roofs

- Low-Slope Roofing System

  The roof shall be weather-tight and provided with a positive drainage that will effectively dispose of rainwater. The roof shall be insulated so that the heat transfer values from roof to occupied area comply with CCR title 24, part 2. Low-sloped roofs shall provide a minimum of ¼" per foot slope to drain along valleys. Roof drainage slopes shall be principally achieved by the elevations of the roof structure, not with fill material under the membrane. Dead level roofs are prohibited.

  Preferred roofing system: Modified bitumen sheet roofing SBS (styrene-butidien-styrene) with mineral granular surface sheet, applied with hot asphalt, and reflective coating to achieve an "Energy Star" rating.

  The roof membrane will be replaced occasionally; to facilitate reroofing, relatively large uninterrupted roof planes are preferred. Mechanical and electrical rooftop equipment and rooftop screens shall be designed to permit reroofing in the future. Curbs and equipment bases on roofs shall be a minimum of 8" high.

  Single ply roofing is not recommended.

  Roof drains shall be recessed below the roof level to form a collection basin; roof drain bodies shall be a two-part cast iron type that allows the waterproof membrane to be clamped between drain body parts, so that water infiltrating the roofing layers can drain into the system.

  Provide additional protection at walking surfaces for rooftop service routes.

- Rooftop Equipment

  Rooftop equipment shall be kept to a minimum. Locate equipment in rooftop penthouses or behind visual screens. Integrate the location, size, and finish of rooftop penthouses and visual screens with the architectural design. Install critical rooftop equipment to permit roof system replacement without unreasonable disruption of equipment operation.

- Roof Access

  Provide an interior permanent dedicated industrial stair (not a ships ladder or ladder) and access hatches to the roof of all court facilities with roof slope of less than 1:4. This stairway can be an extension of the building exit stair system. Provide access to the roof via the freight elevator if the roof includes significant mechanical equipment that requires regular maintenance or the transport of heavy replacement parts. Maintenance worker safety shall be a prime design consideration in development of roof access and roof parapets. The rooftop access shall be of sufficient size to allow the transport of required tools and materials.

Building Maintenance

- Window Washing Equipment

  Multistory buildings require special facilities, which must comply with state regulations for regular maintenance of the exterior skin and window washing. Design the building exterior to accommodate safe, cost-effective window washing and maintenance procedures. Both operational and equipment costs shall be considered. Provide

features necessary for maintenance worker safety. Provide required davits and sockets, tie-offs, guardrails, and relocatable, motorized platforms to reach the windows on all building elevations. For low-rise buildings, provide a clear path at ground level for motorized articulated lifts to reach to all exterior windows.

- Bird Roosting and Nesting Control

  Design exterior façades and roof overhangs to inhibit bird roosting and nesting. Provide means of preventing bird roosting or nesting on horizontal surfaces greater than 6" deep, especially in protected or covered areas.

11.4 BUILDING ELEMENTS: INTERIOR CONSTRUCTION

The following criteria shall apply.

Interior Building

- Daylighting

  Balance the needs for security with openness, transparency, and natural light. Provide natural light to all primary public waiting areas, the main lobby, and work areas. Plan and design interior spaces to allow glare-free natural light at all work areas. Develop methods to share glare-free natural light through the use of interior glazing, sidelights, borrowed light, and light wells.

- Workplace Environment

  Provide a quality work environment that is conducive to and suitable for performing the required tasks of the building occupants. Standards for lighting, acoustics, heating, ventilation, and air conditioning, and other building systems, shall be applied to enhance the work environment and to support a sustainable design objective. Design spaces to reduce energy and materials consumption.

- Floor-to-Floor Heights

  The standard floor-to-floor, or slab-to-slab, dimension for multistory courthouses shall be 14' to 16'. Refer to section 2.4, Chapter 2, for requirements for relative building volume.

- Plenum Spaces

  Provide space above all finish ceiling areas for the HVAC supply and return distribution, electrical distribution, mechanical equipment, fire sprinkler systems, voice, data, low-voltage cable, and other devices. Size plenum spaces to allow for future modification of these systems.

  Coordinate the size, access, and clearance requirements of systems located in plenum spaces with the depth of structural elements to allow required clearances for all systems to all parts of the building.

  Provide access to all plenum spaces for servicing all components. Provide access to plenum spaces above courtrooms for maintenance of utilities, and to allow modification to cabling and outlets, which serve the floor above.

- Interior Partitions

  The minimum standard for steel studs in multilayered gypsum wallboard assemblies is 20 gauge unless a lighter gauge is required for acoustical reasons. Comply with industry recommendations for deflection and span.

  Provide a system of concealed, permanent, secure, and appropriately designed backing, supports, and anchorages for all handrails, wall-hung cabinets, court seals, and other surface-mounted fixtures, equipment, systems, and building specialties.

  Provide corner guards where required.

  Refer to Chapter 18 (Acoustical Criteria) for additional partition requirements.

- Ceilings

  Ceilings are an important visual feature of building interiors, and shall be designed for optimal visual, lighting, and acoustical performance. Refer to Chapters 16 (Lighting Criteria) and 18 (Acoustical Criteria). Courtroom ceilings shall have design attention equal to the vertical elevations of the room, but shall not distract attention from the proceedings. Integrate required technical features with the use of ceiling soffits, coffers, and materials to accommodate acoustical material,

lighting, sprinklers, speakers, cameras, projectors, and projection screens.

Judicial officer offices and conference rooms: Design ceilings to present a quality appearance and to integrate acoustic panels and lighting.

- Public and Private Toilet Rooms

  Public toilet rooms are heavily used and require durable, washable, and easily maintained materials and finishes. For high-volume public restroom entries, consider the use of doorless vestibules with integrated sound and visual screening. Minimum finishes include: coved ceramic tile floors, glazed ceramic tile wall surfaces up to a minimum 4' wainscot height, solid surface countertops, under-counter mounted lavatories, stainless steel or monolithic plastic floor-mounted or floor and ceiling-braced institutional quality toilet stall dividers and doors, institutional quality toilet fixtures, institutional quality stainless steel toilet accessories, wall-mounted mirrors behind the lavatory tops, diaper-changing table in each restroom, gender-specific fixtures, and semigloss painted washable wall and ceiling surfaces.

  Provide one shower/changing area (for each gender) in a staff toilet room off the restricted corridor on the first floor of the building. The dressing area shall have wall-mounted hooks and a bench.

- Elevators

  If the project contains more than one floor or level change, the building shall include vertical conveyance systems. Courthouses typically require three elevator systems: public, restricted (staff), and secure (in-custody defendants). Public and staff elevators shall have a recommended interval of 45-50 seconds (wait time of 26-32 seconds) and a handling capacity of 15 percent of the building population served. All passenger elevators must meet the design requirements of the building code for access by persons with disabilities and emergency personnel. If high-volume areas are located at any other level than the first, provide extra capacity to move large numbers of people to and from that level. If the project contains more than one floor or level change, a shared or dedicated elevator for staff, freight, and service is required for deliveries, staff vertical movement, trash transport, document transport, and building maintenance. Staff elevators can double as a freight/service elevator.

  Hydraulic elevators are permitted for two- or three-story facilities, while four-story and taller facilities shall have traction elevators.

  Passenger elevator car interiors shall have durable and vandal-resistant finish materials consistent with the building design. Cab panels shall be replaceable. One cab in the building shall have an enclosure above the ceiling hatch to accommodate extra-long deliveries such as rolls of carpet. A typical car interior ceiling height is 9'-0" to 10'-0".

- Stairs

  Provide convenient stairs that encourage walking to other floors in support of the sustainable design objective by reducing demand on the elevator systems. Communicating stairs can be provided in both the public areas and restricted circulation system. Required exit stairs shall be designed to encourage use by staff for normal circulation, with materials and finishes similar to the restricted corridors and introduction of natural lighting, when appropriate.

  Provide a public connecting stair to access high-volume public uses on the second and third floors of courthouses, in addition to elevator access. Design and finish open stairways that connect public lobbies to the upper floors in harmony with materials used in the public lobby. Preengineered steel stair and railing systems are acceptable for exit and communicating stairs (not for ceremonial high-volume public stairs). Stair treads and intermediate landings shall be pan-type filled with concrete or terrazzo; channel or flat plate stair stringers are acceptable. Provide architectural railings for communicating stairs; a standard railing system might be adaptable for this purpose.

- Doors Frames and Hardware

  Provide one-piece, welded steel doorframes at permanent locations requiring oversized or heavy doors or having significant traffic, including courtrooms.

  Provide prefinished aluminum doorframes in partitions subject to periodic remodeling. Provide 12"

to 18" wide tempered glass full height sidelights or glazed doors at private offices and conference rooms, except in judicial chambers, jury deliberation rooms, and offices that require privacy.

Provide security-grade hollow metal doors and frames and entrances to holding areas, security control rooms, and secure evidence storage rooms.

Provide flush solid core doors for typical interior conditions. Door construction shall meet or exceed AWI premium grade for courtrooms, custom grade for chambers suite offices, department entrances, and private offices, and paint grade for all other doors. Courtroom public entrances may have stile and rail doors with vision panels.

All hardware provided shall be institutional grade. Pins and hinges on all doors located on corridors, lobbies, atriums, and other public spaces shall be installed on the secure side of the door or shall be fixed. Latch and locksets shall be full mortised type; locks shall have removable key cylinders. Locks shall be grand-mastered, and master-keyed. Provide multiple keys for every lock type. Certain locks off master shall be specified. Hardware specified for courtroom use shall be of the highest quality and shall be selected for quiet, acoustically optimal operation. Selected doors require electric look sets or strikes and proximity reader card key locking systems.

- Courtroom Platforms

  Raised platforms in courtrooms shall be of a construction method not requiring underfloor fire sprinklers. Handrails, if required, shall be discreet and integrated into courtroom design.

- Flooring

  Carpet: Consistent with the expected functional lifetime, select carpet that is durable, low-maintenance, and with 20 percent minimum recycled content. Specify carpet appropriate to the traffic expected in the space; courtrooms and offices are to be (midgrade) minimum 26 oz. to 28 oz. loop pile and minimum 1/10 gauge; chambers are to be (premium) minimum 28 oz. and minimum 1/10 gauge and may be cut pile. Specify nylon, olefin, or polyester products for durability with three-to-four-ply yarn. Loop pile is to be solution-dyed nylon. Hybrid carpet systems with attached pad may be used. Specify a carpet available in broadloom, and carpet tiles to facilitate replacement. Broadloom shall be minimum 12' wide to minimize seams. Carpet tiles shall be standard 24" square. For higher acoustic values, specify urethane-backed tile or urethane cushion on broadloom. Products must meet the Carpet and Rug Institute standards for indoor air quality. Carpet on ramps or courtroom platforms shall meet wheelchair access requirements.

  Impervious Flooring: Public corridors and lobbies carrying significant foot traffic and providing major circulation pathways throughout the building shall have extremely durable, slip resistant materials that require low maintenance.

- Window Coverings

  Provide window coverings appropriate for visual screening, glare control, and use of work areas and courtrooms. Courtrooms with skylights, windows, or borrowed light require window coverings to prevent glare, visual distractions, and light control during audiovisual presentations. Consider the exterior image of building when selecting the color and materials of window coverings, to provide an image consistent with interior and exterior design intent.

Furniture and Fixtures

- Integrated Interior Design

  The design professional shall select, integrate, and coordinate the size, color, style, and finishes of movable furniture and equipment with the other interior elements.

- Modular Furniture and Workstations

  Modular systems furniture (MSF) is composed of freestanding partition panels, worktops, files, components, and integrated circuitry and access raceways for provision of electrical power, voice, and data cabling. The building shall be designed to allow for flexible rearrangement of MSF and connection to building systems. The electrical, telecommunications, data systems, and capacities must be designed to ensure compatibility with MSF design requirements.

- High-Density Files

  Where required, provide a mobile high-density filing system. Locate on ground floor or adequately reinforced floor structure, near clerk's counter. Specify fixed rows for every six movable rows or as determined by AOC to allow access to multiple rows of files. Provide a locking feature for confidential files. Specify seven-shelf-high cars. Filing system shall be accessible to persons with disabilities.

- State Seal

  Provide a metal or composite material of the official seal of the State of California in each courtroom, minimum size of 32" diameter; the appearance and location must reflect the dignity of the court.

- Flagpoles

  Provide two flagpoles and holders in each courtroom, to accommodate a State of California flag and a United States flag. Flagpoles may be wall or floor mounted. Location shall not interfere with bench accessibility.

Interior Finishes and Materials

The Facilities Standards specify four levels of interior architectural finishes corresponding to the component's target functional lifetime, required use, architectural importance, durability requirements, and surrounding interior context. Brief descriptions of example interior finish levels are provided below for reference; however, the design professionals shall propose finishes for each project. See Table 11.1 for suggested finishes for the four levels.

- Level I Interior Finishes

  Level I finishes are specified for building components with long functional lifetimes and high aesthetic importance. Level I finishes have quality, long-term durability, ease of maintenance, and ability to sustain aesthetic appeal over a long period.

- Level II Interior Finishes

  Level II finishes are specified for high-volume public service areas with midrange functional lifetimes and increased architectural importance. Level II finishes offer midrange durability, yet require regular maintenance and refurbishment, such as occasional repainting.

- Level III Interior Finishes

  Level III finishes are specified for building components with midrange functional lifetimes and moderate architectural importance, yet require regular repair, maintenance, and refurbishment, such as repainting.

- Level IV Finishes

  Level IV finishes are specified for building components that may have long functional lifetimes. These are typically utility or support areas and have relatively low architectural importance. Level IV finishes are durable and maintainable.

Architectural Woodwork

Provide premium wood paneling and casework to convey a dignified appearance.

- Veneer Panels and Casework (Courtroom)

  Provide hardwood veneer panels with solid hardwood trim and edge banding, with shop-applied stain and finish with three coats of transparent sealer per Architectural Woodwork Institute (AWI) premium grade requirements. Wood shall be from a certified sustainable source. The use of tropical hardwoods is prohibited. Solid wood base to match courtroom panels may be used in public spaces and chambers. Courtroom built-in components may include: judge's bench; courtroom clerk's, court reporter's, and court security officer's stations; jury box; public bench seating; counsel tables, rails, and gates; and accessible lectern (note: bench seating, counsel tables, and lectern may be standard furniture customized to match courtroom finish).

  All other courtroom desktop work surfaces, whether modular or custom-built, shall be wood or plastic laminate with hardwood edges and fascias, in a nonpatterned color harmonious with the courtroom decor.

	Floor						Walls						Ceiling					Metal	
	Premium Carpet	Stone Tile or Terrazzo	Midgrade Carpet	Ceramic Tile	VCT/Linoleum	Sealed Concrete	Paneling (Wood or Stone)	Premium Acoustical Wall Panels	Ceramic Tile	Painted Gypsum Board	Premium Base (Wood or Stone)	Rubber Base	Architectural Soffits	Premium Acoustical Panels	Midgrade Acoustical Panels	Painted Gypsum Board	Exposed Structure	Premium Clear Coated Metal	Ptd. Metal or Stainless Steel
Level I																			
Courtroom[1,2]	•	•	•		•		•	•	•	•	•		•	•		•		•	•
Public Lobby		•					•			•	•		•	•		•		•	•
Public Corridor		•	•	•	•		•			•	•		•	•		•		•	•
Public Restroom				•			•		•	•	•					•			•
Level II																			
Jury Assembly Room			•							•	•	•	•	•	•	•			•
Clerk's Public Counter		•	•							•	•		•	•	•	•			•
Self-Help Center		•	•							•	•		•	•	•	•			•
Child Waiting Area			•	•						•	•	•	•	•	•	•			•
Level III																			
Judicial Officer Private Office	•		•							•	•		•	•					•
Staff Office/Workstation			•							•		•			•				•
Jury Deliberation Room			•							•		•			•				•
Conference Room			•							•		•	•	•					•
Employee Breakroom					•					•		•			•				•
Staff Toilet				•	•				•	•					•				
Restricted Corridor			•							•		•			•				•
Restricted Communicating Stair			•	•	•	•				•		•				•			•
Copy Room					•					•		•			•				•
Level IV																			
Loading Dock						•						•					•		
Emergency Egress Stair						•						•					•		
Mechanical Rooms						•						•					•		
Telecom Equipment Room						•						•					•		
Storage					•	•				•		•				•	•		
Janitor Closets					•	•						•					•		

Table 11.1 Finish Matrix

1. Arraignment courts may have combination of carpet and hard surface flooring. Hard surface flooring might be appropriate under spectator bench seating.
2. Painting and gypsum board is appropriate above wainscot level in corridors and in combination with other materials in courtrooms. Painted gypsum board would be standard above tile in toilet room walls.

- Cabinets and Casework

  Provide (minimum) AWI premium grade plastic laminate casework with ADA-compliant base cabinets and plastic laminate tops.

11.5 SIGNAGE

Clear, legible, and strategically placed graphics and signage are essential design elements for a court facility. Signage directs visitors and staff to where they need to go, and contributes to a positive experience in the courthouse, by orienting users and minimizing confusion. The many functions and high volume of daily users in the facility underscore the need for a successful signage program. Grouping too many signs in one place, at entries, lobbies, and in corridors, is unsightly, results in confusion among first-time visitors, and undermines the dignity of the judicial system.

All signage must meet the requirements of the Americans With Disabilities Act and the most recently adopted provisions of the Uniform Building Code and CCR, title 24, regarding accessibility. Braille lettering and audio signals shall be provided at elevators and where required by codes. Provide prominent multilingual posting of public notices and informational material.

An integrated, complementary, and comprehensive signage program shall address both code-required signage (such as exit signs, exiting plans, and room numbers) and noncode-required signage (building directories, notices). The graphics and signage programs shall be developed during early design stages to integrate signage with the design concept, functional program, and building circulation zones. Attractive, legible signs showing directions and information shall be incorporated into design of all public areas.

Number rooms logically and consecutively to enable visually impaired persons to make assumptions about where their destination is located. Public room numbers shall be sequential and predictable. Base courtroom labels on a predictable sequence, not the internal administrative department labels. For example, a second floor courtroom shall be labeled Courtroom 200 or Room 200, not Division 200.

Position room label signage at doorways, where sight-impaired persons expect to find information. Locate signage of building management rooms, which are not accessible to the public, in different areas than accessible signage. For example, locate electrical closet room numbers above the door, rather than to the side. Maintain brief, clear, and polite messages in signage.

The following guidelines shall apply to signage and graphics in various locations within the building.

Building Entry

Clearly mark the courthouse entrance with signs indicating that all persons and articles entering the facility are subject to search, that no weapons of any kind are allowed within the facility or on the grounds of the facility, and that violators are subject to fine and arrest.

Restrict all other signage at entry to preserve a unified and attractive façade.

Building Directory

Locate a building directory near the main public entrance. The directory shall contain a diagram listing all major building components. This directory shall be located in an area seen by the public after they have been screened, and may be integrated into an information booth or kiosk. Provide smaller directories at each elevator lobby with information about various occupancies on that floor. Post signs for children's waiting room at each directory.

Court Calendar Postings

Provide a display of calendar information in the entry lobby so information can be viewed before the screening process. Larger courts shall provide wide-screen digital monitors; smaller courts may use other means of information display. Calendar information may be displayed at courtroom entries. This display shall be uniform in appearance; postings shall be limited to the display area.

Public Bulletin Boards

A consistent, controlled system of freestanding or wall-mounted bulletin boards shall be used throughout the facility to allow public postings. All computer-generated signs, handwritten signs, and notices will be restricted to these areas. Provide public bulletin boards in consistent, public locations to prevent staff from taping signs to walls.

Courtroom Entry Signage

All signs outside courtroom doors shall be of uniform appearance and integrated with calendar information displays. The courtroom numbering system shall be displayed at the top and in the largest font size. The judge's name shall be below, in a sign allowing name-plate modifications. All other signage will be posted on a bulletin board below, according to the needs of the court. No signage shall appear on courtroom doors except as noted. The design consultant shall work with court representatives to minimize signage.

Examples of court-specific signage include:

- Calendar postings
- Jurors and Witnesses Please Remain In Hallway Until Called
- Before Entering With Children, Please See Court Staff
- Closed Hearing
- No Cell Phones or Beepers, Please

Courtroom Signage

Provide a consistent, controlled signage system within the courtroom to prevent individual postings by court personnel.

Examples of court-specific signage include:

- No Communication With Inmates. This sign shall be posted on the cage inside the courtroom facing the audience.

Other Signage

Provide a consistent, controlled system of other signs, such as restricted access warnings, directional signs, signs designating services for persons with disabilities, and procedural guides. If high-volume functions, such as the jury assembly room and the public counter, are not immediately visible from the entry lobby, clearly displayed graphics shall be prominently displayed to guide users to these areas.

12

STRUCTURAL CRITERIA

Construction Photo

Jerry L. Pettis Memorial VA Hospital

Loma Linda, CA

Rutherford & Chekene Consulting Engineers

This chapter describes general and technical criteria for structural systems in new AOC buildings.

12.1 OBJECTIVES

Structural design goals for new trial courts facilities shall reflect functional and programmatic needs, adaptability for future technology, and the ability to withstand potential damage from disasters and rare events.

Serviceability

The structure shall provide support for the intended occupancies, including floors of adequate level and flatness, stiffness, and vibration control from environmental and internal sources.

Adaptability

The structure shall be adaptable to local changes of use and occupancy or the installation of new information technology or mechanical, electrical, and plumbing systems due to changing technology. Adaptability features include: gravity systems with capacity to accommodate most nonspecialized AOC occupancies, those that enable local strengthening, and those that facilitate additional floor and wall penetrations.

Performance in Rare Events

Most AOC facilities incorporate specialized features that will not allow relocation to alternative spaces without considerable preparation and alteration. Therefore, it is important to estimate the nature of damage that could be caused by rare, but possible, events such as high wind, extreme snow, flood, and earthquake, and the possibility the building will not be available for occupancy for an extended length of time. The AOC shall determine the regional importance and any performance objectives above code expectations for all new facilities.

12.2 STRUCTURAL SYSTEMS

There are no specific limitations on use of gravity and lateral load resisting structural systems other than as prescribed by the state building codes. The structural engineer shall submit written documentation to the architect describing how the recommended gravity load and lateral load system respond to the performance objectives.

New Technology

Structural components and systems not specifically covered by the applicable code are permitted for use as alternate means of compliance. Criteria for such components or systems shall be reviewed by one or more peer reviewers acceptable to the engineer of record and the AOC, and shall be submitted to the AOC for approval.

12.3 CRITERIA FOR SERVICE LOADS

The following criteria and performance goals shall apply to courts facilities.

Live Loading

Minimum design load shall be 80 psf live plus 20 psf partitions, plus other appropriate dead loads. Areas that require heavier loading, such as libraries, storage areas, computer or communication rooms, and mechanical rooms, shall also be considered in the gravity floor design. Live load reductions shall not be used for horizontal framing components on each floor, transfer girders for columns, or columns supporting the roof or top floor.

Floor Vibration

Floors will be designed to control vibration from footfall to attain slightly perceptible or better performance, as measured by the Modified Reiher-Meister Scale (Murray, Thomas M., "Design to Prevent Floor Vibrations," 3d Qtr., 1975, *AISC Engineering Journal*).

Vibration from reciprocating equipment will be controlled locally by isolation under the direction of others, such as the mechanical engineer, acoustical consultant, or equipment supplier. The structural engineer shall confirm with the architect that there are no special requirements for the structure intended to minimize vibrations in the structure from sources other than footfall.

12.4 CRITERIA FOR RARE LOADS

Earthquake

The Normal Seismic Performance of all new AOC facilities is intended to be above average for buildings designed in accordance with prescriptive code provisions. This will be achieved through design and quality assurance.

The AOC will designate specific buildings to be designed for Enhanced Seismic Performance. Enhanced performance refers to controlling earthquake damage to a building in order to limit the expected loss of use.

- Normal Seismic Performance, Structural

  Normal structural seismic performance objectives will be met by thorough conformance with the principles and provisions of the applicable code using an Importance Factor, I, equal to 1.0.

- Normal Seismic Performance, Nonstructural Components

  Acceptable performance of nonstructural components and systems shall be achieved by implementing code requirements during design and construction phases. An Importance Factor of 1.0 shall be used, except where higher values are required by the applicable code.

  For each project, the AOC shall designate a Nonstructural Seismic Coordinator (NSC), knowledgeable and experienced in the seismic protection of nonstructural components and systems. The NSC may be in the firm of the Project Architect or Project Structural Engineer, or may be an independent design or construction professional. The NSC shall review and coordinate provisions in the construction documents that provide for seismic protection of nonstructural components as required by code. The NSC shall ensure that the construction documents contain provisions for protection, such as anchorage or bracing, that are clear, coordinated, and practical to implement. During construction, the NSC shall monitor the project to ensure compliance with seismic protection requirements and report noncompliance to the AOC.

- Enhanced Seismic Performance, Structural

  During preliminary design, the structural engineer shall develop detailed seismic criteria to meet AOC seismic performance goals. Analysis and design methods shall explicitly account for nonlinear behavior (for example, as described in FEMA 356, *Prestandard and Commentary for the Seismic Rehabilitation of Buildings*). The AOC will review and approve the seismic criteria, and may appoint an independent peer reviewer to review the criteria.

- Enhanced Seismic Performance, Nonstructural Components

  Acceptable performance of nonstructural components and systems shall be achieved by implementing code requirements during design and construction phases. An Importance Factor of 1.5 shall be used.

  For each project, the AOC shall designate a NSC, knowledgeable and experienced in the seismic protection of nonstructural components and systems. The NSC may be in the firm of the Project Architect or Project Structural Engineer, or may be an independent design or construction professional. The NSC shall review and coordinate provisions in the construction documents that provide for seismic protection of nonstructural components as required by code.

  The NSC shall ensure that the construction documents contain provisions for protection, such as anchorage or bracing, that are clear, coordinated, and practical to implement. During construction,

the NSC shall monitor the project to ensure compliance with seismic protection requirements and report noncompliance to the AOC.

In addition, the NSC shall identify equipment critical to continued building function and occupancy, as specified by the applicable code or the AOC. The AOC shall determine requirements for prequalification of such equipment.

Blast

See Chapter 4 (Courthouse Security) for blast criteria.

Wind

Wind design shall be in accordance with applicable codes, unless otherwise specified by the AOC. Because of enhanced performance objectives or siting conditions, the AOC may select certain buildings for site-specific wind studies. This analysis will determine design parameters for the structural system, exterior cladding, and ornamentation.

Snow

Parameters for design for snow loading shall be in accordance with requirements of the jurisdiction having authority.

13

MECHANICAL CRITERIA

Service Corridor

Forensics Laboratory
San Mateo County, CA
HOK Architects

This chapter identifies the program and criteria for heating, ventilating, and air conditioning (HVAC), and plumbing and piping systems.

13.1 OBJECTIVES

Design mechanical systems to meet building performance objectives including performance, sustainability and energy conservation, maintenance and reliability, and flexibility for changes.

Performance

The design solutions shall not sacrifice the basic needs of one program area to optimize another. Instead, the mechanical designs must optimize the program to ensure attainment of all critical performance goals.

Sustainability And Energy Conservation

The design of mechanical systems shall combine with other component design to produce a building that meets the project's programmed sustainability and energy efficiency goals, as referenced in Chapter 1 (General Principles).

Maintenance and Reliability

Design all equipment and components to allow removal and replacement. Systems shall have above-average reliability over the 25-year life span.

Flexibility for Change

Design systems to provide optimum flexibility in scheduling the use of all principal spaces in the court building.

Standby Capacity

Standby capacity shall be designed into mechanical systems, enabling continuous operation during repair or replacement of a failed piece of equipment or components. Standby units shall not be redundant equipment but sized at half design capacity and used in multiples of two, and used as part of the operating system with equal time cycling through automatic control sequencing. Standby capacity is mandated only in the case of critical systems and associated equipment identified as critical to the life safety and communication systems in the building program.

13.2 HVAC CRITERIA

- Set Point Criteria

  Summer: 23.3°C (74°F dry bulb +/-2 degrees, operating range of 72–76°F)

  Winter: 19.9°C (68°F degrees dry bulb +/-2 degrees, operating range of 66–70°F)

- Ventilation

  Define indoor population density and the building code occupancy classification in the project program. Where aspects of energy conservation and air quality are in conflict, air quality shall take precedence.

- Temperature Control Zone

  Interior control zones shall not exceed 1,500 gross square feet for open areas, or a maximum of four enclosed offices. Perimeter zones shall not exceed 400 gross square feet. Corner offices shall be independent zones. Provide independent zones for each courtroom, chambers suite, jury deliberation room, entrance lobby, atrium, child waiting area, and equipment rooms.

- Air Distribution

  Based on size and complexity of the building, air distribution systems will be manufactured pre-

engineered air handling units (AHU) or custom designed, built-up central air handling systems, with the decision based on the LCCA and whole building cost analysis. AHUs provide flexible zone control through use of multiple smaller units. AHU casing construction details are included in Table 13.1 and 13.2. Central systems will incorporate components similar in quality to those in Table 13.1 and 13.2.

Variable Air Volume (VAV) terminal boxes: Provide ARI Standard 880 Certification, the ARI seal and a five-year warranty on VAV terminal boxes. If fan-powered, the terminals shall be designed, built, and tested as a single unit including motor and fan assembly, primary air damper assembly, and any accessories. The VAV terminal boxes selected shall be pressure-independent type units.

Diffusers: All terminal ceiling diffusers or booted-plenum slot diffusers shall be specifically designed for VAV air distribution. Booted plenum slots shall not exceed 4' in length unless more than one source of supply is provided. Diffuser spacing selection shall be based on the predominant air volume range. Ensure that the air diffusion performance index (ADPI) values remain above the specified manufacturer's minimum. Diffusers shall be high entrainment type (3:1 minimum) to maximize air velocity at low flow rates.

All motors shall be premium efficiency as per ASHRAE standard 90.1 and the energy code. All 0.5 HP and larger motors shall incorporate polyphase configuration. All motors 0.5 HP and smaller shall be single phase. For motors operated with variable speed drives, provide inverter-duty motors with Class-F insulation per NEC and NFPA.

The VAV supply fan shall be designed for the largest block load, not the sum of the individual peaks. The air distribution system up to the VAV boxes shall be medium pressure, designed by using the static regain method; downstream of the VAV boxes the system shall be low and medium pressure construction, designed using the equal friction method.

The primary air ductwork (fan connections, risers, main distribution ducts) shall be medium pressure classification as a minimum. The secondary air ductwork (branches from main to terminal boxes and distribution devices) shall be low-pressure classification as a minimum. The ductwork downstream of the final distribution devices (VAV and CV boxes) shall not be duct leak tested except for duct sections specified by the energy code.

Design and construct supply, return, and exhaust air ducts to allow no more than 3 percent leakage of total airflow in systems up to 3" WG at design static pressure. In systems from 3.1" WG through 10.0" WG, limit leakage to 1 percent of the total airflow at design static pressure. The pressure loss in ductwork system shall be designed to comply with the criteria stated above. Mitered elbows are not permitted where duct velocity exceeds 2,000 FPM.

Fabricate ductwork from galvanized steel and/or aluminum sheet metal, depending on applications. Water-based sealants are not permitted; use low VOC duct sealant. A factory made UL Class 1 listed acoustical flex duct may be used for low-pressure ductwork connected to air devices. The length of the flex duct shall not exceed 8' nor contain more than two 45-degree bends. Joint sealing shall be accomplished using airtight, mechanical joint draw bands. The use of UL-approved reinforced fiberglass-backed tape material or metal foil-based tapes with factory-applied mastic material is permitted.

Test ductwork leakage before final acceptance. Each section tested must have a minimum of a 20' length straight-run, a minimum of two elbows, and a connection to the terminal. The stated static test pressures represent the pressure exerted on the duct system and not the total static pressure developed by the supply fan. The static test pressure shall be 100 percent of the design pressure exerted on the duct system and not to exceed the designated duct pressure construction class.

Plenum and Ducted Returns: Air drawn through the most remote register must reach the air-handling unit. No more than 1,000 cfm shall be collected at any one return grille. When deemed necessary, all plenums shall be sealed airtight with respect to the exterior wall and roof slab or ceiling deck to avoid creating negative air pressure in exterior wall cavities that would allow intrusion of untreated outdoor air. Where fully ducted return

systems are used, consider placing returns low in walls or on columns to complement ceiling supply air. Double wall ductwork with insulation in between shall be considered in lieu of sound lining for a minimum 5' before connecting to the air-handling unit or a return air duct riser.

Air distribution access doors shall have a low leakage, double wall, and internally insulated, gasketed access door at 40' intervals along the main air distribution system to allow for inspection and cleaning of the entire system.

- Building Pressurization: Design system to provide a slight, but continuous, positive pressure with respect to the outdoor environment. Principal spaces are to maintain positive pressure relative to circulation spaces; circulation spaces and building entrances and public lobbies are to maintain positive pressure relative to the outdoors.

- Air Intake and Exhaust: The placement and location of outside air intakes must comply with ASHRAE Standard 62n and the building security requirements. The intake design shall minimize the entrainment of exhaust air. The outside air intake louvers shall be drainable stationary storm louver type in accordance with AMCA 500L.

- Internal Heat Gains

  Occupancy: For courtrooms, auditoriums, assembly rooms, and other high-occupancy spaces, occupancy loads shall be based on the number of fixed seats available. For office spaces, the average density of the floor area of a building is one person per 120 usable square feet. The workstations occupancy load can be as dense as one person per 75 usable square feet. Sensible and latent loads per person shall be based on the latest edition of the ASHRAE Handbook of Fundamentals.

  Equipment: Internal heat gains from all appliances (electrical, gas, or steam) shall be determined by manufacturer-provided heat gain and usage schedules if available; heat gains from office equipment shall be based on the latest edition of the ASHRAE Handbook of Fundamentals.

  The cooling load estimated for the connected electrical load shall be based on the electrical and lighting load analysis and the estimated demand loads.

Air Conditioning Cooling Systems

- Chilled Water Systems

  District chilled water, if available, shall be used if it is determined to be economical and reliable through a life cycle cost analysis. In the life cycle cost analysis, use high-efficiency chillers with COP and IPLV ratings that exceed 6.4 (0.55 KW/ton). The feasibility of thermal storage chillers and absorption chillers shall be considered for demand shedding and thermal balancing of the total system. Chiller leak detection systems shall be connected to the HVAC building control system with remote alarms.

  If perimeter spaces require individual fan coil units, specify a four-pipe fan coil unit with cooling coil, heating coil, 35 percent efficiency filters, internal condensate drain, and overflow drain. Fan coil units shall be capable of operating with unit mounted or remote mounted temperature sensor.

  All chillers shall be piped to a common chilled water header with provisions to sequence chillers online to match the load requirements. All required auxiliaries for the chiller systems shall be provided with expansion tanks, heat exchangers, water treatment, and air separators. When multiple chillers are used, automatic shutoff valves shall be provided for each chiller. Chiller condenser piping shall be equipped with recirculation and bypass control valves to maintain incoming condenser water temperature within chiller manufacturer's minimum requirement.

  Multiple cell cooling towers and isolated basins are required. The number of cells shall match the number of chillers. Supply piping shall be connected to a manifold to allow for any combination of equipment use. Multiple towers shall have equalization piping between cell basins. Equalization piping shall include isolation valves between each cell. Supply and return lines for each cell shall be provided with automatic isolation valves. Cooling towers shall have ladders and platforms for inspections and replacement of components. Variable speed pumps or fans for multiple cooling towers shall not operate below 25 percent of rated capacity.

  Pumps shall be of a centrifugal type and shall generally be selected to operate at 1,750 RPM. Both

partial load and full load must fall on the pump curve. The number of primary chilled water and condenser water pumps shall correspond to the number of chillers, and a separate pump shall be designed for each condenser water circuit. Variable volume pumping systems shall be considered for all secondary-piping systems with pump horsepower greater than 10 KW (15 HP). The specified pump motors shall not overload throughout the entire range of the pump curve. Each boiler cooling tower and chiller group pumps shall be arranged with piping, valves, and controls to allow each chiller-tower group to operate independently of the other chiller and cooling tower groups.

- Direct Expansion Systems

  Air handlers with air-cooled package chillers are preferable to field-piped (split system) direct expansion (DX) systems. Field-piped DX evaporators with condensing units are not allowed unless, in the schematic design phase, a case can be made to prove that the chilled water system application does not have a favorable life cycle cost or it can be demonstrated that the application requires a DX approach. When the total connected design load exceeds 150 tons the HVAC designer is required to first consider and rule out using chilled water concepts before specifying any high-efficiency DX refrigeration equipment.

Heating Systems

- Water Heating Systems: Low-temperature water heating is the preferred system. Supply temperatures and the corresponding temperature drops for space heating hot water systems must be set to best suit the equipment being served. The temperature drop for terminal unit heating coils shall be 52°F. Design water velocity in piping to not exceed 8' per second, or design pressure friction loss in piping systems to not exceed 4' per 100 feet, whichever is larger, and not less than 4' per second.

  All boilers for hydronic water heating applications shall be low pressure, with a working pressure and maximum temperature limitation stated, and shall be installed in a dedicated mechanical room with all provisions made for chimney, flue stack, and combustion air. For installations where the ASHRAE winter design is 34°F and above, a minimum of two equally sized units at 55 percent of the peak capacity (each) shall be provided. Multiple closet type condensing boilers shall be utilized, if possible. All boilers shall have a minimum efficiency of 81 percent as per ASHRAE standard 90.1. All boiler emissions shall comply with local air quality regulations. The products of combustion from fuel-fired appliances and equipment shall be terminated to the outside of the building through the use of chimneys. All boilers shall be piped to a common heating water header with provisions to sequence boilers online to match the load requirements. All required auxiliaries for the boiler systems shall be provided with expansion tanks, heat exchangers, water treatment, and air separators.

- Radiant Heating Systems: Areas that experience infiltration loads in excess of two air changes per hour at design heating conditions shall incorporate radiant heating systems.

- Fin-Tube Heating System: When fin-tube radiation is used, the design shall incorporate individual zone thermostatic control capable of connecting to a self-contained microprocessor and a HVAC building control system.

- Variable Volume Reheat Boxes: A variable air volume system with hot water reheat shall be used for perimeter zone applications. VAV shutoff boxes may be used with the perimeter air distribution systems in order to eliminate the need for reheat.

- Variable Volume With Fan-Powered Boxes: Fan-powered boxes may have water heating coils for maintaining temperature conditions in the space under partial load conditions. Fan-powered boxes located on the perimeter zones and on the top floor of the building shall contain water coils for heating.

- Heat Pump: A console perimeter heat pump system may be considered for the perimeter zone. For the interior zone either a packaged heat pump variable volume system or a central station air-handling unit with cooling-heating coil with VAV boxes shall be considered. Condenser water loop temperatures shall be maintained between 15°C (60°F) and 27°C (80°F) year round, either by injecting heat from a gas-fired, modular boiler if the temperature drops below 15°C (60°F) or by

rejecting the heat through a cooling tower if the temperature of the loop rises above 35°C (95°F) dry bulb. Outside air shall be ducted to the return plenum section of the heat pump unit. Heat pumps shall be provided with filter/filter rack assemblies upstream of the return plenum section of the air-handling unit.

Vibration and Acoustical Isolation

Refer to Chapter 18 (Acoustical Criteria), which shall govern in case of conflict. Refer to and incorporate the basic design techniques as described in ASHRAE Applications Handbook, Sound and Vibration Control. See "Design Guidelines for HVAC-Related Background Sound in Rooms" in the (latest version) ASHRAE Application Handbook, and "Selection Guide for Vibration Isolation."

- Mechanical Room Isolation: Floating isolation floors shall be considered for major mechanical rooms located in penthouses or at intermediate levels of midrise construction.
- Mechanical shafts and chases shall be closed at top and bottom, as well as at the entrance to the mechanical room. Any piping and ductwork shall be isolated as it enters the shaft to prevent propagation of vibration to the building structure. All openings for ducts and piping must be sealed. Shafts dedicated to gas piping must be ventilated.
- Isolators shall be specified by type and by deflection, not by isolation efficiency. Specifications shall be worded so that isolation performance becomes the responsibility of the equipment supplier.
- Concrete inertia bases shall be delineated for reciprocating and centrifugal chillers, air compressors, all pumps, axial fans above 300 RPM, and centrifugal fans above 37 KW (50 HP).
- Ductwork: The design shall delineate the methods to reduce fan-generated noise immediately outside any mechanical room wall by acoustically coating or wrapping the duct. The ductwork design shall appropriately address the airborne generated equipment noise, equipment vibration, duct-borne fan noise, duct breakout noise, airflow generated noise, and duct-borne crosstalk noise. All ductwork connections to equipment having motors or rotating components shall be made with aligned, 6" long, double-walled UL labeled, flexible connecters. All ductwork within the mechanical room shall be supported with isolation hangers.
- Piping Hangers and Isolation: The design shall delineate the isolation hangers for all piping in mechanical rooms and adjacent pipe rack spaces. The pipe hangers closest to the equipment shall have the same deflection characteristics as the equipment isolators. Other hangers shall be spring hangers with ¾" deflection. Positioning hangers shall be specified for all piping 8" and larger throughout the building. Spring and rubber isolators are recommended for piping 2" and larger hung below noise-sensitive spaces. Floor supports for piping may be designed with spring mounts or rubber pad mounts. For pipes subject to large amounts of thermal movement, plates of Teflon or graphite shall be installed above the isolator to permit horizontal sliding. The piping and equipment anchors and guides for vertical pipe risers usually must be attached rigidly to the structure to control pipe movement. Flexible pipe connectors shall be designed into the piping before it reaches the riser.
- Noise Control in VAV Systems: The system-generated sound levels at maximum flow must be carefully evaluated to ensure that acoustical performance conforms to project-specific targets.. Inlet guide vanes shall be evaluated for noise in their most restricted position. Duct noise control shall be achieved by controlling air velocity, by the use of sound attenuators, and by not oversizing terminal units. Terminal units shall be selected so that design air volume is approximately three-quarters of the terminal box's maximum capacity. Volume dampers in terminal units shall be located at least 6" from the closest diffuser, and the use of grille-mounted balance dampers shall be restricted except for those applications with accessibility problems.
- VAV Box Sound Attenuation: The VAV boxes and associated attenuation lining shall incorporate fiber-free insulation or foil faced insulation duct materials. The attenuation materials shall be appropriately sealed and either covered with reinforced aluminum laminated foil liner or coated with water-based sealant tested and approved for air erosion per UL 181 or ASTM C1071. The materials shall not promote or support the growth of

fungi or bacteria, in accordance with UL 181 and ASTM G21 and G22. All exposed edges shall be sealed with sealant approved per NFPA 90A.

13.3 HUMIDIFICATION AND WATER TREATMENT

- Humidifiers and Direct Evaporative Coolers

  Courthouse spaces shall not be humidified unless severe winter conditions are likely to cause indoor relative humidity to fall below 30 percent the majority of the time. Where humidification is necessary, atomized hot water, clean steam, or ultrasound may be used and shall be generated by electronic or steam-to-steam generators. To avoid the potential for oversaturation and condensation at low load, the total humidification load shall be divided between multiple, independently modulated units. Single-unit humidifiers are not acceptable. Humidifiers shall be centered on the air stream to prevent stratification of the moist air. All associated equipment and piping shall be stainless steel.

  The makeup water for direct evaporation humidifiers and direct evaporative coolers, or other water spray systems, shall originate directly from a potable source that has equal or better water quality with respect to both chemical and microbial contaminants. Humidifiers shall be designed so that microbiocidal chemicals and water treatment additives are not emitted in ventilation air. All components of humidification equipment shall be stainless steel. Air washer systems are not permitted for cooling.

- Relative Humidity Controls Criteria

  Summer: Unless noted to the contrary in the project program, inside relative humidity is not to be directly controlled. Dehumidification is a byproduct of the cooling process. However, the cooling equipment and systems shall be selected and sized to produce 45 percent relative humidity +/-10 percent in the conditioned space when the design outside conditions prevail and other design parameters are fulfilled.

  Winter: Do not add moisture to the air stream. When the program document indicates that humidification in the winter is required, the humidification equipment shall be sized to avoid condensation on inside surfaces, visible or concealed.

- Water Treatment

  A qualified specialist shall design the water treatment for all hydronic systems, including humidification systems. The water treatment design system shall address the three aspects of water treatment: biological growth, dissolved solids and scaling, and corrosion protection. The water treatment systems shall produce, at a minimum, the following characteristics; hardness: 0.00; iron content: 0.00; dissolved solids: 1,500 to 1,750 ppm; silica: 610 ppm or less; and a pH of 10 or above. The system shall operate with an injection pump transferring chemicals from solution tank(s) as required to maintain the conditions described. The chemical feed system shall have self-contained microprocessor controls capable of connecting to and interoperating with a direct digital control HVAC building control system. The methods used to treat the system makeup water shall have prior success in existing facilities on the same municipal water supply and follow the guidelines outlined in the ASHRAE Applications Handbook.

Mechanical Requirements for Specific Spaces

- Chambers suites shall be independently controlled and zoned to enable off-hours temperature control.
- For security equipment closet requirements, see Chapter 4 (Courthouse Security). For telecommunication equipment rooms, see Chapter 17 (Telecommunications and Audiovisual Criteria).
- Building entrance vestibules and lobbies shall have sufficient heating and cooling to offset the base load plus the infiltration to the space.
- Systems dedicated to spaces with intermittent occupancy, such as elevator machine rooms, telephone equipment rooms, and similar spaces, shall be exempt from the requirement of an economizer cycle. A waterside economizer system shall be employed where an airside economizer is not practical or feasible.
- The HVAC system serving detention areas shall be designed for continuous operation and shall be independently controlled and zoned. All ductwork

and air circulation openings penetrating the secure area envelope, including prisoner circulation areas, shall be designed for maximum security, with security bars and tamper-resistant diffusers with openings no greater than 3/16" in diameter. Holding areas shall be negatively pressurized with regard to adjacent spaces and exhausted directly outdoors.

- Mailrooms shall have segregated exhaust under negative pressure and be maintained under a negative pressure condition relative to surrounding spaces if required by the threat assessment.
- Mechanical rooms shall be mechanically ventilated. Water lines shall not be located directly above motor control centers or disconnect switches. The mechanical rooms shall have sloped floors with floor drains in proximity to the equipment served.
- Electrical and communication equipment rooms: No water lines are permitted in or overhead in electrical and communication rooms, except for fire sprinkler piping or chilled water and condenser water piping serving the dedicated cooling equipment in the room.
- Elevator machine rooms: A cooling or ventilating system must be provided to maintain elevator machine room temperature and humidity as required by geographical location. If hoist way venting is required by code and if the building is a high-rise, provide an automatic damper that is controlled by the smoke detector in the hoist way.
- Emergency generator rooms: The environmental systems shall meet the requirements of NFPA Standard 110 (Emergency and Standby Power Systems) and meet the combustion air requirements of the equipment. Rooms must be ventilated sufficiently to remove heat gain from equipment operation. The air supply and exhaust shall be located so air does not short circuit. Generator exhaust shall be carried up to roof level. Horizontal exhaust through the building wall shall be avoided.
- UPS designated battery rooms: Design space to accommodate battery and exhaust requirements.
- Loading docks and sallyports: The entrances and exits at loading docks and service entrances shall be designed to reduce infiltration and collection of outside debris. Loading docks must be maintained at negative pressure relative to the rest of the building. Enclosed vehicle sallyports shall be ventilated to prevent buildup of engine exhaust fumes and transferring of fumes into the building. Sallyports shall be equipped with ventilation fans controlled by carbon monoxide detection and control system to automatically purge the sallyport when unsafe levels of carbon monoxide are detected. The carbon monoxide sensors shall be uniformly located throughout the enclosed space and near each stairwell or exit.
- Toilets: Multiple fixture and public toilets shall have dedicated exhaust systems. Single and occasional use toilets shall have point of use fans connecting to a common exhaust header.
- Janitor and housekeeping closets: The janitor and housekeeping closets shall maintain negative pressure in the rooms relative to the surrounding spaces.
- Copy areas: All copy areas shall have a localized exhaust adjacent to high-volume reproduction machinery and shall be negative in pressure to the surrounding areas.

Criteria for Mechanical Spaces

Service access shall be provided in ventilation equipment, ductwork, and plenums for on-site inspection and cleaning. Access doors or panels shall be readily operable and sized to allow full access. Access doors and panels in courtrooms must be positioned to not impede judicial proceedings. Make provisions for removing and replacing major equipment over the life of the building, without damage to the structure. Provide adequate access to all devices with maintenance service requirements. Provide walkways or fixed ladders for all major equipment that cannot be maintained from floor level. Where maintenance requires the lifting of 50 pounds or more, provide and install hoists and hatchways. Configure mechanical rooms with clear circulation aisles and adequate access to all equipment. The mechanical rooms shall have adequate doorways or areaways and staging areas to permit the replacement and removal of equipment without the need to demolish walls or relocate other equipment.

- Roof mounted equipment: No mechanical equipment except for air handlers, cooling towers, air-cooled chillers, evaporative condensers, and exhaust fans shall be permitted on the roof of the building. The equipment shall be skid mounted on structural base rails supported off the roof waterproofing membrane. The roof-mounted equipment shall have permanent code compliant access.
- Housekeeping Pads: The housekeeping pads shall be at least 6" wider on all sides than the equipment they support and a minimum height of 3½" above the roof level or finished floor. The pad shall be of adequate height to trap and drain condensate from heat transfer coils to the condensate drain.

13.4 PLUMBING AND PIPING SYSTEMS CRITERIA

Pump Systems for Fire and Hydronic Heating Water

Provide a parallel piping system with a two-pipe main distribution system arranged in a reverse return configuration. Series loop piping for terminal or branch circuits shall be equipped with automatic flow control valves at the transfer units. Each terminal unit or coil shall be provided with isolation valves, on both the supply and return lines, and a flow-indicating balance valve on the return line. Isolation valves shall be provided on all major pipe branches, such as at each floor level, building wing, or mechanical room. Each pumping system shall be provided with two pumps, one operating while the other is in standby mode, and shall be configured for automatic lead/lag operation. Each boiler shall be provided with a control and piping arrangement, which protects the boiler from thermal shock. A primary-secondary piping arrangement with a modulating mixing control valve and higher primary flow rate shall ensure that the boiler return water temperature does not drop too low, as commonly occurs with night setback.

If required by threat assessment, the plumbing design shall provide features to minimize the impact of localized airborne attacks. Locate plumbing and piping vents to minimize the entrainment of fumes, moisture, and particles from the vent discharge piping to the building HVAC system air intakes.

Hydronic hot water space heating pumps shall be selected to operate at 1,750 RPM.

Variable volume pumping systems shall be provided for all secondary-piping systems with pump horsepower greater than 15 HP.

Air separators and vents must be provided on hot water systems to remove accumulated air within the system. Automatic bleed valves shall only be used in accessible spaces in mechanical rooms where they can be observed by maintenance personnel, and must be piped directly to open drains.

Manual bleed valves shall be used at terminal units and other less-accessible high points in the system. Air vents shall be provided at all localized high points of the piping systems and at each heating coil. Likewise, system drains shall be provided at all localized low points of the heating system and at each heating coil.

- Hydronic Closed Loop Systems

  Closed piping systems are unaffected by static pressure; therefore, pumping is required only to overcome the dynamic friction losses. Pumps used in closed loop hydronic piping shall be designed to operate to the left of the peak efficiency point on their curves (higher head, less flow). This compensates for variations in pressure drop between calculated and actual values without causing pump overloading. Pumps with steep curves shall not be used, as they tend to limit system flow rates.

- Variable Flow Pumping

  Variable flows occur when two-way control valves are used to modulate heat transfer. The components of a variable volume pumping system include pumps, distribution piping, control valves, and terminal units, and shall also include boilers and chillers unless a primary-secondary arrangement is used. All components of the system are subject to variable flow rates. It is important to provide a sufficient pressure differential across every circuit to allow design flow capacity at all times. Flow may be varied by variable speed pumps or staged multiple pumps. Pumps shall operate at no less than 75 percent efficiency on their performance curve. Package systems, complete with pumps and controls, shall be factory-tested before shipment. Chillers and most boilers may experience flow-related heat exchange problems if flow is not maintained above a minimum rate.

For this reason, separate, constant flow primary water pumps are recommended for variable volume pumping systems.

- Primary and Secondary Pumping

  Primary and secondary systems are recommended for larger buildings (circulation of more than 500 gpm) and multiple building facilities. Pumping circuits are separate, with neither having an effect on the pumping head of the other. The primary circuit serves source equipment (chiller or boiler), while the secondary circuit serves the load. Primary and secondary pumping arrangements allow increased system temperature design drops, decreased pumping horsepower, and increased system control. The primary loop and pumps are dedicated and sized to serve the flow and temperature differential requirements of the primary source equipment. This permits the secondary pump and loop to be sized and controlled to provide the design flow rate and temperature differential required to satisfy the heating or cooling loads.

Piping Systems

All piping systems shall be designed and sized in accordance with the ASHRAE Fundamentals Handbook and the ASHRAE HVAC Systems and Equipment Handbook. Materials acceptable for piping systems are black steel and copper. No PVC or other types of plastic pipe are permitted.

Piping Accessories

- Isolation of Piping at Equipment

  Isolation valves, shutoff valves, bypass circuits, flanges, and unions shall be provided as necessary for piping at equipment to facilitate equipment repair and replacement. Equipment requiring isolation includes boilers, chillers, pumps, coils, terminal units, and heat exchangers. Valves shall also be provided for zones off vertical risers.

- Piping System and Equipment Identification

  All pipes, valves, and equipment in mechanical rooms, shafts, ceilings, and other spaces accessible to maintenance personnel must be identified with color-coded bands and permanent tags indicating the system type and direction of flow for piping systems or type and number for equipment per ANSI color and labeling standards and the plumbing code. The identification system shall also tag all valves and other operable fittings. Gas piping and sprinkler lines must be identified as prescribed by the fire code.

Domestic Water Supply Systems

Water hammer arrestors shall be provided at every branch to multiple fixtures and on every floor for both hot and cold water.

- Cold Water Service

  A pressurized piping distribution system shall incorporate a separate supply line from the tap in the existing outside water main to the equipment area inside the building. The water meters furnished by the local department of public works shall meter water service inside the facility property boundaries. Incoming service shall have an approved backflow prevention device. The irrigation systems must be sub-metered for deduct billing of the sewer system. The internal distribution system shall include equipment that is capable of maintaining adequate pressure and flow in all parts of the system in accordance with plumbing code. A duplex booster pumping system shall be utilized if the water pressure is not adequate to provide sufficient pressure at the highest, most remote fixture. The water pressure at the fixture shall be in accordance with the plumbing code.

- Hot Water Service

  Heaters utilizing natural gas, electricity, or steam as an energy source shall generate hot water. Selection shall be supported by an economic evaluation incorporating first cost, operating costs, and life cycle costs in conjunction with the HVAC energy provisions. Domestic hot water supply temperature shall be generated at 140°F, and shall be capable of tempered water to at least 121°F using a three-way mixing valve, before supplying to all plumbing fixtures. Heat pump water heaters shall be used where possible to save energy. Circulation systems or temperature maintenance systems shall be included. Hot water shall be available at the furthest fixture from the heating source within 30 seconds of the time of operation.

  The application of point-of-use instantaneous hot water (IHW) generators is permitted for isolated

or incidental use at terminal fixtures and single accommodation toilet rooms.

Sanitary Waste and Vent Systems

- Waste Pipe and Fittings

  A complete sanitary collection system shall be provided for all plumbing fixtures, floor drains, and kitchen equipment designed in compliance with applicable codes and standards. Piping shall be cast iron soil pipe with hub and spigot joints and fittings. Aboveground piping may have heavy-duty no-hub joints (ASTM C1540-02) and fittings.

- Floor Drains

  Floor drains shall be provided in multiple fixture toilet rooms, mechanical equipment rooms, locations where condensate from equipment collects, and parking garages and ramps. Single fixture toilet rooms do not require floor drains. In general, floor drains shall be cast iron body type with 6" diameter nickel-bronze strainers for public toilets, kitchen areas, and other public areas. Equipment room areas shall require large diameter cast iron strainers, and parking garages shall require large diameter tractor grates. Drainage for ramps shall require either trench drains or roadway inlets when exposed to rainfall. Automatic trap primer system shall be provided for all floor drains and air handler P-traps where drainage is not routinely expected from spillage, cleaning, continuous condensate, or rainwater.

- Sanitary Waste Equipment

  Specific drains in kitchen areas (not employee break rooms) shall discharge into a grease interceptor before connecting into the sanitary sewer in accordance with the requirements of the state health department, and local authorities will determine which drains. Floor drains or trench drains in garage locations are to discharge into sand/oil interceptors.

- Automatic Sewage Ejectors

  Sewage ejectors shall only be used where gravity drainage is not possible. If they are required, only the lowest floors of the building shall be connected to the sewage ejector; fixtures on upper floors shall use gravity flow to the public sewer. Sewage ejectors shall be nonclog, screen-less duplex pumps, with each discharge not less than 4" in diameter. They shall be connected to the emergency power system if available.

- Rainwater Drainage System

  Pipes and fittings shall be in compliance with local codes and sized based upon local rainfall intensity. Roof drains shall be cast iron body type with high dome grates and membrane clamping rings, manufactured. Each roof drain shall have a separate overflow drain located adjacent to it. Overflow drains shall be the same drains as the roof drains except with a damming weir extension.

- Plumbing Fixtures

  All plumbing fixtures and faucets shall be water efficient, commercial grade type, similar to hotel type fixtures. Provide permanently wired automatic flush valves with optional manual flush activation for water urinals, water closets, and automatic faucets in public toilet rooms. For detention fixtures see Chapter 8 (In-Custody Defendant Receiving, Holding, and Transport).

Fuel Piping

- Natural and Propane Gas Systems

  Service entrance: A gas piping entering the building must be protected from accidental damage by vehicles, foundation settlement, or vibration. Where practical, the entrance shall be above grade and provided with a self-tightening swing joint before entering the building. Gas piping shall not be placed in unventilated spaces, such as trenches or unventilated shafts, where leaking gas could accumulate and explode. The provision of a seismic gas shutoff valve is not required for facilities that conform to the following provisions of the building and fire codes:

  - The building structure is classified as a 1-hour rated classification.
  - The building has an approved and operational fire sprinkler system.

  Gas shall not be piped through confined spaces, such as trenches or unventilated shafts. All spaces containing gas-fired equipment, such as boilers,

chillers, and generators, shall be mechanically ventilated. Vertical shafts carrying gas piping shall be ventilated. Gas meters shall be located in enclosed rooms that comply with local utility regulations. All gas piping inside ceiling spaces shall have plenum-rated fittings.

- Fuel Oil Systems

  Fuel oil-piping systems shall use at least schedule 40 black steel or black iron piping. Fittings shall be of the same grade as the pipe material. Valves shall be bronze, steel, or iron and may be screwed, welded, flanged, or grooved. Double-wall piping with a leak detection system shall be used for buried fuel piping. Duplex fuel-oil pumps with basket strainers and exterior enclosures shall be used for pumping the oil to the fuel-burning equipment.

  Underground fuel oil storage tanks shall be of double wall, nonmetallic construction or contained in lined vaults to prevent environmental contamination. For all underground tanks and piping systems, a leak detection system with monitor and alarm systems shall be required. The installation must comply with local, state, and federal requirements.

  The fuel storage capacity of each generator system shall be determined by the availability of timely fuel deliveries, the determination of the appropriate operational/climatic durations, and the emergency response plans scenarios of the system. The location of the generator system exhaust discharge shall be selected to minimize the potential of entrainment of exhaust fumes into the outside air intakes. Any additional external fuel tanks for the generator system shall be located adjacent to the generator in compliance with current and applicable fire code, UL listings for double containment tanks, regulatory leak detection systems, and local environmental ground water and air regulations.

13.5 INSULATION

All insulation shall comply with fire and smoke hazard ratings indicated by ASTM-E84, NFPA, and UL. Accessories such as adhesives, mastics, cements, tapes, and so forth shall have the same or better component ratings.

- Piping Insulation

  Insulation shall be provided on all cold surface mechanical systems, such as ductwork and piping, where condensation has the potential of forming and in accordance with ASHRAE Standard 90.1 and the energy code. Insulation that is subject to damage or reduction in thermal resistivity if wetted shall be enclosed with a vapor seal (such as a vapor barrier jacket). Insulation shall have zero permeability. All chilled water piping systems shall be insulated with nonpermeable insulation (of perm rating 0.00) such as foam glass or polyisocyanurate materials. All exposed and concealed piping shall have PVC jacketing. All insulated piping exposed to the weather shall be protected with aluminum jacketing and seams sealed.

- Duct Insulation

  All duct insulation materials used as internal insulation exposed to the airstream shall be in accordance with UL 181 or ASTM C 1071 erosion tests. The materials shall not promote or support the growth of fungi or bacteria. All exposed externally insulated ductwork shall have sealed canvas jacketing. All concealed externally insulated ductwork shall have foil face jacketing. All supply air ducts must be insulated, in accordance with ASHRAE Standard 90.1 and the energy code. Supply air duct insulation shall have a vapor barrier jacket. The insulation shall cover the duct system with a continuous, unbroken vapor seal. Insulation shall have zero permeability. All ductwork exposed to the weather shall be protected with aluminum jacketing and seams sealed. All return air and exhaust air distribution systems shall be insulated in accordance with ASHRAE Standard 90.1 and the energy code. The insulation of return air and exhaust air distribution systems shall be evaluated for each project and for each system to guard against condensation formation and heat gain/loss on a recirculating or heat recovery system. All equipment, heat exchangers, converters, and pumps shall be insulated as per ASHRAE Standard 90.1 and the energy code.

- Equipment Insulation

  All equipment including air-handling units, chilled and hot water pumps, and heat exchangers must be insulated in accordance with ASHRAE Standard

90.1 and the energy code. All exposed pumps in unconditioned spaces shall have jacketing.

- Thermal Pipe Insulation for Plumbing Systems

  All sanitary sewer vents terminating through the roof shall be insulated to prevent condensation from forming and shall include a vapor barrier jacket on this insulation. All domestic water piping shall be insulated in accordance with ASHRAE 90.1 and the energy code. All cold water and storm water piping exposed in plenums or above ceilings shall be insulated to prevent condensation.

13.6 THERMOMETERS AND GAUGES

Major mechanical equipment shall be provided with instrumentation that includes ISA data sheets and permanent test ports to verify critical parameters, such as capacity, pressures, temperatures, and flow rates. Following are the general instrumentation requirements: thermometers and pressure gauges are required on the suction and discharge of all pumps, chillers, boilers, heat exchangers, cooling coils, heating coils, and cooling towers. To avoid pressure gauge tolerance errors, a single pressure gauge may be installed, with a valve to sense both supply and return conditions. For coils with less than 10 GPM flows, provide permanent provisions for use of portable instruments to check temperatures and pressures. Duct static pressure gauge assemblies shall be provided for the central air-handling unit air supply fan discharge, for branch take-offs of vertical supply risers, and at all duct locations at which static pressure readings are being monitored to control the operation of a VAV system. Differential static pressure gauge assemblies shall be placed across filters in air-handling units and to measure building pressure relative to the outdoors. A temperature gauge is required at the outside air intake of each air-handling unit.

- Airflow Measuring Devices

  Airflow measuring grids are required for all central air-handling units. Measuring grids shall be provided at the outside air supply duct, supply air duct, return air duct, main distribution ducts to branch mains by floor or major zone, and outside air duct by accurate "DP" sensor or VFD-controlled injection fan. Airflow measuring grids must be sized to give accurate readings at minimum flow.

- Water Flow Measuring Devices

  Water flow or energy measuring devices shall be required for each chilled water refrigeration machine, hot water boiler, pump, and connections to district energy plants. Individual water flow or energy measuring devices shall be provided for chilled water lines serving computer rooms and chilled water and hot water lines to outleased spaces. Flow measuring devices shall be capable of communicating with the central HVAC building control system. Water flow and airflow measuring devices shall confirm or validate the energy code and ASHRAE 90.1 requirements.

- Testing Stations

  Provide a permanent testing station for airflow and water flow, with connections designed so temporary testing equipment can be installed and removed without shutting down the system.

AHU Component Items	Minimum Requirements
Prefilters	ASHRAE 52.2 -1999, Rigid Filters, 25-30% Rated > MERV 8, low pressure drop,: rated at 500 FPM: 0.08 inch W.C. clean, 1.0 inch W.C. dirty, >150 grams minimum dirt holding capacity
Outside Air Make-Up Dampers	Low-Leakage Control Dampers
PreHeat Coils (Optional TBD)	Copper Tube/Copper Fins; > 0.049"/.010" >6 fins/inch
Preheat Coil Drain Pan (Optional TBD)	Stainless Steel 304, Double Sloped - No Standing Water Design , >1/4"/FT Minimum slope, 16 gauge construction or approved equal
Steam Humidifier section (Optional TBD)	Stainless Steel 304 Grid Type (Dri-Steem, Ultrasorb or approved equal)
Supply and or Return Fan Systems	TBD by Engineer
Supply Fan Type	Aluminum Airfoil Type - Direct Drive, Continuous Welded Scroll Section, No bolts or screws protruding into the air stream
Fan Wheel Protection	Fan Wheel Enclosure and Fenced Inlet and Outlet, Cal OSHA Title 8, General Industrial Safety Orders, Subchapter 7, Group 6, Article 41
Fan Isolation (Vertical/Horizontal)	>2" Spring height with seismic rated captive housing
Cooling Coil Bypass Section with Low Leakage Damper Assembly	Low Leakage Dampers with shaft seals and 5 year warrantee motorized damper motor
Cooling Coils (10 fins maximum)	Copper Tube/Copper Fins:> 0.030/0.006 inches (Heatcraft, Precision of approved equal)
Cooling Coil Fins	0.006", Maximum of 10 fins/inch
Coil Casing	Stainless Steel 304 Construction
Coil Access	Field cleanable and side access removable without cutting and welding
Cooling Coil Drain Pan	Stainless Steel 304, 18 Gauge Construction, Double Sloped - No Standing Water Design, >1/4"/ft Minimum Slope, Pan extends at > 1" downstream and >1" upstream of the coil face sections or approved equal
Prefilter Frames	Front or side loading type: Galvanized Steel construction, incorporating close cell gasket edge with permanently attached 316 Stainless Steel, hinged or locking clips that interlocking with filter header, < 5% bypass leakage at 2" of static pressure
Post Filter Frames	Front Loading Type: Powder Coated Finish construction, Aluminum construction, or 316 Stainless Steel construction, incorporating knife edge Tongue and Groove mating system with permanently attached Powder Coated Finish Aluminum or 316 Stainless Steel, hinged clips, that interlocking with filter header, < 1.0% bypass leakage at 5" of static pressure
PreFilter Media Gaskets	Closed Celled Neoprene or EPDM Gasket, Bonded to filter track header
Post Filter Media Gaskets	Closed Celled Neoprene or EPDM Gasket, Bonded to filter media assembly or filter track header
AHU Casing: Double Wall Construction, Internal Wall Insulation, Solid Smooth Interior, Wipe Down and Cleanable Surfaces	Aluminum or Galvanized Steel, Manufacturer shall provide calculations certifying the Internal insulation meets or exceeds a 0.12 U factor (BTU/HR/FT^2/F°).
AHU Door Access	Lockable doors
AHU Door Gaskets	Closed Cell Neoprene or Interlocking EPDM gaskets embedded along the entire door assembly
AHU Flooring (1/8" Minimum thickness) Flooring: The design shall prevent floor oil canning with 250 pound - single point load over 1 square foot area	Aluminum with Aluminum Casing or Galvanized Steel with Galvanized Steel Casing

Table 13.1 AHU Matrix (Airflow Ranges: 2,500 to 9,999 CFM)

AHU Component Items	Minimum Requirements
AHU Interior Lighting	Interior Light Fixture, NEMA 3R housing with exterior mounted control switch
Supply Fan Motors (TEFC)(1200- 1800 RPM)	Label for Inverter Duty, High Efficiency, TEFC < 2 HP , Premium High Efficiency, TEFC > 3 HP with sealed grease bearings
Fan Access for > 20 HP Motors	Overhead Support Beam to allow for the removal motor and fan assemblies
AHU Door Access	Each Section - Double Gasket Closed Cell Neoprene
AHU Under Floor Insulation	Equal to U-factor of walls
Final Filtration Requirements	ASHRAE 52.2 -1999, High Capacity, Low Pressure Drop, Pleated, Pocket or Rigid bag filters, 70-75% Rated > MERV 12, rated at 500 FPM: 0.20 inch W.C. clean, 1.0 inch W.C. dirty, >1070 grams minimum dirt holding capacity
Indoor Air Quality/ Threat Reduction Modules (TBD)	Germicidal, High Performance, Low Pressure Air Purification System, High Voltage Charged, Grid Modules, > MERV 15 rated
AHU Minimum Frame Rail Height	>3" Height - Vertical flange to flange edges
AHU Frame Deflection	>1/240 of overall length
Cooling Coil Velocity (Design)	<475 FPM
Filter Face Velocity (Design)	<475 FPM
AHU Casing Leakage	<3% of total design air flow
Smoke Detector	UL/CSA Listed (Low Velocity Type 200 - 650 FPM)
AHU Test Ports	1/2" I.D. port with threaded cap for each access door
AHU VSD Inverter	Allen Bradley Powerflex or ABB ACH 550 with integral bypass switch assembly or approved equal
AHU Drain Pan Void Insulation	Expanded Foam type or approved equal
AHU Under Floor Insulation	Compressed Fiber or Expanded Foam type or approved equal
AHU Bottom Plate	TBD by Engineer
Seismic Design (California)	Zone TBD , C-Factor > TBD
AHU Airfoil Dampers	Low Leakage type with shaft seals
AHU Coil Piping	Gasketed Casing Penetrations with I.D. labels
AHU Cooling Drain Pan Piping	Piped and sloped to exterior for connection
AHU Coil Section Drain Piping	Floor Drain capped and pipe and slope to exterior with thread cap
AHU Sound Criteria (at 1 Meter)	<78 DBA ±3
Electrical Services	TBD, 3 Phase & 120 volts, 1 Phase
Electrical Conduits	EMT or PVC
Electrical Safety	Manual Disconnect and Emergency Stop Button per NEC
Electrical Controls	Install all designated interconnection color coated / numbered wiring between electrical components for testing and factory commissioning
Factory Acceptance Testing and Pre-Commissioning Documentation Reports	♦ 125% of Design Static Pressure Testing of Unit Casing and Water Leak Test ♦ Design Airflow Leak Test @ <3% percent and Sound Test ♦ 8 hour VFD Ramp Test, 0.33 Mil P-P Vibration Test
Warrantee	12 months from date of shipment from factory: 8 months from completion on site acceptance testing
Factory Cleaning & Packaging for Shipping	Surface wiipe down of interior, Vacuum clean interior, Provide protection of openings, Exterior Shrink Wrap for Shipping, Dedicated Trucking to the Jobsite

Table 13.1 AHU Matrix (Airflow Ranges: 2,500 to 9,999 CFM) (*continued)*

AHU Component Items	Minimum Requirements
Prefilters	ASHRAE 52.2 -1999, Rigid Filters, 25-30% Rated > MERV 8, low pressure drop,: rated at 500 FPM: 0.08 inch W.C. clean, 1.0 inch W.C. dirty, >150 grams minimum dirt holding capacity
Outside Air Make-Up Dampers	Low-Leakage, Thermal Break, Insulated Control Dampers
PreHeat Coils (Optional TBD)	Copper Tube/Copper Fins; > 0.049"/.010" >6 fins/inch
Preheat Coil Drain Pan (Optional TBD)	Stainless Steel 304, Double Sloped - No Standing Water Design , >1/4"/FT Minimum slope, 18 gauge construction or approved equal
Steam Humidifier section (Optional TBD)	Stainless Steel 304 Grid Type (Dri-Steem, Ultrasorb or approved equal)
Supply and or Return Fan Systems	TBD by Engineer
Supply Fan Type	New York or Twin City or approved equal : Aluminum Airfoil Type - Direct Drive, Continuous Welded Scroll Section, No bolts or screws protruding into the air stream
Fan Wheel Protection	Fan Wheel Enclosure and Fenced Inlet and Outlet, Cal OSHA Title 8, General Industrial Safety Orders, Subchapter 7, Group 6, Article 41
Fan Isolation (Vertical/Horizontal)	>2" Spring height with seismic rated captive housing
Cooling Coil Bypass Section with Low Leakage Damper Assembly	Low Leakage Dampers with shaft seals and 5 year warrantee motorized damper motor
Cooling Coils (10 fins maximum)	Copper Tube/Copper Fins:> 0.035/0.008 inches (Heatcraft, Precision or approved equal)
Cooling Coil Fins	0.008", Maximum of 10 fins/inch
Coil Casing	Stainless Steel 304 Construction
Coil Access	Field cleanable and side access removable without cutting and welding
Cooling Coil Drain Pan	Stainless Steel 304, 14 Gauge Construction, Double Sloped - No Standing Water Design, >1/4"/ft Minimum Slope, Pan extends at > 2" downstream and >1" upstream of the coil face sections
Prefilter Frames	Front or side loading type: Galvanized Steel construction, incorporating close cell gasket edge with permanently attached 316 Stainless Steel, hinged or locking clips that interlocking with filter header, < 3% bypass leakage at 2" of static pressure
Post Filter Frames	Front Loading Type: Powder Coated Finish construction, Aluminum construction, or 316 Stainless Steel construction, incorporating knife edge Tongue and Groove mating system with permanently attached Powder Coated Finish Aluminum or 316 Stainless Steel, hinged clips, that interlocking with filter header, < 1.0% bypass leakage at 5" of static pressure
PreFilter Media Gaskets	Closed Celled Neoprene or EPDM Gasket, Bonded to filter track header
Post Filter Media Gaskets	Closed Celled Neoprene or EPDM Gasket, Bonded to filter media assembly or filter track header
AHU Casing: Double Wall Construction, Internal Wall Insulation, Solid Smooth Interior, Wipe Down and Cleanable Surfaces	Aluminum or Galvanized Steel, Manufacturer shall provide calculations certifying the Internal insulation meets or exceeds a 0.08 U factor (BTU/HR/FT^2/F°).
AHU Door Access	Lockable doors
AHU Door Gaskets	Closed Cell Neoprene or Interlocking EPDM gaskets embedded along the entire door assembly
AHU Flooring (1/8" Minimum thickness) Flooring: The design shall prevent floor oil canning with 250 pound - single point load over 1 square foot area	Aluminum with Aluminum Casing or Galvanized Steel with Galvanized Steel Casing
AHU Interior Lighting	Interior Light Fixture, NEMA 3R housing with exterior mounted control switch

Table 13.2 AHU Matrix (Airflow Ranges 10,000 to 60,000 CFM)

AHU Component Items	Minimum Requirements
Supply Fan Motors (TEFC)(1200- 1800 RPM)	Label for Inverter Duty, High Efficiency, TEFC < 2 HP , Premium High Efficiency, TEFC > 3 HP with sealed grease bearings
Fan Access for > 20 HP Motors	Overhead Support Beam to allow for the removal motor and fan assemblies
AHU Door Access	Each Section - Double Gasket Closed Cell Neoprene
AHU Under Floor Insulation	Equal to U-factor of walls
Final Filtration Requirements	ASHRAE 52.2 -1999, High Capacity, Low Pressure Drop, Pleated, Pocket or Rigid bag filters, >70-75% Rated > MERV 12, low pressure drop, rated at 500 FPM: 0.20 inch W.C. clean, 1.0 inch W.C. dirty, >1070 grams minimum dirt holding capacity
Indoor Air Quality/ Threat Reduction Modules (TBD)	Germicidal, High Performance, Low Pressure Air Purification System, High Voltage Charged, Grid Modules, > MERV 15 rated
AHU Minimum Frame Rail Height	>4" Height - Vertical flange to flange edges
AHU Frame Deflection	>1/240 of overall length
Cooling Coil Velocity (Design)	<475 FPM
Filter Face Velocity (Design)	<475 FPM
AHU Casing Leakage	<1.5% of total design air flow
Smoke Detector	UL/CSA Listed (Low Velocity Type 200 - 650 FPM)
AHU Test Ports	1/2" I.D. port with threaded cap for each access door
AHU VSD Inverter	Allen Bradley Powerflex or ABB ACH 550 with integral bypass switch assembly or approved equal
AHU Drain Pan Void Insulation	Expanded Foam type or approved equal
AHU Under Floor Insulation	Compressed Fiber or Expanded Foam type or approved equal
AHU Bottom Plate	TBD by Engineer
Seismic Design (California)	Zone TBD , C-Factor > TBD
AHU Airfoil Dampers	Low Leakage type with shaft seals
AHU Coil Piping	Gasketed Casing Penetrations with I.D. labels
AHU Cooling Drain Pan Piping	Piped and sloped to exterior for connection
AHU Coil Section Drain Piping	Floor Drain capped and pipe and slope to exterior with thread cap
AHU Sound Criteria (at 1 Meter)	<75 DBA ±3
Electrical Services	TBD, 3 Phase & 120 volts, 1 Phase
Electrical Conduits	EMT or PVC
Electrical Safety	Manual Disconnect and Emergency Stop Button per NEC
Electrical Controls	Install all designated interconnection color coated / numbered wiring between electrical components for testing and factory commissioning
Factory Acceptance Testing and Pre-Commissioning Documentation Reports	♦ 125% of Design Static Pressure Testing of Unit Casing and Water Leak Test ♦ Design Airflow Leak Test @ 1.5% percent and Sound Test ♦ 8 hour VFD Ramp Test, 0.33 Mil P-P Vibration Test
Warrantee	18 months from date of shipment from factory: 12 months from startup: 8 months from completion on site acceptance testing
Factory Cleaning & Packaging for Shipping	Surface wiipe down of interior, Vacuum clean interior, Provide protection of openings, Exterior Shrink Wrap for Shipping, Dedicated Trucking to the Jobsite

Table 13.2 AHU Matrix (Airflow Ranges 10,000 to 60,000 CFM) (*continued)*

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AUTOMATIC CONTROL SYSTEMS CRITERIA

Courtroom

Riverside Family Court
Riverside, CA
Ratcliff Architects

Date of Issue: March 1, 2010

California Trial Court Facilities Standards, 2006 edition

This amendment is a change to the 2006 edition of the California Trial Court Facilities Standards. This amendment deletes or replaces existing language in the standards. This amendment is effective on the date of issue[1].

Design and Construction or Facilities Modifications projects which have reached design development completion (at effective date of this amendment) may be exempted from compliance with this amendment subject to specific approval by the Office of Court Construction and Management.

Chapter 14 AUTOMATIC CONTROL SYSTEMS CRITERIA – Amendment 1

On pages 14-3, under section "14.1 OBJECTIVES", in the second paragraph, delete the following as shown below:

The control system shall comply with ~~ASHRAE/ ANSI/ISO Standard 135n: Native BACnet only or~~ Lonmark by Echelon and ANSI/EIA/CEA -709.1 standards, including addenda to these standards.

On page 14-3, under section "14.1 OBJECTIVES", insert the following at the end of the section:

The Building Management System (BMS) control system shall consist of Direct Digital Controls that are capable of communicating over a network.

The BMS shall be based on an "Open Systems" non-proprietary configuration version of Echelon "LON" architecture bound by a Microsoft Visio based Echelon Turbo LONWORKS binding tool. The BMS shall consist of following:

1. LonMark Certified control components to allow total facility control to manage, monitor, trend, schedule, down and up load data to and from building MEP systems network devices and the ability to communicate using the AOC Wide Area Network (WAN) or the Internet.

2. Rack mounted servers with mirrored drives, accessible from a remote workstation that includes a monitor with capabilities to manage and monitor networked building microprocessor based controlled subsystems.

[1] This amendment is implemented under Rule of Court, Rule10.180 (b) - "*Non substantive changes to the standards may be made by the Administrative Office of the Courts:"*

3. Capability to communicate using a Loytec LON to Intranet Protocol middleware translator to a Linksys/Cisco 4-Port, Gigabit, Security Router with Virtual Private Network capabilities.

4. Graphic User Interfaces (GUI) display shall includes:

   - Equipment pictorial diagrams of network component devices
   - Interactive color coordinate graphical status symbols
   - Component level status notifications on demand
   - Execution of password protected global and component level commands
   - Multiple leveled alarm notifications as defined by the user
   - Network component devices: HVAC, Plumbing, Heating, Utilities Generation, Electrical, Lighting, Day Lighting Harvesting, Alternative Energy Generation, Waste Processing etc.
   - Network component device fault detection and diagnosis system data/ alarm collection
   - Energy / utility consumption data collection
   - Environmental data collection
   - Optional Wireless communication of disparate and non disparate systems
   - Optional Seismic response data collection

End of Chapter 14– Amendment # 1

This section identifies the criteria for systems that control heating, ventilating, air conditioning, and refrigeration (HVAC).

14.1 OBJECTIVES

The following criteria shall be used in designing and selecting the HVAC building control system. Such a system is not required for every project; before a decision is made, the size and complexity of the HVAC system, number of pieces of equipment, expected energy savings, and availability of trained staff shall all be considered. The control system shall be designed to automatically respond to local climatic conditions and heat recovery opportunities by providing cost-effective energy conservation measures while ensuring set point control. A new control system shall consist of direct digital controls (DDC) and be an open system, protocol neutral, and nonproprietary for interoperability (meaning the ability of disparate control system devices to work together through the digital exchange of relevant information). It will allow third-party protocol acceptance and processing of inputs from devices supplied by different vendors.

The control system shall comply with ASHRAE/ANSI/ISO Standard 135n: Native BACnet only or Lonmark by Echelon and ANSI/EIA/CEA -709.1 standards, including addenda to these standards. Other applicable codes are CCR, Title 24/NEC, UL916, and FCC part 15, subpart J, class A.

The control system shall consist of a series of direct digital microprocessor controllers and have a central processing station, all interconnected by a high-speed local area network (LAN). It shall have a graphical user interface (GUI) that provides trending, scheduling, downloading instructions to field devices, real-time "live" colored graphic programs, parameter changes of properties, set point adjustments, alarm notification, alarm event information, confirmation of operators, data collection, data storage, and execution of global commands.

The control system design shall include a cabling network that complies with EIA/TIA -862: Building Automation Systems Cabling Standards for Commercial Buildings.

14.2 LEVEL OF INTEGRATION

The building HVAC control system shall not control the fire alarm systems, security systems, lighting systems, or elevator systems. These systems shall have independent control panels and network interfaces. The HVAC system shall, however, be able to monitor the status of these systems in order to prompt emergency operating modes of the HVAC building system.

The control system device protocols and software will provide the following functions:

- Data collection
- Data archiving
- Data trending
- Calendar scheduling
- Temperature-based reset scheduling
- Programming of system-functional set points
- Adjustment of set point range
- Automatic and manual control of addressable field devices
- Access to building systems flow diagrams, with navigation using GUI

- Energy management monitoring and curtailment
- Password reset
- Alarm level notification

The control system shall be designed to use the available energy efficiently and to assist in troubleshooting the malfunction conditions of numerous addressable and nonaddressable devices.

The control system design shall allow information retrieval at high speed so that any data can be retrieved within 3 seconds and trending can be received within 30 seconds of the browser click at a remote station. The software will allow a critical alarm to be directed to a predetermined destination.

The control system shall be able to monitor building occupancy, individual area occupancy, and time-of-day cycling of equipment. The ability to make unauthorized adjustments shall not be allowed at addressable local devices.

The programming of the control system shall be performed from the facility operation center or via a Web browser. Both require a password for access, and the latter shall have firewall protection.

All nonproprietary energy management software and firmware shall be resident in field hardware and shall not be dependent on the operator's central control system terminal. Therefore, if the central control system fails, local control devices will continue to operate at the last control set point.

The system must include the ability to log data created by user-selectable features. In new facilities and major renovations, the HVAC building control system shall have at least 25 percent spare memory capacity for future expansion.

The use of modular design of the control system for maximum flexibility is encouraged.

The use of nonproprietary, addressable field devices is preferred.

All new systems shall be native protocol neutral, and shall use no gateways for communication with controllers, except for the existing controllers if required.

The design shall specify quality actuators that include a manufacturer's warranty for five years for control applications on valves and dampers.

14.3 ENERGY CONSERVATION DESIGN

The HVAC control algorithms shall include optimized start/stop for chillers, boilers, air-handling units, and all associated equipment and feed-forward controls, based on weather prediction programs as defined by the energy code.

The optimal start/stop programs will calculate the earliest time that systems can be shut down before the end of occupancy hours and the latest time that systems can start up in the morning, to minimize equipment run time without letting space conditions exceed the comfort set points.

The weather prediction programs, based on stored historic weather data in the HVAC building control system processor memory, shall use this information to anticipate peaks or partial load conditions.

The system economizer programs, based on the site's or region's environmental conditions, shall operate the economizer cycles and heat recovery equipment in an efficient manner, in accordance with the energy code.

The HVAC building control system shall be user programmable to monitor and control pumps, fans, and compressors in either operating or standby modes on a scheduled basis.

Energy Measurement Instrumentation

The HVAC building control system shall have the capability to perform automatic measurement of energy consumption and to monitor performance.

Energy Management Data Collection Requirements

- Electrical values such as V, A, kW, KVAR, KVA, PF, kWh, KVARH, frequency, and percent THD shall be monitored.
- Mechanical values such as CHW flow and pressure, HW flow and pressure, equipment status, and equipment capacity shall be monitored, measured, and stored.

- The collection of data shall be maintained for trending for at least two years locally on the central HVAC building control system.
- Energy management measurements shall have the capability to totalize and mark trends in both instantaneous and time-based numbers for chillers, boilers, air-handling units, exhaust fans, and pumps.
- Energy monitoring data shall be automatically converted to a user-defined standard database, transmitted to a designated interface PC, and presented in a color spreadsheet format on demand.

14.4 CONTROL SYSTEM DESIGN FEATURES

- DDC drill down to zone level
- Intelligence at zone level "close loop" controls
- Cascading close loop for sequencing to minimize heating and cooling
- Cascading control loop (valve control for heating)
- VAV zone cascading control (no overlapping of heating and cooling)
- AHU controls (cascading set point reset per ASHRAE Standard 55 where applicable)

Demand Base Reset Control

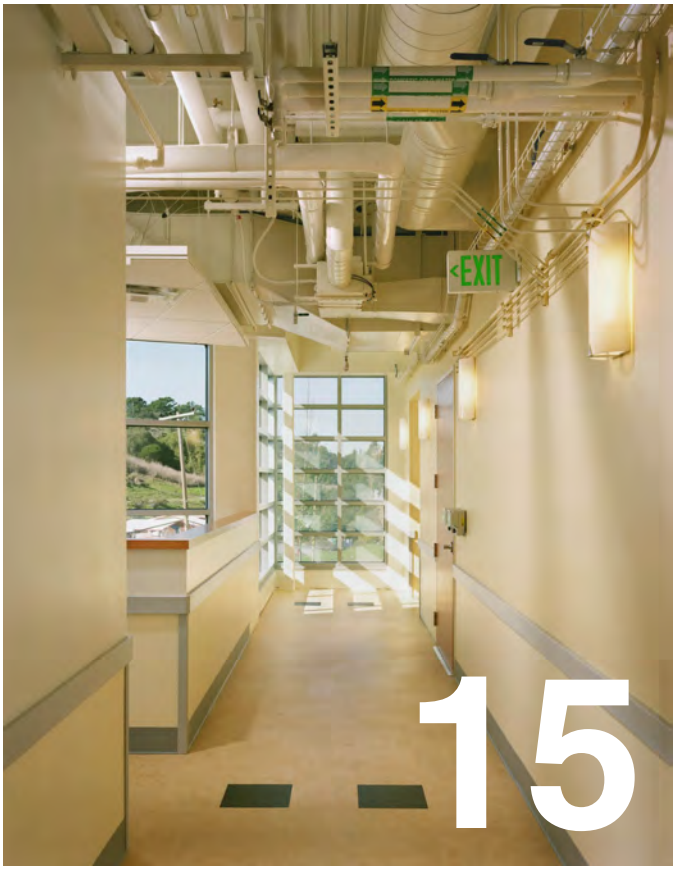
- Supply temperature
- Supply pressure
- Building pressure
- Minimum outside air supply

Outside Air Control Methods

- Injection fan, VFD controlled
- Accurate "DP" measurement across outside air damper assembly

CO_2 Demand Control

- Demands control ventilation for spaces of less than 40 square feet per person in single zones or greater than 300 square feet per zone (assemblies and conference spaces, and the like)



15

ELECTRICAL CRITERIA

Service Corridor

Forensics Laboratory
San Mateo County, CA
HOK Architects

Date of Issue: March 1, 2010

California Trial Court Facilities Standards, 2006 edition

This amendment is a change to the 2006 edition of the California Trial Court Facilities Standards. This amendment deletes or replaces existing language in the standards. This amendment is effective on the date of issue[1].

Design and Construction or Facilities Modifications projects which have reached design development completion (at effective date of this amendment) may be exempted from compliance with this amendment subject to specific approval by the Office of Court Construction and Management.

Chapter 15 ELECTRICAL CRITERIA - Amendment 1

On page 15-6 under Section 15.3 "Emergency and Standby Power System", insert the following paragraphs after the first paragraph of this section:

Electrical generators to supply emergency power are to be provided only where it can be demonstrated that the electrical loads from critical systems that shall have emergency power (listed in this section) are best accommodated by a generator set; or where the local area has record of a large number and long period of power interruptions.

Except for special situations (mentioned in first paragraph of this section) the duration of emergency power shall be determined by the Building Code or the time necessary to prudently shut down critical systems and to safely evacuate and close the building, whichever time is greater.

End of Chapter 15- Amendment #1

[1] This amendment is implemented under Rule of Court, Rule10.180 (b) - "*Non substantive changes to the standards may be made by the Administrative Office of the Courts:"*

This section defines the general and technical criteria for the building normal power system and the emergency and standby power systems. It will encompass recommendations and minimum acceptable performance criteria for the normal power distribution system and the emergency and standby power systems.

15.1 OBJECTIVES

Designers shall use these criteria to develop building electrical power systems and standby electrical power systems, including emergency generator and uninterruptible power system (UPS) design. The electrical system design shall provide a safe installation and operation of the electrical power supply and distribution through standardization of design, installation, and testing requirements, based upon sound engineering principles, applicable building codes, and field experience.

These criteria set the minimum acceptable requirements for design and installation of electrical power systems. While new technologies or alternate arrangements may be used, they shall not lower the level of safety prescribed by these criteria and the applicable state building codes.

Designers shall use the criteria to develop electrical power systems for new buildings, retrofit of existing buildings, and interior renovation of existing buildings. When the criteria are applied to interior renovations of existing structures, the designer shall provide systems that meet the design parameters of the existing power system and the requirements of these criteria, whichever result in a better system and also satisfy the applicable building codes.

15.2 ELECTRICAL CRITERIA

Basic Requirements

Spare capacity: All electrical panels, including the main building electrical service and emergency and standby power systems, shall be adequately sized to power all the building system needs and leaving not less than 15 percent of the breaker positions spare for future growth. The spare positions shall be complete with full-length copper bus and hardware for future breaker installation. The designer shall demonstrate during the electrical system design that the required spare capacity has been preserved. The spare capacity shall be provided at each of the following system elements for future growth:

- Main building switchgear
- Distribution bus risers
- Distribution feeders and breakers
- Space in electrical room layout for future addition of switchgear equipment and motor control center (MCC) sections
- Distribution and lighting panels

The distribution transformers feeding the nonlinear loads shall be K-rated (using a K-factor value, a value used to determine how much harmonic current a transformer can handle without exceeding its maximum temperature rise level) to compensate for harmonics.

Full-size neutral conductors shall be utilized throughout the project for three-phase, four-wire service, power, and lighting feeders. The neutral feeder on the secondary of Delta-Wye transformers shall be double size.

"True" RMS meters shall be used wherever meters are specified on switchgear and distribution boards.

In office areas, the ceiling space shall be used for the distribution of power, data, and communication systems. The distribution drops shall be contained in columns and walls to offices and workstation spines. Power, voice, and data poles may be used on a case-by-case basis if approved by AOC.

The electrical equipment and systems shall be specified to include startup, testing, and adjusting per the applicable codes, recognized industry standards, and equipment system manufacturer requirements.

Switchboards, distribution panels, transformers, disconnects, and branch circuit panelboards shall be of commercial grade and manufactured by one manufacturer throughout the building. All panelboards shall include door-in-door trim. All outdoor equipment enclosures shall be NEMA-3R or 4X depending on the application.

All electrical motors above ½ HP shall be 460 volts, 3-phase. This requirement shall be coordinated across the project with other disciplines.

Wiring devices: All power receptacles and switches for general purpose circuits shall be NEMA specification grade and manufactured by one manufacturer and rated for specific environment and application. Outlets served from an emergency power system shall be red. All indoor floor-mounted equipment, MCC, and panels shall be installed on minimum 4" high concrete housekeeping pads. At outdoor locations, a minimum of 6" housekeeping pads shall be provided.

The criteria for the following systems shall be specified in accordance with the following chapters of the Facilities Standards:

- Chapter 4 (Courthouse Security)
- Chapter 13 (Mechanical Criteria)
- Chapter 16 (Lighting Criteria)
- Chapter 17 (Telecommunications and Audiovisual Criteria)
- Chapter 19 (Fire Protection Criteria)

For areas where high-speed computer and digital equipment are used in the building, specify the following requirements:

- The neutral and ground conductors shall not be shared between phases A, B, and C. A separate neutral conductor and ground conductor shall be specified for each phase, feeding computer and electronic office equipment within buildings.
- For linear electrical power, specify phase, neutral, and ground conductors to be one size larger than what is required by NEC.
- For three-phase applications, specify double the size of the neutral conductor.
- The design shall include equal distribution of load on each phase.

Conductors

The following type of conductors shall be specified based on each one's application.

- All wire, cable, and equipment shall be new.
- All wire #8 and larger shall be stranded copper. Wire used in fire alarms shall be solid copper per NEC.
- All wire and cable for secondary power distribution shall be 600 volt insulated, type THHN, or THWN for #8 and smaller. Type THW, THHN and XHHW for #6 and larger and for wet, underground, and exterior locations. Type RHH or THHN 90°C standard used for fixture wire and circuit runs within fixtures.
- All wire #10 and smaller shall be color-coded throughout. The system conductors shall be identified as to phase connections by means of color-impregnated insulation or approved colored marking tape.
- Power and lighting branch circuits shall be specified not less than #12 wire gauge (AWG).
- Signal and control circuits shall be specified not less than #14 AWG.
- The cabling for fire alarm, security, telecommunication, and audiovisual systems shall be specified

in accordance with the respective section requirements.

- Specify that the cable ducts for power are not shared with data and communication systems**.**

Conduits

The following shall be specified as a minimum requirement for the conduits:

- Minimum acceptable conduit size shall be ¾" diameter. Exceptions: Short runs to a single outlet or a single fixture may be ½".
- For indoor locations where subject to physical damage: Rigid steel or intermediate metallic conduit (IMC) with zinc coating inside and out with hot-dipped galvanizing and shall conform to ANSI C80.1 and UL. Couplings and unions shall be electroplated steel, threaded type.
- For interior space in dry locations: Electrical metallic tubing (EMT), cold-rolled steel tubing, with enamel coating inside and zinc coating outside and galvanized steel fittings.
- For electrical service and underground distribution: PVC coated galvanized rigid steel, concrete encased.
- In wet and outdoors locations, specify cadmium plated cast malleable iron liquid-tight fittings with insulated throat.
- Flexible metallic conduits of limited lengths may be used at power terminations to equipment in indoor and dry locations. For outdoor and wet locations, it shall be liquid-tight with plastic jacket extruded over the outer zinc coating.

Quality Assurance

All materials, devices, and equipment shall be commercial grade, new and Underwriters Laboratories (UL) listed.

The electrical system design shall be in conformance with the applicable codes and standards and the requirements of these criteria.

Certain material, equipment, apparatus, or other products may be specified by manufacturer's brand name, type, or catalog number. In such case the designated product shall meet the established standards for quality, style, utility, and performance.

The main switchboard, distribution panels, transformers, disconnects, and branch circuit panelboards shall be manufactured by a recognized manufacturer with minimum 10 years' experience in the manufacture of such equipment and shall be manufactured to commercial grade specifications.

Identification

Electrical system shall be specified to include identification and signage in accordance with ANSI standards. Specify identification at all power service switchboards, power distribution panels, transformers, conduits, branch circuits, pull boxes, outlet covers, and J-boxes using industry-standard materials and methods.

Electrical light fixtures and convenience outlets on emergency power circuits shall be identified with a unique identification system. The identification tags shall be applied on location and be easily identifiable and uniformly applied throughout the building.

Coordination

The electrical work shall be coordinated with the work of all other divisions to interface power and control requirements to equipment, devices, lighting, control systems, and other systems specified under the respective divisions.

Power Distribution System

For new facilities, the power service will be taken from the 277/480V 3 PH 4W distribution system via transformers in a transformer vault or on a pad. The location of the transformer shall be properly coordinated with the local utility company, depending on the project location. The designer shall coordinate with the utility company on proper sizing of the service to ensure there is 15 percent spare capacity available for future growth.

Branch circuit panelboards will be located throughout the facility. 277/480V panels will be fed from breakers in the main switchboard. K13 (harmonics rated) dry-type step-down transformers will be provided, which will in turn feed 120/208V 3 PH 4W distribution type panelboards or via distribution panels. 120/208V branch panelboards located throughout the

facility will be fed from breakers in these distribution panels.

Large air-conditioning and motor loads will be supplied at 480V 3 PH from the new main switchboards and distribution boards.

Lighting fixtures will be connected to 20A1P circuit breakers in 277/480V 3 PH 4W branch circuit panelboards.

Convenience and special power receptacles will be provided as required throughout the facility. Convenience receptacle and miscellaneous loads will be connected to 120/208V 3 PH 4W branch circuit panelboards.

Computer and other sensitive electronic loads will be fed through point-of-use, localized UPS units as required.

Neutral bussing and conductors for all distribution equipment feeding clean power panelboards and branch circuiting will be sized to accommodate harmonic currents generated by electronic power supplies.

A TVSS (Transient Voltage Surge Suppressor) will be provided either at the main switchboard or at distribution boards. The TVSS will comply with UL 1449. TVSS units will also be provided at the clean power 120/208V panelboards throughout the building.

Grounding System

Complete grounding system shall be provided per the National Electric Code (NEC). The electrical system shall be grounded to a common building grounding system, which utilizes grounding to building steel, building cold water pipe, and concrete encased electrode. Grounding to cold water pipes shall only be to continuous metallic main pipe. Where the cold water pipe has insulated joints or plastic pipe connectors, properly sized jumper cables shall be specified to maintain the continuity of the pipe grounding.

The grounding system for the transformer shall be provided per the local utility company criteria. The building emergency generator shall be grounded to provide 200 percent of the nominal capacity required. Telecommunications equipment rooms shall be grounded per the requirement of Chapter 17 (Telecommunications and Audiovisual Criteria). For existing buildings, the grounding shall tie back to the nearest building grounding and to the building steel and building cold water pipes.

15.3 EMERGENCY AND STANDBY POWER SYSTEM

General Requirements

The need for and capacity of the emergency power system shall be carefully evaluated, based on the project size, location, and usage. The fuel storage capacity shall be based on the minimum requirements to provide life safety and egress lighting. In remote project areas with limited accessibility, or if the court building will also serve as an emergency operations center, the generator size and fuel storage capacity may be designed to meet local requirements, based on discussions with the AOC project manager.

Specify engine mounted critical type exhaust muffler and double contained integral type fuel oil day tank with fuel leak detection system.

- The automatic emergency power system shall consist of a 277/480V 3 PH 4W diesel engine generator set, water-cooled radiator type, 1,800 RPM, complete with integral base-mounted day tank. Engine generator set shall be located indoors or on the roof or on the site with weatherproof-sound attenuating enclosure.
- A single electrical operator shall operate the transfer switch, with bypass/isolation in normal and emergency positions.
- Fuel oil storage tank may be above or below grade, with proper filling and monitoring systems. The day tank shall be of the manufacturer's standard size, based on the generator capacity.
- In buildings equipped with emergency power, the following areas in the building shall have emergency lighting on generator power as a minimum:
    - Detention areas, custody areas, and sally-port
    - Exit signs
    - Exit corridors

- Egress lighting for public corridors and stairwells
- Assembly rooms, such as courtrooms
- Communication equipment rooms
- Generator, electrical, mechanical, and elevator equipment rooms
- Security control offices

Systems where an outage of 10 seconds (to transfer from normal to emergency power) could damage essential equipment or impair safety shall be on UPS power connected to generator power. The areas shall include, but are not limited to, the following:

- Security control center, main, and secondary equipment, including cameras and communication systems
- Computer servers
- Telephone switches

The following systems shall have emergency power:

- Air-conditioning units serving the communications equipment rooms, elevator machine rooms, and computer equipment rooms
- Backup ventilation fans serving the aforementioned rooms
- Any alarm and security system, including CCTV and communications system
- Sprinkler system alarming devices and fire alarm systems
- Computer equipment system, via UPS
- Data communications equipment (on a case-by-case basis)
- Fire life safety system
- All parts of electrically operated detention systems, such as gates and lockup doors
- Two elevators: one public, one secure or private (on a case-by-case basis)
- At least one emergency duplex convenience receptacle in electrical, mechanical, telecommunication, audiovisual, and elevator equipment rooms

Uninterruptible Power System (UPS)

UPS shall be small localized and rack mounted units to serve individual racks or equipment. In a larger facility, central UPS may be necessary.

UPS for the data processing equipment shall consist of shielded isolation transformers, rectifier/battery charger, solid-state inverter, static bypass transfer switch, maintenance-free batteries for 15 minutes, and synchronized circuitry.

Specify grounding mat and water detection in the computer room.

UPS system shall include load bank for testing.

The UPS system shall include distribution panels, for a complete hookup to the operating equipment.

Installation Contractor Certification

The electrical system specifications shall require the installing contractor to certify that the work is installed in accordance with the applicable codes and standards. The system shall be tested, adjusted, and fully functional, and all necessary inspections and certificates of occupancy shall be obtained.

Energy Management System Interface

Coordinate with the building Energy Management System (EMS) division work to control, monitor, alarm, and data log the following electrical power information as a minimum:

- Building normal and emergency power consumption and demand
- Emergency generator alarms, including but not limited to engine trouble, low fuel, fuel leak alarm, low voltage, and loss of phase
- Lighting controls, including interior lighting, lighting on emergency power, and exterior lighting

16

LIGHTING CRITERIA

Public Waiting Area

Phoenix Municipal Courthouse
Phoenix AZ
HOK Architects and DMJM Architects

This chapter defines the general and technical criteria for lighting, and encompasses recommendations for best practices, energy efficiency, sustainability, and creating productive work environments that emphasize the dignity and importance of activities conducted in the facility.

16.1 OBJECTIVES

Lighting design in the court facility shall be functional, appropriate for users, energy efficient, and easy to maintain, and shall maximize use of appropriate technology. Daylight in occupied spaces is desirable, but must be carefully controlled to avoid glare, minimize heat gain, and, in some security-sensitive spaces, minimize views into the space from outside the building.

Designers may use a variety of methods to illustrate design concepts, such as computer simulations, calculations, renderings, models, and mockups. Mockups are encouraged when a project has the same or similar spaces repeated throughout the facility, such as courtrooms. Custom light fixtures shall be discouraged, except in architecturally significant spaces where they are deemed necessary to advance the design concept.

16.2 LIGHTING CRITERIA

Refer to Table 16.1 for recommended illuminance levels.

Reflectance Values

Indirect or direct/indirect lighting systems shall be the preferred system. The reflectance of surrounding surfaces greatly impacts the quality of the lighting system and energy efficiency levels. Surrounding surfaces shall comply with criteria noted in Table 16.2.

Lamp Selection

- Interior lighting systems shall be primarily fluorescent, with some metal halide lamps, to maximize energy efficiency and minimize maintenance.
- LED systems may be considered as the technology improves.
- Induction sources may be considered where relamping is difficult because of high ceilings or fixed furniture.
- Minimize the number of lamp types wherever possible, for ease of maintenance.
- Select long-life sources to minimize replacement and landfill contributions.
- Limit incandescent (including tungsten halogen or quartz) lamps to artwork and displays, or for detailed facial recognition in some areas.
- Utilize the most energy-efficient light sources with the lowest mercury content, to maximize energy efficiency and sustainability.
- Within a facility, one type of 4' fluorescent lamp and two types of compact fluorescent (single ended) lamps shall provide most of the building lighting.
- All fluorescent lamps and metal halide lamps under 150 watts will use electronic ballasts. Verify compatibility of selected electronic ballasts with assisted listening systems where programmed. Fluorescent lamps will be tri-phosphor (80+ CRI) and 3500K. Metal halide lamps will be 80+ CRI and 3000K.

Space Description	Recommended Illumination Level (fc) [1]	Other Considerations
Courtrooms		
Judge's Bench	45-55	Additional task lighting may be desirable from ceiling
Clerk	45-55	Additional task lighting may be desirable from ceiling
Spectator Seating	15-25	
Litigant's Table	45-55	Additional task lighting may be desirable from ceiling
Podium	45-55	Additional adjustable task lighting recommended
Witness Chair	30-40	
Offices		
Intensive VDT[2] use	30-40	Additional task lighting may be desirable
Intermittent VDT use	45-55	Additional task lighting may be desirable
Conference Rooms	30-40	
Circulation	15-20	
Public Lobbies	15-20	
Holding Areas	25-35	
Library		
Active Book Stacks	25-35	Vertical illumination to within 30 inches of the floor
Reading Areas	30-40	Task lights in some areas are desirable
Holding Areas	25-35	
Restrooms	10-20	

1. Value ranges are for general illumination unless noted otherwise. Task illumination requirements are higher.
2. Visual Display Terminal (VDT)

Table 16.1 Recommended Illuminance Levels

Room Surface	Recommended Reflectance
Ceilings	Minimum reflectance shall not be below 85%
Walls, systems furniture partitions	Generally, walls should not be below 50% reflective, but occasional accent walls that are darker will be acceptable
Floors	Approximately 20% reflective

Table 16.2 Recommended Reflectance Levels

- For exterior lighting, use white light sources with a high CRI, such as metal halide and induction sources. Where low temperatures are not common, fluorescent lighting shall be considered. High and low pressure sodium and mercury vapor shall not be used.
- For public art or other displays, the type of art and location shall be identified during design development, to ensure adequate, appropriate lighting.
- Design lighting and controls to accommodate video-conferencing where programmed in courtrooms, conference rooms, chambers, or mediation areas.

Fixture Selection

Lighting fixtures shall be selected on the basis of maintaining a 20-year life cycle with the facility. Fixtures shall be evaluated on the basis of effectiveness and long-term life cycle costs, especially characteristics and components that ensure longevity and quality, not only lowest first costs.

Visual Criteria

Fixtures shall be selected and located to minimize direct or reflected glare. When several fixtures are specified as equally acceptable, the specifier shall ensure that they meet equivalent performance standards.

Energy Efficiency Criteria

Efficient light sources can be optimized with fixtures that are designed for specific light sources, further enhancing system efficiency. The most efficient fixtures that provide visual comfort necessary for the activity shall be used.

Maintenance Criteria

Typically, most facility management departments have limited resources, and a maintenance staff with little to no training in relamping methods.

- Access to fixtures for relamping shall be readily apparent.
- Removable shielding devices shall have cables or chains to hold the device to the fixture during relamping.
- Reduce relamping errors by minimizing the number of lamp types within the facility and using lamps with sockets that are unique from each other.
- A color-coded relamping diagram, provided by the design team at the end of construction, will assist the maintenance staff.

16.3 LIGHTING STRATEGIES

The following recommendations address various spaces in and around the facility.

Exterior Lighting

Exterior lighting provides safety and security for those entering and exiting the building outside of daylight hours, and enhances the building's civic presence within the community. As a design element, exterior lighting can highlight the architectural elements and character of the building, while controlling glare.

Exterior lighting shall be compatible with security cameras used on the site. Typically, a high uniformity ratio, of 3:1 or 4:1, shall be used, with well-shielded fixtures. Lighting levels do not need to be high if the light source is of good color quality, uniformity is high, and glare is minimized. Lighting levels shall be determined for each project, based on camera technology and local site requirements.

Exterior lighting shall not contribute to light pollution by throwing light beyond the property, causing glare and unwanted light for neighbors, or up into the sky, contributing to sky glow and obscuring nighttime vistas. USGBC's LEED for New Construction Version 2.2 (Site Credit 8) shall be used as a guideline for developing the exterior lighting plan.

Outdoor lighting shall have photo sensors for control.

Security Lighting

Determine security lighting requirements at entries, screening stations, or wherever programmed, and coordinate with the security equipment specifications. Faces appearing in cameras must be lit.

Courtroom Lighting

Facial feature modeling is very important in the courtroom, except the spectator area.

- Use a combination of direct and indirect lighting.

- Avoid harsh shadows, whether from electric light or daylight.
- Minimize direct and reflected glare.
- Ensure that fixture quality and appearance reflect the dignity of courtroom activities.
- Avoid trendy looks; durable, aesthetic choices are best.

Audiovisual presentations are common in many courtrooms. Projectors and screens are often portable, so lighting must be flexible enough to allow for dimmed ambient light levels, with sufficient light for note taking. For courtrooms with flat screen monitors located in the jury box, ensure that light sources do not obscure the screen image. Provide multiple levels of switched controls or continuous dimming in all courtrooms.

Diffuse daylight, without direct sunlight penetration, is desirable, but will not be possible in all spaces. Where daylight is available, provide shading devices capable of darkening but not blacking out the room. In spaces where a direct view into the courtroom is a security concern, provide daylight by clerestories or skylights. Where daylight is unavailable, supplement general illumination with other wall lighting such as wallwashers, or sconces.

General Open and Private Offices Lighting

Office ceilings shall be suitable for indirect or both direct and indirect lighting. As with other spaces, minimizing glare and maximizing fixture efficiency are key considerations. Where the energy code requires additional controls for daylight zones, dimming is preferred to multilevel switching or stepped dimming.

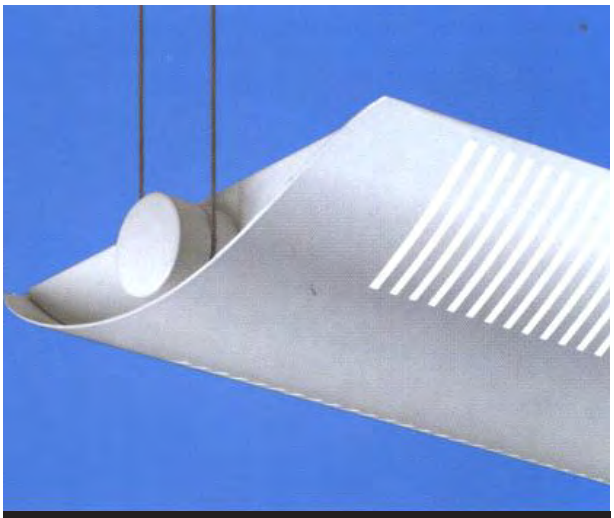


Figure 16.1 Direct/Indirect Lighting Fixture

Judges Chambers Lighting

The judges' chambers have the same general illumination requirements as other offices. The chambers typically have several task areas. Provide supplementary task lighting as follows:

- Bookshelf wall washers sufficient to light the books from the top shelf to the bottom. Requirements are similar to library stacks.
- Overhead task lighting at the conference table.

Lobby Lighting

Lobby shape, size, finishes, and lamp types vary at each facility. Lighting shall complement the materials and architectural features, through the use of downlights, wallwashers, cove lights, and decorative fixtures. Select the most efficient source with good shielding to reduce glare. Public art in the lobby shall be identified during early design phases so that appropriate lighting can be specified.

Circulation Lighting

Circulation areas shall have even, diffuse illumination for wayfinding. Fixture selection and location shall be coordinated with directional signage and artwork. Limited accent lighting may be used to assist in wayfinding.

Holding Area Lighting

Select security rated lighting fixtures for these areas.

Library Lighting

Each row of book stacks shall have illumination from fixtures designed to provide good vertical illumination in a narrow space. Fixtures can be mounted to the ceiling or the stack, depending on the specific project conditions.

Transaction Counter Lighting

A glass or acrylic security barrier typically separates the public from staff in areas where public transactions occur. This barrier can create reflections from light fixtures that reduce visibility and the ability to

view facial expressions. Reflections cannot be eliminated, but they can be minimized by limiting light output to horizontal work surfaces and using fixtures with a low surface brightness. A glass or acrylic barrier that is intersected by an 18" or greater soffit at the ceiling will reduce reflections. Lighting layouts that are identical on both sides of the glazed material will minimize reflections. Indirect or direct/indirect lighting shall be avoided under these conditions, as the bright ceiling will be a source of reflected glare in the glazing.

Restroom Lighting

Lighting at mirrors shall be adequate to see without creating facial shadows. Lighting shall be evenly distributed within the stall areas. Light-color value wall surfaces are preferred over darker values.

Service Area Lighting

Lighting for electrical and mechanical rooms, janitor closets, and related areas shall consist of fluorescent striplights and wireguards.

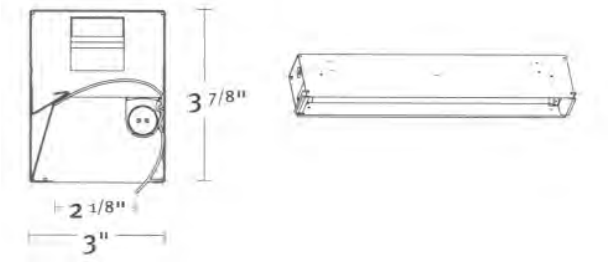


Figure 16.2 Wallwasher Fixture

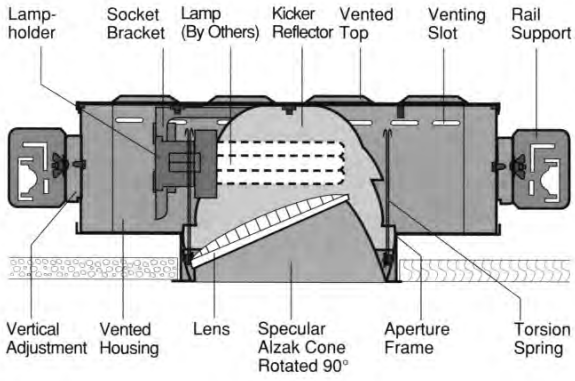


Figure 16.3 Wallwasher Fixture

Below Grade Vehicle Area Lighting

At judges' parking, loading, receiving, and central holding areas, uniform lighting without shadows shall provide visibility and coverage if security cameras are used. Metal halide and induction sources shall be considered for these areas, along with fluorescent, where temperature is not a concern. Fluorescent and induction sources are preferred where on and off cycles are frequent, or where emergency lighting is required.

16.4 LIGHTING CONTROLS

Courtrooms typically have multiple zones of control. Utilize the least complex, most intuitive system that will provide the required functions. In courtrooms with four or fewer zones of control where lighting can be controlled from one primary location with one or two additional three-way controls, standard wallbox switches and dimmers shall be used. In courtrooms with more than four zones of control or multiple control location requirements, or if a room can be subdivided into smaller rooms with movable partitions, provide a preset dimming system. Controls shall be located to be convenient to court staff but not accessible to the public.

16.5 LIGHTING COMMISSIONING

Specifications shall include commissioning services to ensure that the building delivered at the end of

Figure 16.4 Tasklight

construction has fully operational occupancy sensors, photo cells, and dimming systems that provide proper controls. Basic services shall include staff training for systems operation and troubleshooting.

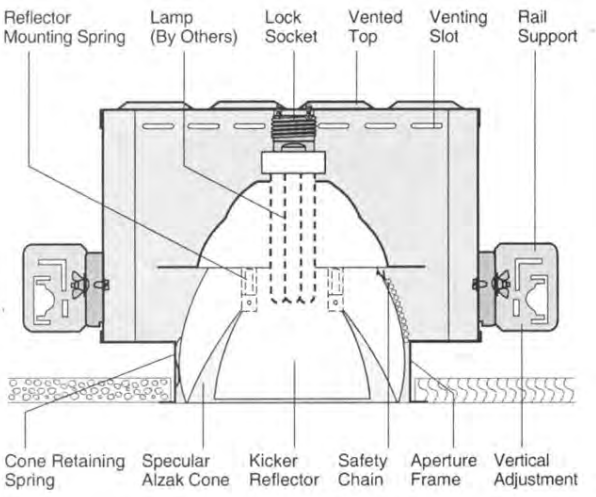


Figure 16.5 Downlight

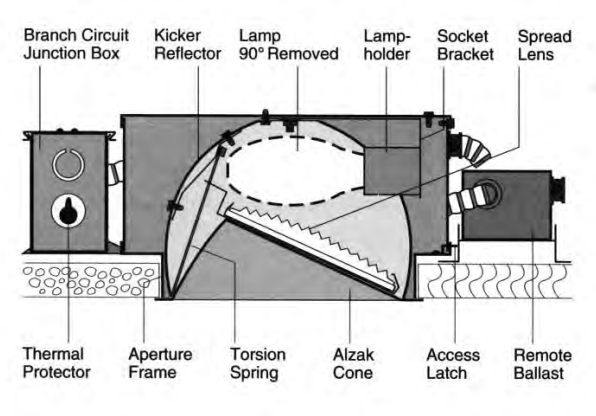


Figure 16.6 Wallwasher

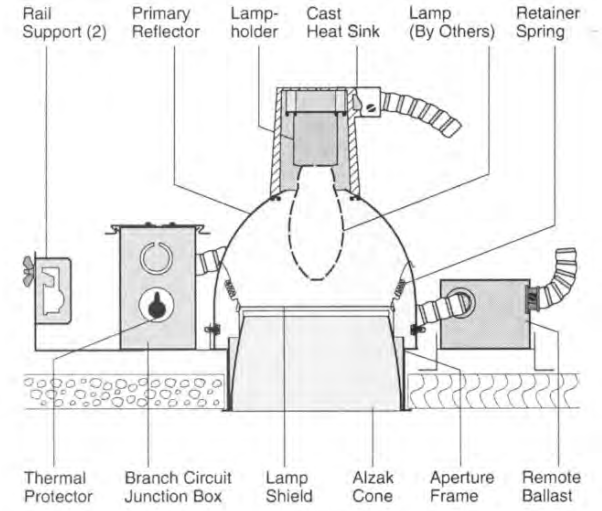


Figure 16.7 Downlight

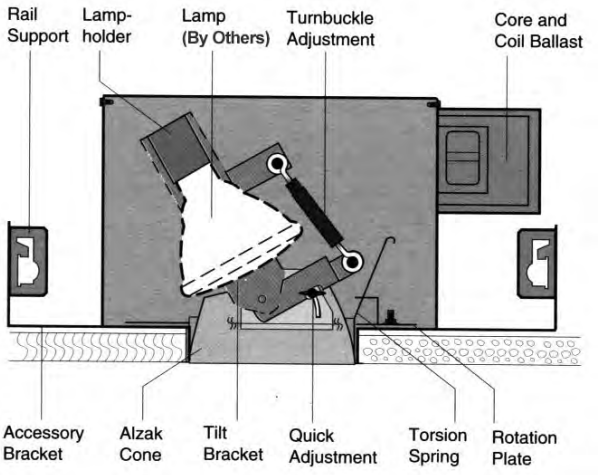


Figure 16.8 Accent Light

Figure 16.9 Library Stack Lighting

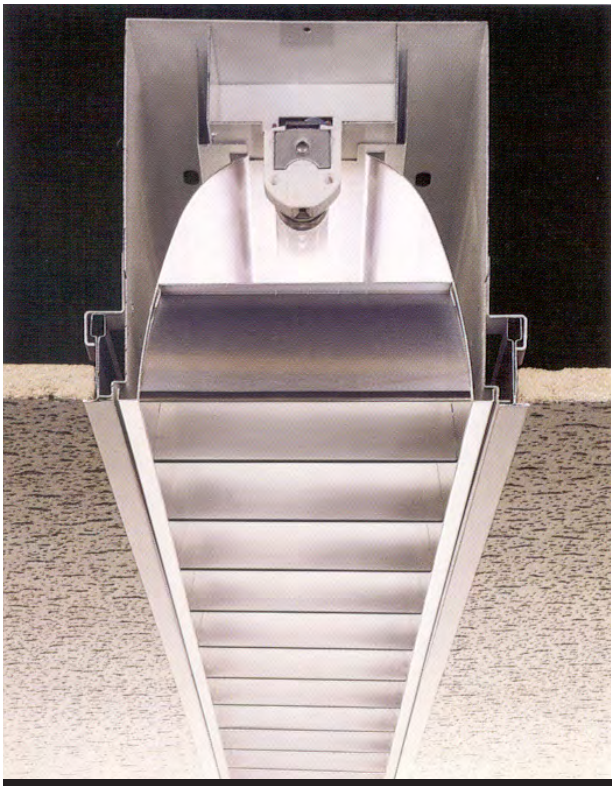


Figure 16.10 Low Brightness Direct Luminaire

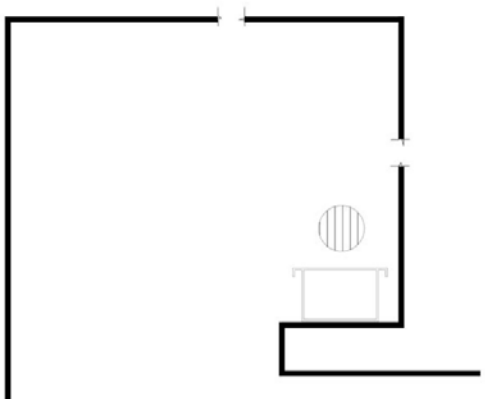


Figure 16.11 Cove For Restrooms

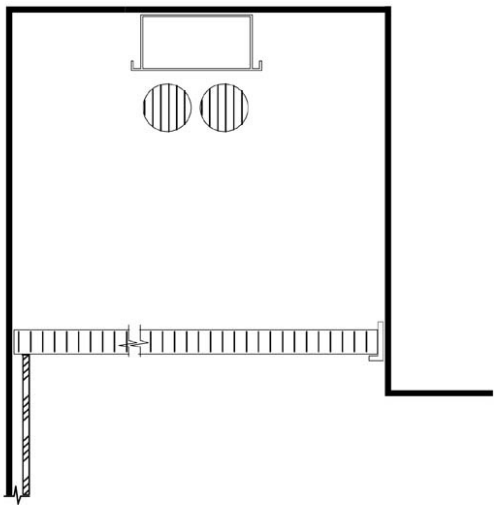


Figure 16.12 Cove For Restrooms

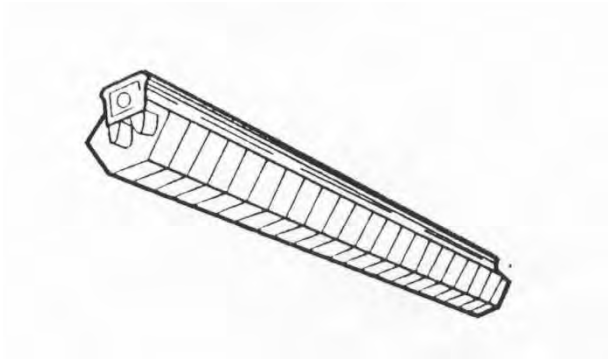


Figure 16.13 Striplight With Wireguard

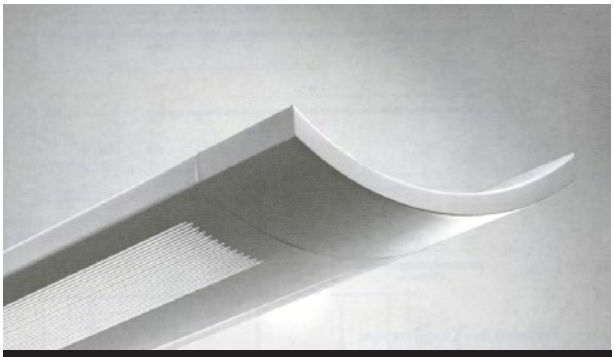


Figure 16.14 Direct/Indirect Lighting Fixture

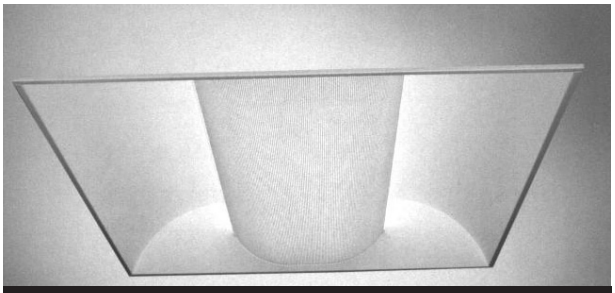


Figure 16.15 Circulation General Illumination

17

TELECOMMUNICATIONS AND AUDIOVISUAL CRITERIA

Electronic Lectern
Location Unknown

Telecommunications and audiovisual systems are essential for daily courthouse operations. A technology program is required with the architectural program; the design consultants, the AOC, and the Court Advisory team shall determine what is to be provided throughout the court building. The technology program shall be predicated on the personnel available or required to support the technology; the extent and complexity of telecommunications and audiovisual technology to be embedded in a new court building will be determined in part by the commitment of the court to provide the required operational support. This chapter describes industry standards, best practices, performance criteria, and requirements for telecommunications and audiovisual technology. Telecommunications and audiovisual system designs shall be coordinated to avoid duplications and conflicts.

17.1 TELECOMMUNICATIONS

Telecommunications systems require dedicated spaces, pathways, cabling, and grounding to support voice and data communications throughout the courthouse.

17.2 TELECOMMUNICATIONS OBJECTIVES

This section describes the technical standards and criteria for court telecommunications systems. Building infrastructure must support installation of the telecommunications system, at initial occupancy and in the future, with spaces, pathways, work areas, cabling, grounding and bonding, administration, and performance verification.

17.3 TELECOMMUNICATIONS CRITERIA

The items identified below clarify and enhance industry standards. These standards shall be the minimums applied during facility design. Where clarifications are identified, provide the systems, components, and facilities described.

Telecommunications Spaces

- Equipment Room

  Minimum size of equipment rooms shall be 150 square feet for buildings up to 20,000 square feet. Add 0.75 square foot to the Equipment Room for each additional 100 square feet over 20,000 square feet. If audiovisual and broadband distribution equipment is to be housed in the Equipment Room, add 25 square feet for each audiovisual equipment rack. Comply with the sizing and location requirements identified in ANSI/TIA/EIA-569.

  Limit access to equipment rooms to those persons performing necessary work in that area with card access. In sensitive or critical equipment rooms, allow a two to four week out-gassing period after completion of construction before the installation of network electronic equipment.

- Telecommunications Room

  Telecommunications rooms shall be 9' wide by 10' long (minimum) for each 10,000 net square feet (NSF) served. Provide an additional telecommunications room if the area exceeds 10,000 NSF. These requirements may be on a case-by-case basis, and will require telecommunications rooms serving more than 10,000 NSF to be increased in size to accommodate the area served. Provide one-half ton of cooling per equipment rack. Each room will have two to three racks.

- Telecommunications Space Pathways, Racks, Frames, and Cabinets

  Provide a design for telecommunications spaces to create a continuous cable runway from all pathways entering the telecommunications space to all equipment racks, frames, and cabinets. Use horizontally and vertically mounted cable runway from the entrance pathways to the equipment racks, frames, and cabinets.

  Provide EIA RS-310-C compliant 19" equipment racks in the telecommunications spaces for mounting of fiber optic cable and copper horizontal cabling. Provide one rack for each 240 horizontal cables terminating at patch panels. Provide for 50 percent growth capacity. Each rack shall be equipped with one vertical cable manager on each side of the rack with a minimum 6" width. Provide horizontal cable management to accommodate the quantity of cables terminated, including patch cables. Minimum clearance from the front and rear face of racks to the nearest obstruction must be or exceed 36". Wall-mounted termination and protection blocks are considered an obstruction. Power distribution at the equipment racks will require a minimum of 12 outlets on power strips.

  Standard cabinets in equipment rooms are 24" wide by 36" deep by 84" high, nominal. Cabinets are four-post style. Place cabinets in aisles with the front of the cabinets facing each other, and the rear of the cabinets facing each other. Do not place the front of a cabinet facing the rear of another cabinet. Minimum clearance from the front and rear face of cabinets to the nearest obstruction must exceed 42". Preferred clearance is 48".

- Horizontal Pathways

  The preferred method for routing cables from the telecommunications room to the outlet is cable tray and conduit.

  Cable trays shall be used to support major runs of cables in accessible locations, such as above acoustical tile ceilings. Use ladder or spine type trays. Place trays at the lowest possible position to provide future accessibility. Cabling will be the most frequently changed component in ceiling areas and must be accessible. Provide 24" clear access to one side of the cable tray, and 12" clear access at the top of the tray. Where the cable tray provides shared service for low voltage cables (security, network, audiovisual, or building management systems cables), provide divided cable trays with each divided section of sufficient size to support the cables to be installed.

  J-hooks may be considered for use where the quantity of cables is less than 50, and where the cables are completely concealed for the entire run. Provide j-hooks on 48" centers, minimum. Use of j-hooks is not preferred and should be avoided if possible.

  Provide dedicated conduit from the cable tray to the telecommunications outlet box to allow for future placement and maintenance of cables. Do not "daisy chain" telecommunications outlet boxes together with conduit. No conduit shall serve more than one telecommunication outlet box, with the exception of feeds into the spine of modular workstations. As a cost-reducing measure, cables may be without conduit, using j-hooks and the stud cavities as pathways. Where conduit is not used, take steps to protect the cables as they pass into the stud cavity and into the telecommunications outlet box, such as placing protective bushings or grommets at openings where the cables may become damaged.

  Minimum size of conduit serving a telecommunications outlet box shall be 1", except at modular systems furniture outlets. At modular systems furniture outlets, where cast-in-place conduit is terminated at floorboxes and routes to the modular furniture, conduits may be filled to the maximum allowable by code, or as allowed by the floorbox manufacturer, whichever is less.

  The minimum outlet box size is 4" by 4" by 2" deep. Provide single or double-gang device ring to

BGSF served	Quantity of 4" conduits to BEF
Up to 20,000	3
20,000–60,000	4
60,000–100,000	5
100,000–200,000	6
200,000 +	verify with program

Table 17.1 Entrance Conduit Requirements

accommodate the telecommunications faceplate. Larger boxes are required for larger conduit, in accordance with the standards.

- Entrance pathway and sizing: Use buried pathways using conduit. Base entrance pathway sizing on the specific user requirements. Provide a minimum quantity of 4" conduits based on building gross square feet (BGSF). Refer to Table 17.1 for the quantity of conduits required based on building size.

  For a facility larger than 200,000 BGSF, the requirements will be project specific, and conduit quantities must be confirmed. If the project contains more than one building, each building may have the quantity of entrance conduits shown above.

- Entrance Pathway Vaults and Maintenance Holes: Entrance and exits from the vaults and maintenance holes are to be from the ends only. Do not use the vaults and maintenance holes to make directional changes.

  Vaults and maintenance holes shall be provided with embedded racking and cable hooks for cable and attachment management, sump hole, cast-in-place pulling irons, and cast-in-place bonding grid for telecommunications use. Vault and maintenance hole covers shall meet the expected traffic conditions for the proposed location of the vaults and maintenance holes.

- Entrance Pathway Innerduct: Provide four, 1" PVC innerduct in ducts as indicated in Table 17.2.

- Entrance Pathway Duct Sealing: Provide duct sealing plugs at each duct and innerduct installed in the entrance pathway. Plugs are required whether the duct is occupied or empty. Duct sealing plugs at building entries shall be provided with drain cocks to allow water to be drained before opening the duct-sealing plug.

- Roof Entrance Pathways: Provide a minimum of two 2" conduit pathways from the roof to the equipment room for routing of satellite and other communications cables. Locate the pathways adjacent to the locations for communications reception equipment on the roof. Provide "weather head" service entrances for the roof entrance pathways.

Quantity of 4" conduits in duct bank	Number of 4" ducts with four 1" innerduct
3	1
4	2
5	2
6	3

Table 17.2 Entrance Innerduct Requirements

Cabling

Fiber optic cabling shall form a hierarchical star originating in the equipment room. Each equipment room, telecommunications closet, and building entrance facility shall be connected to the main distribution frame using a minimum 6 strands of single-mode fiber and 12 strands of multimode fiber. If the single-mode and multimode terminate at different fiber optic patch panels, provide the single-mode and multimode in different physical jackets. The type and quantity of fiber optic cable is court dependent, and will change over time. The design professional shall verify that quantities and types of fiber optic cable meet the needs of each court and court project. Terminate fiber optic cabling in fully enclosed fiber optic patch panel. Provide 50 percent spare capacity at the panel.

- The required multimode fiber optic cable is:

  Core: 50/125

  Bandwidth: 700/500 MHz-km (850/1,300 nm)

  Attenuation: 3.5/1.5 dB/km

  Gigabit Ethernet Distance: 750 meters

  10-Gig Ethernet Distance: 150 meters

- The required single-mode fiber optic cable is:

  Core: 8 micron (nominal)

  Attenuation: 1.0/0.75 dB/km (1,310/1,550 nm)

  Gigabit Ethernet Distance: 5,000 m

  10-Gig Ethernet Distance: 10,000/40,000 m

  Use ANSI/TIA/EIA 568 SC-type connectors for fiber optic connectors.

- Copper Backbone Cabling

  Copper backbone cable shall be terminated on 110-type blocks mounted to metallic enclosures mounted to the plywood backboard. Terminations shall use C-5-type clips.

  Cabling type shall be dependent on the space in which the cables will be placed. In non-plenum spaces, use CMR rated ARMM-type backbone cable. In plenum spaces, use CMP copper backbone cables.

  Pair count for copper backbone cable shall be based on the number of work areas served. Refer to Table 17.3 for the required pair count schedule.

  The design professional must verify with the telephone service provider for voice services whether copper protection is provided by the court or by the service provider. Show locations for protection devices on the drawings, whether provided by the court or the service provider.

- Backbone Copper Coaxial Cabling

  For distribution of broadband television signals between telecommunications rooms, use quad shielded Series 11 coaxial cabling that meets or exceeds the Society of Cable Television Engineers guidelines for construction and attenuation.

  Backbone coaxial cables will be provided with a black jacket.

  Design the coaxial cabling system in a star topology. Homerun cables from telecom rooms to the broadband television distribution headend.

  Terminate coaxial cables at directional couplers, splitters, or tap-offs in the telecommunications rooms or spaces.

- Copper Horizontal Cabling

  Copper Cable Types and Permanent Link: Provide the design based on the highest approved performance standards level for unshielded twisted pair cabling (UTP), based on ANSI/TIA/EIA cabling standards current at the time of bidding. Minimum standard for all components in the permanent link is Category 6.

  Cables for data outlets will be provided with a blue jacket; cables for voice will be provided with a white jacket.

  Terminate data cables on 19" patch panels in the telecommunications rooms. Provide one horizontal cable manager for each patch panel provided.

  Terminate voice cables on 110-type termination blocks using C-4 clips.

  Wiring standard for courts is TIA/EIA-568A.

- Horizontal Copper Coaxial Cabling

  For distribution of broadband television signals to televisions and end stations, use quad shielded Series 6 coaxial cabling that meets or exceeds the Society of Cable Television Engineers guidelines for construction and attenuation.

  Coaxial cables will be provided with a black jacket.

  Design the coaxial cabling system in a star topology. Route coaxial cables to the telecommunications room or space to which the data and voice cable is routed.

  Terminate coaxial cables at directional couplers, splitters, or tap-offs in the telecommunications room or space.

Work Areas Served	Pair count of copper backbone cable
1–25	50
25–60	100
60–125	200
125–200	300
200–300	400
300–500	600
500–800	900
Above 800	1.5 pairs in backbone cable for each work area served

Table 17.3 Copper Backbone Requirements

At the work area or end station, terminate the cable on an "F" type connector. Provide an "F" barrel insert for the telecommunications faceplate that serves the location, if available.

- Wireless Local Area Network (WLAN)

  If a WLAN is included in a project, the courthouse shall be provided with cabling and outlet locations to fully cover all designated locations with wireless local area network(s) with a minimum signal to provide a nominal throughput of 5.5 megabits per second, or one quarter of the bandwidth of the access point, whichever is greater. WLAN outlets shall be provided in unobtrusive locations that prevent tampering and vandalism. Do not place WLAN outlets in air return plenums.

  Assume that 120 VAC electrical outlet will be required at each WLAN outlet location to power access points. Do not assume use of Power over Ethernet (PoE) without verification.

Telecommunications Outlets and Connectors

The standard outlet consists of two data and two voice telecommunications outlets and connectors at a single gang faceplate. Data outlets shall be blue. Voice outlets shall be white. Refer to Table 17.4.

Test the entire cable plant using industry recognized testing procedures. Provide written test results for each cable and fiber optic strand installed. Test results will be reviewed for conformance with the testing standards.

Test horizontal copper cable for the following parameters:

- Frequency Range
- Propagation Delay 546 ns @ 250 MHz
- Delay Skew
- Insertion Loss
- NEXT
- PSNEXT
- ELFEXT
- PS-ELFEXT
- Return Loss

  For fiber optic cables, perform attenuation testing for all strands in cables under 200' in length using a power meter. In cables over 200', perform optical time domain reflectometer (OTDR) testing for

Outlet Type No.	Description
1 Standard	Two data and two voice at single gang faceplate
2	Three data and one voice at single gang faceplate
3	Four data at single gang faceplate
4	One data and one voice at single gang faceplate
5 WLAN	One data at single gang faceplate
6 TV	One broadband at single gang faceplate
7 TV/Satellite	Two broadband at single gang faceplate
8	One data and one broadband at single gang faceplate
9 Standard	Two data, two and one broadband voice at double gang faceplate
10 Wall Phone	One voice at wall phone station
11 Elevator Phone	One voice at terminal block for elevator
12 Exterior Phone	One voice coiled in box for exterior phone
13 Empty Box for Future	Empty telecom box with blank cover plate

Table 17.4 Types of Outlets in Typical Rooms

each finer optic cable tested. Provide a written test result for each strand in each cable placed.

17.4 AUDIOVISUAL DESIGN

Audiovisual systems are required and shall be provided throughout each courthouse. Audiovisual (AV) systems require appropriate spaces, pathways, cabling, and grounding to support audiovisual equipment throughout the courthouse. Telecommunications and audiovisual system designs shall be coordinated to avoid duplications and conflicts.

17.5 AUDIOVISUAL DESIGN OBJECTIVES

The objective is to provide building infrastructure to support the installation of a structured, standards-based audiovisual system. Infrastructure includes spaces, pathways, work areas, cabling, grounding and bonding, administration, and verification of performance. To meet this objective, design professionals must be familiar with the standards cited in Chapter 21 (Appendix), and follow those standards, except as modified by this section. Best practices for the design and construction of court technology infrastructure in a new courthouse will be identified.

17.6 AUDIOVISUAL CRITERIA

The following are criteria and best practices to be followed by design professionals:

- Installed equipment shall be adequately ventilated.
- Provide conduit, cable, and power requirements for courtroom technology.
- Do not specify equipment to be under counters. Use ventilated equipment rooms instead.
- Provide dedicated circuits for AV equipment. Tie the AV system ground to the telecommunications ground where practical.

17.7 DESCRIPTION OF COURT TECHNOLOGIES

The following lists the technology needs of each courtroom station and ancillary spaces in the courthouse. These describe active electronic systems in a fully equipped courtroom. Provide infrastructure for all systems; the inclusion of certain elements marked optional shall be determined by the design professionals during the architectural programming phase.

Courtroom

Provide an audio system with speech reinforcement for each courtroom. The courtroom audio system shall include the following features and subsystems:

- Voice reinforcement
- Audio playback
- Audio teleconferencing
- Sound masking over jury box for bench conferences, or white noise (optional)
- Holding cell audio feed (optional)
- Assisted listening system (ALS) or infrared wireless with belt packs. A two-channel system shall be specified; the second channel can be used for call-in to language interpretation services.
- A 6" LCD touch control panel: for operation of the audio system, including volume levels, microphone override and mute capability, conference calling, and activation of sound masking system. The control system will also enable a straightforward upgrade path for adding evidence presentation systems.
- Four-channel audio feeds with headphone jack at reporter's station receptacle plate to allow connection to recording device (optional).
- Motorized projection screen with low voltage controller, sized to provide adequate viewing of text from the jury box. Specify screen height equal to ¼-1/5 the distance from the screen to the last row of seats. The bottom of the screen shall be a minimum of 4' above the audience floor.

For systems in the courtroom and other courthouse spaces refer to Table 17.5.

Baseband Audiovisual Distribution

Baseband is a transmission technique in which all of the available bandwidth is dedicated to a single communication channel. Only a single message transfer can occur at a given time. Provide space for a single equipment rack in the equipment room for facility-wide and point-to-point distribution of baseband audiovisual signals. This signal connectivity would occur via Category 6 cabling. The connectivity would occur from all AV enabled rooms, includ-

ing: courtrooms, conference rooms, training rooms, media rooms, and jury assembly. Signal from these rooms would be distributed initially through a floor serving telecommunications room. The baseband AV equipment rack could also house CATV distribution, allowing baseband AV signals from anywhere in the building to be modulated and distributed facility-wide on the broadband cable system.

MATV, CATV, and Broadband Uplink

Broadband is a high-speed, high-capacity transmission medium that can carry signals from multiple independent network carriers. This is done on a single coaxial or fiber-optic cable by establishing different bandwidth channels. Broadband technology can support a wide range of frequencies. It is used to transmit data, voice, and video over long distances simultaneously. Provide space and structural accommodation on the roof for satellite dish antennas with southern exposure. Provide infrastructure for two 18" to 24" wide dishes for each court building. Signals from these antennas shall be routed to receiving equipment in the equipment room baseband and broadband distribution rack. The rack would include channel strippers and modulators to allow court-created programming to be viewed on the CATV system. If the trial court and related justice agencies share occupancy of the court building, the CATV system described here shall be dedicated to use by trial courts only.

Media and Press Area

In larger court facilities the courthouse baseband audiovisual distribution system shall route to an exterior connection monument, so that electronic news gathering (ENG) vehicles can receive signals generated by the courtroom audiovisual systems. In urban areas where an exterior location is not feasible,

COURT AREAS

	ALS	Analog Phone Line	Audio Recording	CATV	Equipment Rack	Language Interpretation	Microphone & Audio Reinforcement	Projection Screen	Real-Time Transcription	Touch Panels	Videoconferencing	Video Feeds	Video Projector	Video Recording
Courtroom	•	•	•		•	•	•	•	•	•	•	•	•	•
Jury Deliberation Room														
Large Conference Room		•		•				•			•		•	
Chambers Suite		•		•								•		
Family Courts/Mediation			•								•	•		•
Training Room	•	•		•	•		•	•		•	•		•	
Jury Assembly	•			•	•	•	•	•					•	
Holding Cell												•		
Attorney Interview Room		•												
Media/Press							•					•		
Public Lobby														•
Self Help Center/Mediation											•	•	•	•
Staff Conference Room											•	•		
Witness Waiting Area												•		

Table 17.5 Court Systems Minimum AV Requirements

or in smaller courthouses, an interior location, not necessarily near courtrooms, may be designated for a media and press area.

Media and press area requirements include:

- Media feed from equipment room to the media and press area, which may be a designated or multipurpose room.
- View to southern horizon from exterior satellite uplink trucks.
- Stainless steel 18" by 18" weather and vandal resistant media pedestal cabinet in parking lot or location at the exterior face of the building.

Courtroom Videoconferencing Systems

Videoconferencing systems provide live two-way audio and video transmission of speech and images between a courtroom and a remote site, such as a prison or location of an expert witness. Cameras shall be placed so that they provide a clear view of the judge, the litigants, and their attorneys, but not the jury. A videoconferencing codec, or an encoder and decoder, can be mounted with the other courtroom technology equipment or in a central location where it can be shared between courts. Videoconferencing can also be provided with a mobile cart in conference rooms, training rooms, and courtrooms. AC power and data connection shall be provided at the cart position. Videoconferencing systems must be coordinated with the courtroom sound reinforcement system.

17.8 COURTROOM SIGNAL INFRASTRUCTURE

Signal pathways, conduit and junction box locations, and other building infrastructure are required to accommodate current and emerging courtroom technology systems. Signals sources, such as microphones or audiovisual devices at each courtroom station, shall have a pathway to an equipment room. The following describes the infrastructure requirements of the equipment room and each station.

Courtroom Audiovisual Equipment Rooms

See telecommunications equipment room description in section 17.3 (Telecommunications Criteria). Audiovisual rooms can be combined with telecom rooms if the room is segregated. Electronics for courtroom audiovisual systems shall be rack-mounted in equipment rooms near the courtrooms. Minimize the length of audiovisual cable runs.

To access the front and back of audiovisual equipment racks, provide spaces per the standards cited in the telecommunications section. Smaller rooms or closets would require equipment racks on slide-out rail systems for servicing.

Provide two 20-amp isolated electrical ground circuits via AC quad-plex and four RJ 45 data outlets to the equipment rack location. Equipment shall not be stored under a counter within the courtroom.

If audiovisual and telecom equipment rooms are separate, provide a signal pathway equivalent to a 1¼" conduit between each AV closet and the floor serving the telecommunications room. This is to allow baseband audiovisual signal to be routed to head end audiovisual racks in the equipment room.

Baseband and Broadband in Equipment Room

Adequate signal pathways from local serving telecommunications rooms to the equipment room shall be provided for baseband and broadband signaling. Each AV enabled room in the building shall have capacity equivalent to 1¼" conduit from the equipment rack location to the local serving telecommunications room for baseband and broadband signal routing.

Courtroom Locations

Table 17.6 is a description of the standard outlets at each courtroom station. Junction boxes shall oversized to accommodate flexibility and future growth. Conduit shall route from each junction box to the equipment rack. Conduit count indicates necessary wire capacity and signal separation. Equivalent capacity and separation can be provided in raceways or other signal pathways in millwork. Intermediary conduit collection boxes above ceilings shall be used to reduce conduit runs to the equipment rack.

Table 17.7 is a description of audiovisual requirements at courtroom stations.

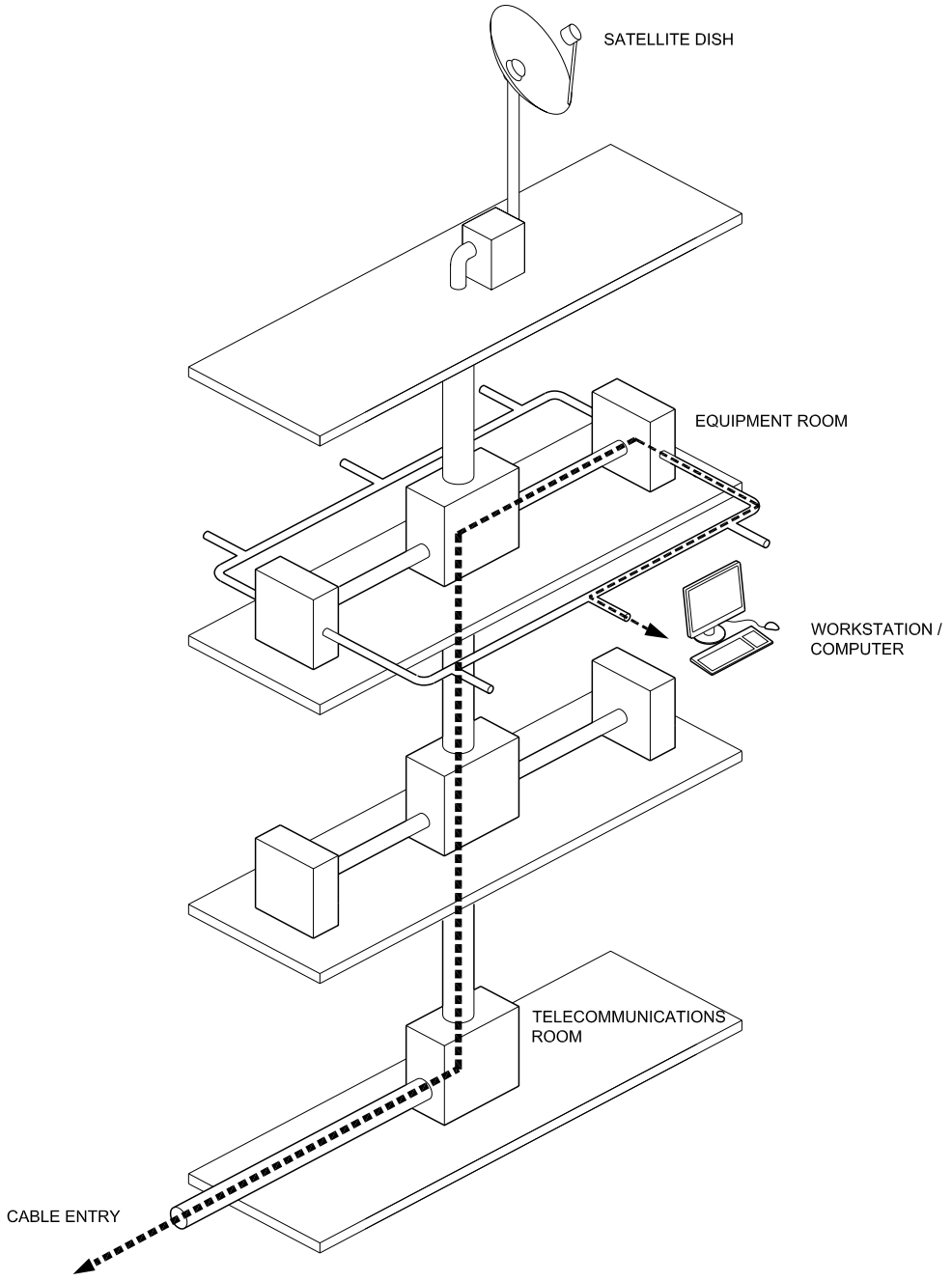


Figure 17.1 Building Cabling Diagram

OUTLET SPECIFICATIONS
Judge
5-gang boxes in the millwork knee space
Three one-inch conduits back to equipment rack location
Horizontal low voltage wire management in knee space
Horizontally-mounted power receptacles on plug-strip
Clerk
5-gang boxes in the millwork knee space
Split loom, ENT, or two one-inch and one 1-1/4-inch conduits back to equipment rack location
Horizontal low voltage wire management in knee space
Horizontally-mounted power receptacles on plug-strip
5-gang boxes in the ledge above work surface
Reporter
5-gang boxes in floorbox or front of bench
Split loom, ENT, or two one-inch and one 1-1/4-inch conduits back to equipment rack location
Horizontal low voltage wire management in knee space
Horizontally-mounted power receptacles
Witness
5-gang junction boxes in the millwork knee space
Two one-inch and one 1-1/4-inch conduits back to equipment rack location
Horizontal low voltage wire management in knee space
Horizontally-mounted power receptacles on plug-strip
Public Seating
Floorbox or wall-box (locations to be determined)
Two one-inch conduit to equipment rack location
3/4-inch conduit to equipment rack location
Jury
Conduit for LCD displays (verify with local court)
2-gang box at each end of railing for microphone input
Two one-inch conduit to equipment rack location
Camera Wall Plates (verify locations)
One 1-1/4-inch conduit to equipment rack location
One three-gang junction box to accommodate 1-1/4-inch conduit

Table 17.6 Courtroom Outlet Specification Table

OUTLET SPECIFICATIONS
Ceiling Projector (verify projector location with local court)
One 1-1/4-inch and one 1-inch conduit to ceiling location
Electrical power outlet at projector location with 10-amp capacity
Three-gang junction box to accommodate 1-1/4-inch conduit
Power and controls for projection screen
Jury Assembly
Equipment rack location
AC power and 1-inch signal conduit for distribution to ceiling mount video monitors
Four (RJ45) data network services to equipment rack
20-amp circuit at equipment rack
Training Room
Equipment rack location
AC power and conduits for projector and projection screen
AC power and conduits to floorbox at conference table
Coordinate lighting requirements for video conferencing
Four (RJ45) data network services to equipment rack
20-amp circuit at equipment rack
Counsel Table
7-Gang two-sided floor box (four-gang on one side, two-gang and one-gang on the other side with AC divider)
AC duplex in one-gang opening
Two (2) 1-1/4-inch conduits plus 3/4-inch conduits back to AV equipment rack
One (1) 3/4-inch conduit to telecom room
Lectern and DPS
7-Gang two-sided floor box (four-gang on one side, two-gang and one-gang on the other side with AC divider)
AC duplex in one-gang opening
Two (2) 1-1/4-inch conduits plus 3/4-inch conduits back to AV equipment rack
One (1) 3/4-inch conduit to telecom room
Media Feed
Media Pedestal - 18-inch by 18-inch by 6-inch stainless steel NEMA Type 4 watertight enclosure in parking lot or street fro truck access
Two (2) 3-inch conduits from Media Pedestal to Main Server Room or head-end AV rack

Table 17.6 Courtroom Outlet Specification Table *(continued)*

COURTROOM STATION REQUIREMENTS
Judge
Microphones on movable base with integral mute switch
Under-counter receptacle plate
Witness
Millwork mounted microphone with shock mount
Microphone input to translation system
Under-counter receptacle plate
Connection for powered loudspeaker
Clerk
Microphones on movable base with integral mute switch
Remote control touch panel to control AV system (by decision of local court)
Under-counter receptacle plate audio for multichannel recording system
Connection for powered loudspeaker (by decision of local court)
Video recording devices
Court Reporter (AOC to verify)
Under-counter receptacle plate audio feeds for court recorder
Headphone input with volume control
Counsel Tables
Two microphones on movable base with integral mute switch per table
Microphone input to translation system
Floorbox signal receptacles under table
Jury
Microphone input
Sound masking
Courtroom lectern & DPS Cart
VCR
Floorbox with signal and power receptacles
Integral microphone
LCD panel for evidence display touch annotation (Infrastructure Only)

Table 17.7 Courtroom Station Requirements

- Multiple purpose courtroom shown; outlet locations are similar in large or arraignment courtrooms.
- Additional outlets may be provided for specific requirements.

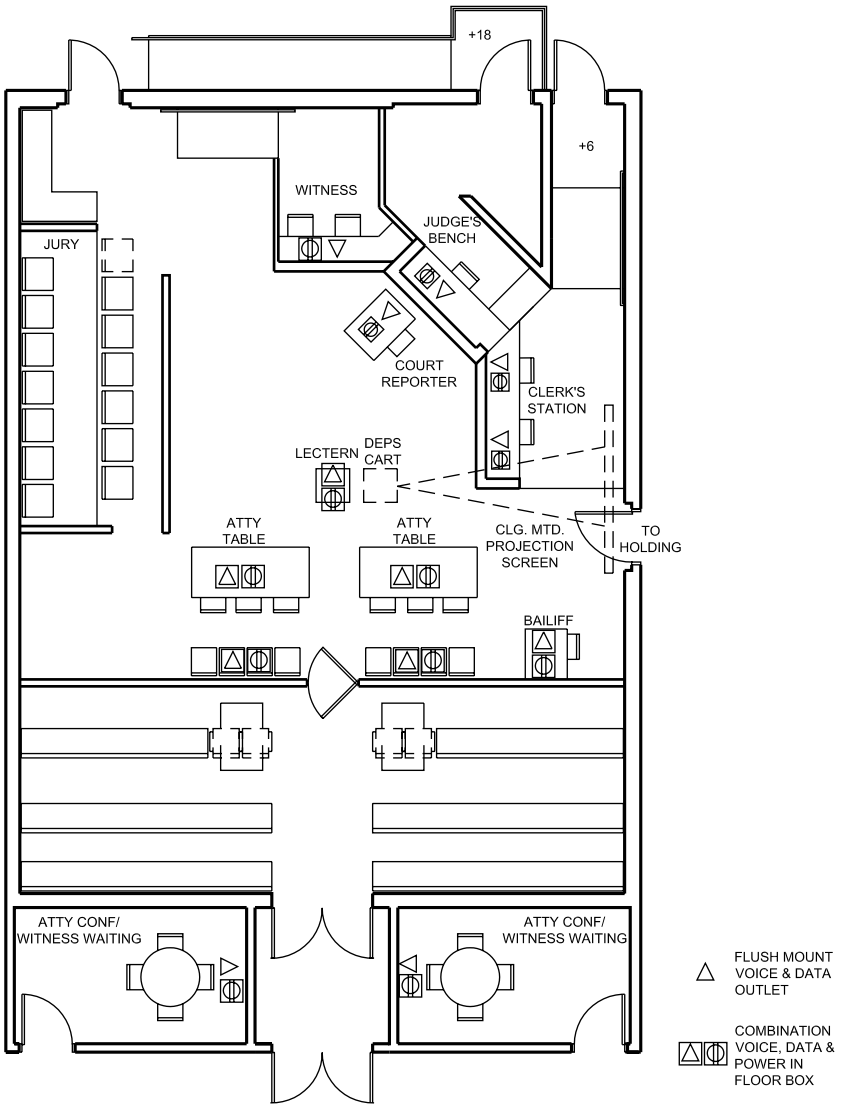


Figure 17.2 Data Outlet Location Diagram

- Multiple purpose courtroom shown; outlet locations are similar in large or arraignment courtrooms.
- Additional outlets may be provided for specific requirements.

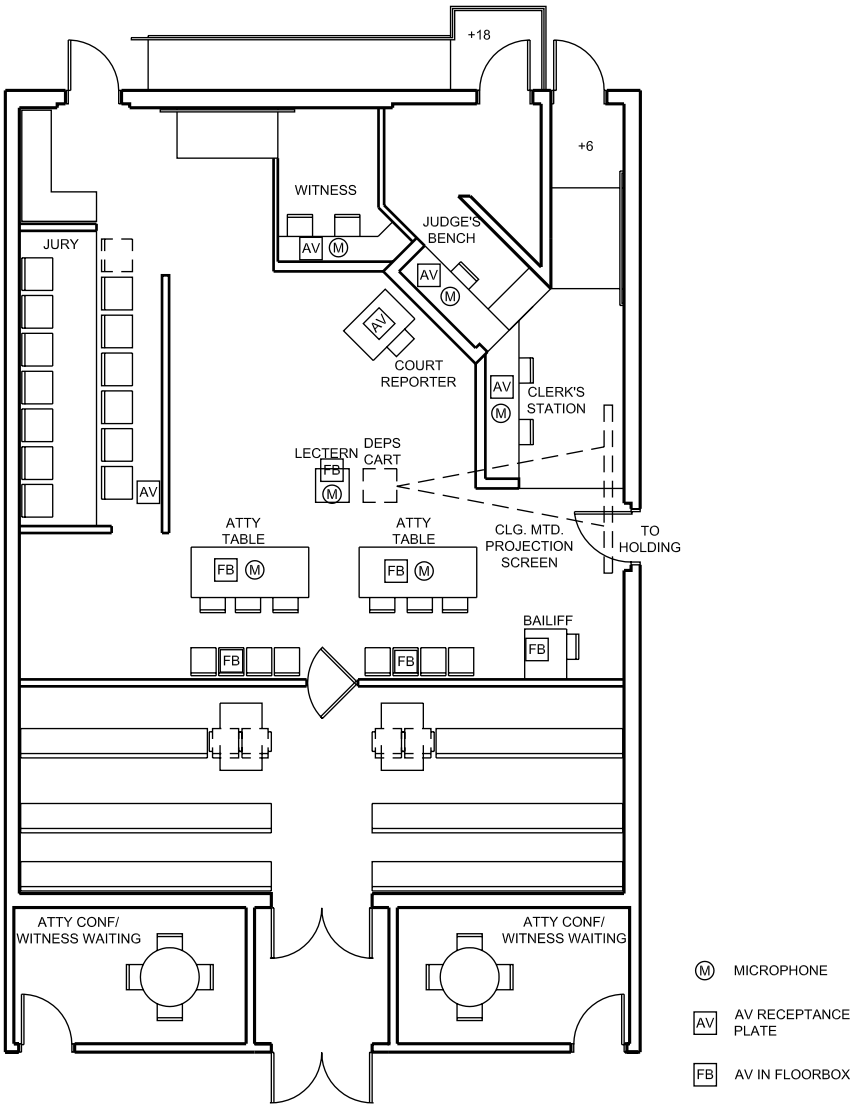


Figure 17.3 A/V Device Location Diagram

- Multiple purpose courtroom shown; outlet locations are similar in large or arraignment courtrooms.
- Additional outlets may be provided for specific requirements.

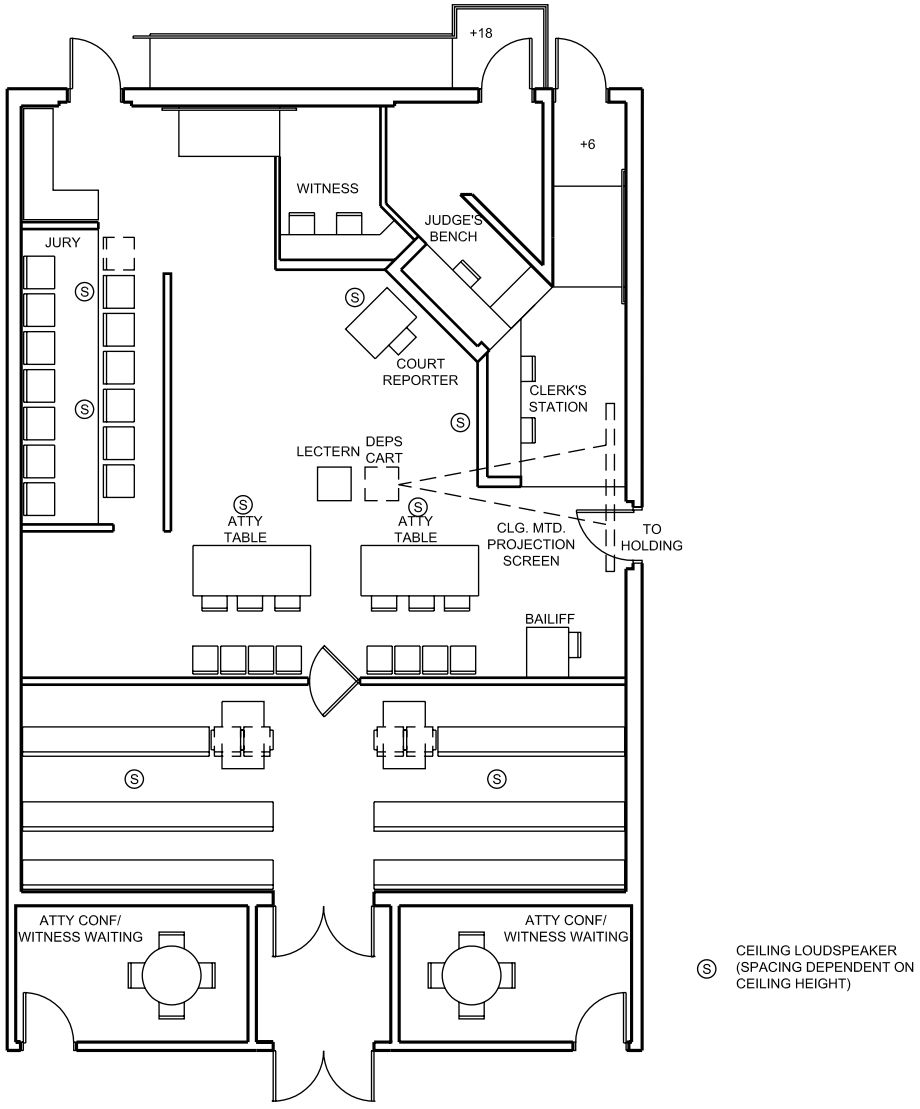


Figure 17.4 A/V Ceiling Speaker Location Diagram

18

ACOUSTICAL CRITERIA

Courtroom Public Waiting

Peter L. Spinetta Family Law Center

Martinez, CA

RossDrulisCusenbery Architecture

This chapter provides acoustical criteria for acoustical and mechanical vibration reduction in new court facilities.

18.1 OBJECTIVES

The goal of this chapter is to address acoustical best practices for reverberation, echo control, environmental noise reduction, sound isolation, speech privacy, and noise reduction of mechanical and electrical equipment. Each courtroom, except for very large courtrooms, shall be designed for effective spoken communication with a minimum of sound reinforcement. In the standard size trial courtroom all participants shall be able to hear and be understood at normal speech volumes.

18.2 ACOUSTICAL CRITERIA

Acoustical criteria are described by numbers defining performance standards.

Considerations

Factors to be considered during acoustic design include background noise levels, sound insulation, and room finishes. Courtrooms shall be quiet, shall be free of detectable echoes, and shall naturally reinforce voice levels with strategic placement of sound-reflecting surfaces.

Background Noise Levels

Vibrations and equipment noise shall not disrupt judicial proceedings.

The background noise level of an enclosed space is quantified by Noise Criterion (NC) curves, published in ASHRAE Handbook of Fundamentals.

Refer to Table 18.1 for the recommended HVAC noise criteria (NC) for courthouse spaces.

Room Acoustics

Room acoustics, including reverberation and echo control, are created by the presence of sound reflections in an enclosed space that result in reverberation, echoes, and early reflections. The amount of reverberation directly relates to room size and surface treatments. Hard surfaces, such as untreated gypsum board and wood paneling, will cause greater sound reflections and reverberation in a space. Soft surface materials, such as acoustical tile and fabric wrapped fiberglass panels, will result in fewer echoes and less reverberation. However, a room with too much sound absorption on its wall surfaces can be perceived as acoustically "dead." To achieve the proper balance of balance of sound reflecting versus absorbing surfaces, alternating "hard" and "soft" surfaces can be installed on the sidewalls in 4'-wide segments. The panels shall be arranged such that a hard surfaced

Noise Criteria[1]	Space Type - Room(s)
NC 30	Courtrooms Conference Rooms Meeting Rooms Training Spaces
NC 35	Judicial Chambers Enclosed Offices Jury Deliberation Clerks Office
NC 40	Reception Lobbies Workroom Open Office Corridors
NC 50	Warehouses Parking Garages Fire stairs

Table 18.1 Background Noise Criteria

1. **Noise Criteria (NC)** Single-number rating based on a set of spectral curves used to describe the "noisiness" of environments for a variety of uses. NC is typically used to rate the relative loudness of ventilation systems.

panel directly faces a soft panel on the opposing wall. A hard-surfaced wall shall be located behind the judge, witness, and clerk to provide good projection of voice to the jury.

Reverberation is the effect of sound scattering and steadily decaying in a room. Conversely, echoes are distinct, late-arriving reflections from a single wall surface. In excess, reverberation can adversely affect speech intelligibility.

Echoes in a courtroom shall be avoided. Sound from the judge's bench reflecting off the back wall at the other end of the courtroom can be a source of echoes. The courtroom back wall shall be treated with acoustically absorbing material. Conversely, walls behind the judge's bench shall be of acoustically reflective materials so that sound generated from the judicial area is reflected to the rear of the courtroom. This reflected sound is defined as an early reflection, and will not be heard as a distinct echo. A hard surface ceiling slightly tilted outward six degrees or more will have the effect of projecting voice into the room, without creating a flutter echo with the hard surfaced bench counter.

Refer to Table 18.2 and 18.3 for room acoustic and door requirements for courthouse spaces.

Sound Insulation

Sound insulation is the capacity of a structure to prevent sound from being transmitted from one space to another. In courthouses, greater sound insulation enhances speech privacy. Higher levels of sound insulation are required when acoustically sensitive spaces are located near sound generating equipment.

Partitions with greater mass or larger insulated airspaces allow higher sound insulation values, and will perform better than construction with high air infiltrations. Flanking paths, such as above-ceiling ducts or window mullions at partitions, degrade sound insulation performance.

Sound insulation is quantified by two numerical ratings, Noise Isolation Class (NIC) and Sound Transmission Class (STC). NIC is a field-measured noise reduction from a building design element. STC is a sound insulation performance, as measured in a controlled laboratory.

Refer to Table 18.4 for sound isolating performance requirements for courthouse spaces.

Speech privacy within a space depends on the sound insulation performance of its partitions and doors, and the background noise levels in adjoining spaces. Confidential speech privacy is defined as when speech is detectable though no individual words can be discerned; Sound Insulation of construction and Noise Criteria for adjoining space is greater than 80. For example, if the space adjoining the space under consideration has a background noise level of NC 30, the intervening partition must have an STC rating of 50 to achieve confidential speech. Unless a reliable source of background noise such as sound masking is provided in the adjoining space, an STC 50 con-

Space Type	Room Acoustic Considerations
Courtrooms	Reverberation time (RT_{60})[1] criteria 0.6 to 1.0 seconds. Treat ceiling and wall surface with sound absorbing materials to meet reverberation time criteria. Wall behind judge's bench can be hard surfaced and sound reflecting.
Enclosed Offices Judicial Chambers Conference Rooms Training Spaces Jury Deliberation Clerks Office	Acoustical ceilings should have a minimum NRC of 0.65.
Open Office	Acoustical ceilings should have a minimum NRC of 0.65.
Lobbies	Reverberation time less than 1.5 seconds. Sound absorbing ceiling should be considered if lobby is not carpeted.

Table 18.2 Room Acoustic Requirements

1. **Reverberation Time (RT_{60})** The time (in seconds) required for the sound pressure level to decrease 60 decibels in a room after the noise source is abruptly stopped. Reverberation time relates to a room's volume and sound absorption.

struction assembly is generally required to achieve confidential speech privacy. To achieve a "normal" speech privacy level, the sum of both numbers shall equal 70 or more. Normal speech privacy is defined as when a few words may be understandable but complete sentences cannot be comprehended.

Sound-rated partitions shall be acoustically sealed around the entire perimeter. Refer to the "Catalog of STC and IIC Ratings for Wall and Floor/Ceiling Assemblies" by the Office of Noise Control, California Department of Health Services for rated assembly types.

Space Type	STC Door
Courtroom to Courtroom Courtroom to Jury Deliberation	Doors not recommended; use vestibule if possible. If not possible, use only a Laboratory Rated STC 53 (or two gasketed doors in tandem)
Jury Deliberation (sound masking in corridor recommended) Judge's Chambers Judicial Conference Attorney Conference (to public vestibule)	Laboratory Rated STC 43 (Sound masking in corridor recommended)
Courtroom Public Vestibule (both door sets) Court Reporter Conference Room Electric Mediation Investigators Office Courtroom to Secure Vestibule/Hallway	Acoustically gasketed Nonrated

Table 18.3 Door Requirements

Space Type & Adjacency	STC of Partition*
Courtroom to Holding Cell Electrical Transformer to NC 30 space or less Elevator Shaft to NC 30 space or less Hydraulic Elevator Equip. to NC 30 space or less	65
Courtroom to Courtroom Judicial Chambers to adjoining areas Judicial Conf. Rms. to adjoining areas Jury Deliberation to adjoining areas Family Law mediator to adjoining areas Toilet room to adjoining spaces	50-55
General Office Space to General Office Space Orientation to adjoining areas Telecom AV rooms to adjoining areas	40
Office Equipment to adjoining areas Workroom to adjoining areas Children's waiting room to adjoining areas Computer Room Spaces to adjoining areas Conference, Meeting, and Training Spaces to adjoining spaces	45

Table 18.4 Sound Isolation Requirements

*Partitions with doors need only be 10 points greater than STC of door.

Environmental Criteria

- To identify noise levels in decibels (dB, or dBA) at a potential site under consideration, conduct a 96-hour environmental noise study that tests for average and single event noise. Perform this study for all potential courtroom sites near roadways, highways, trains, busy urban areas, and flight paths. The average sound level over a 24-hour period is known as the Day-Night Average Level (DNL).
- Based on results of the environmental noise study, calculate exterior facade STC to achieve an interior DNL of 40 and maximum single event of 50 dBA.

18.3 BEST PRACTICES

The following recommendations address: noise reduction from mechanical and electrical equipment, sound insulation, speech privacy, and room acoustics.

Mechanical and Electrical Equipment Noise Reduction

- Do not locate variable air valve (VAV) units above courtrooms chambers, or conference and other rooms with noise criteria of NC 35 or less. Instead, locate VAV units in corridors. If this is not possible, a gypsum board ceiling or enclosure around box may be required.
- Select air diffusers five points below the NC rating of the room they serve.
- Locating air-handling units (AHUs) and other noisy equipment above courtrooms or other noise-sensitive spaces may require expensive and complicated sound attenuating ceilings.
- Locating fan-powered VAV boxes above spaces with noise criteria of NC 45 or less may require expensive and complicated sound attenuating ceilings.
- Do not exceed 1¼" of static pressure at VAV box inlets.
- Do not use rooftop "down discharge" air-handling units if possible. Instead, use side-discharge units. Noise mitigation of down discharge may be prohibitively complicated and expensive.
- Locate volume dampers at least 10' upstream from air diffusers in rooms with an NC criterion of NC 35 or less. Do not use face dampers.
- Vibration: Isolate all mechanical equipment per ASHRAE guidelines.
- Do not use seismic restraints that are integral to vibration isolators. Instead, use independent seismic restraints.
- Supply air ductwork: Ductwork attached to the fan discharge is to be connected with a flexible connection. Allow room for a 5' silencer near the fan.
- Make provision for a 5' silencer at the supply-air side of air-handling units.
- Ducts penetrating sound-rated wall, floor, and ceiling assemblies shall be in an insulated sleeve between independent construction elements. Ducts penetrating the building structure shall have a clear distance of 1¼" around the perimeter. This perimeter void must be packed with glass-fiber batts at both ends, and caulked airtight with a nonshrinking, nonhardening flexible acoustical sealant with a backer rod.
- To vibration-isolate transformers, inverters, rectifiers, and UPS, use flexible conduit and resilient mounts with a minimum static deflection of ¼".
- Avoid locating transformer rooms near sensitive locations. If not possible, consider double stud construction.
- Provide transformers with sound levels that do not exceed the following maximums in accordance with NEMA and ANSI standards. The manufacturer is to verify that the actual sound levels comply by conducting sound tests, before shipping to the project site.

  25–50 KVA, 45 dB
  51–150 KVA, 50 dB
  151–300 KVA, 55 dB
  301–500 KVA, 60 dB

Sound Insulation and Speech Privacy

- Return-air path for rooms requiring confidentially speech privacy:Install 3' long acoustically lined sound-boots with at least one turn. Aim air opening away from corridor.

- Full-height partitions shall be required between adjacent rooms where confidential speech privacy is required.
- Use nonhardening acoustical sealant at partition intersections.
- Do not locate electrical and low-voltage junction boxes back-to back; instead, locate in separate stud cavities. Seal the back of electrical boxes with an approved sheet caulking.
- Where full-height partitions are not possible and confidential speech privacy is required, provide sound masking in a space where listening should not occur.
- Avoid duct paths that will create "crosstalk" between spaces. Instead, provide minimum 10' long acoustically lined ducts with two turns between acoustically sensitive spaces.
- For partitions requiring normal speech privacy, use a foam seal tape between top of partition and the lay-in ceiling, or extend partition 6" above ceiling.
- Provide sound-lock vestibule at courtroom entry from public corridor. Provide two sets of solid-core, acoustically gasketed doors.
- Provide sound masking where construction does not allow adequate speech privacy.
- Sound isolating doors: Doors with cam-lift hinges and thresholds work best. For standard hinges, use threshold with integral gasketing. Doors with drop-bottom gasketing will require periodic maintenance to align seals. Do not use noisy panic hardware.
- Sound isolating doors: Use dual gaskets, such as compression sound gaskets and smoke gaskets, in tandem.
- Recessed junction boxes must be offset at least 16" on opposing sides of sound-rated construction.
- Recessed junction boxes four-gang and smaller are to have the back and sides sealed airtight using sheet caulking. Junction boxes larger than four-gang require gypsum board backing.
- Conduit must not bridge independently framed sound-rated partitions or resilient ceilings by rigidly connecting to the framing. Flexible conduit connections are required.
- Where equipment noise and vibration do not meet these standards, sound isolating, or floating floors, may be required for mechanical rooms where space below is occupied.
- For adjacent spaces along exterior window façade where speech privacy is required, treat window mullion with a layer of wood or gypsum board on each side of partition where the partition intersects the exterior window.

Room Acoustics

- Fabric-wrapped sound absorbing panels shall be a minimum of 1"-thick and minimum NRC of 0.85.
- Fabric for acoustical panels must be porous and allow air to pass. Do not use fabric with acrylic or other backings.
- Avoid concave or domed surfaces. If these surfaces cannot be avoided, they must be acoustically treated. Convex surfaces are better.
- Avoid parallel hard surfaces. Gypsum board and other hard surfaced ceilings over tables and counters with microphones shall be avoided.
- Ornate, irregular, or convex surfaces will minimize echoes.
- Carpet alone does not provide good room acoustics.

19

FIRE PROTECTION CRITERIA

Public Lobby
Riverside Family Court
Riverside, CA
Ratcliff Architects

Date of Issue: March 1, 2010

California Trial Court Facilities Standards, 2006 edition

This amendment is a change to the 2006 edition of the California Trial Court Facilities Standards. This amendment deletes or replaces existing language in the standards. This amendment is effective on the date of issue[1].

Design and Construction or Facilities Modifications projects which have reached design development completion (at effective date of this amendment) may be exempted from compliance with this amendment subject to specific approval by the Office of Court Construction and Management.

Chapter19 FIRE PROTECTION CRITERIA – Amendment 1

On page 19-3, delete in section, "19.2 FIRE PROTECTION CRITERIA", as shown:

~~In high-content-value areas, or where water damage must be minimized, use is recommended of a dry system with early alarm and preactivated system charging control, on-off cycling heads, or on-off cycling system~~.

On page 19-6, delete subsection, "Data Center, Control Centers and Server Room Protection", in its entirety and replace with the following:

"Telecommunication and Server Equipment Room Protection"

The telecommunication and server equipment room must be a minimum of 1 hour resistive construction. All walls (4 sides) terminate at the structure above so a sealed enclosure is created. No intermediate ceiling is required. Adjoining rooms should not be electrical, UPS, fire pump, switch gear, transformer, generator or other high combustible/fire risk rooms. Sprinkler heads should be provided with sprinkler guards.

Pre-action sprinkler systems are not recommended. The sprinkler system for the room will have a separate, dedicated, manually operated, isolation valve with a tamper switch and a separate flow switch located outside the protected area in an accessible location. Both the tamper switch and flow switch should be connected to the building fire alarm system.

If approved by AOC, an automatic gaseous fire suppression system in high valued critical facilities rooms shall use gaseous agent Novec 1230. Detection system will be cross-zoned or counting zone photoelectric detectors. Minimum two detector activation required before discharge sequence can begin. Quantity of detectors shall be determined by air-flow within hazard area but not exceeding 250 sq.ft. per detector. Minimum detection per room is 3 counting zone detectors.

End of Chapter 19- Amendment #1

This amendment is implemented under Rule of Court, Rule10.180 (b) - "*Non substantive changes to the standards may be made by the Administrative Office of the Courts:"*

This chapter defines the general and technical criteria for fire protection systems, including recommendations and minimum acceptable performance criteria.

19.1 FIRE PROTECTION OBJECTIVES

Fire protection systems protect life and property from fire through standardization of design, installation, and testing requirements for sprinkler systems, based upon sound engineering principles, applicable state fire code, and field experience. The following criteria set minimum acceptable standards for design and installation of automatic fire sprinkler systems. New technology and alternate arrangements may be applied, but they shall not reduce safety levels prescribed by these criteria or by state fire code.

Designers shall use the criteria to develop fire protection systems for new buildings, retrofit of existing unsprinklered buildings, or interior renovation of existing buildings. When the criteria are applied to interior renovations of existing structures, designers shall provide systems that meet design parameters of either the existing fire protection system or these criteria, whichever result in a better system that satisfies applicable codes.

19.2 FIRE PROTECTION CRITERIA

- All mechanical spaces shall be designed for ordinary hazard, with a density of 0.15 gallons per minute/square foot (gpm/sf) over 2,500 SF maximum.
- All other spaces in the building shall be designed for light hazard criteria, with 0.10 gpm/SF over the most remote 1,500 SF. The sprinkler heads in exposure zones shall be included in most remote area calculations for adjacent ceiling areas.
- The maximum head spacing shall be limited to 200 SF per head for light hazard, and 130 SF per head for ordinary hazard areas.
- The hydraulic calculations shall be based upon pressure available at point-of-connection to on-site water supply.
- For fire sprinkler systems in mechanical rooms, provide sprinkler system per NFPA requirements using corrosion resistance, standard response, and wax coated brass heads rated for 200°F.
- In high-content-value areas, or where water damage must be minimized, use is recommended of a dry system with early alarm and preactivated system charging control, on-off cycling heads, or on-off cycling system.
- Coordinate location of each sprinkler head with reflected ceiling plan, including lighting, diffuser, and grille layout.
- Coordinate the location, signage, keying, and access of fire sprinkler shutoff and zone valves with the local fire authorities. Access and signage shall be obvious. Visibility shall not be blocked by equipment.
- Show a water flow switch for each floor or sprinkler zone where a shunt box is used. Switch shall have one normally open and one normally closed contact. Specify alarm wiring in Division 16 work.
- Show a test valve and drain piping for each flow switch. If required by the local fire authorities, specify provision for draining the water for full flow tests to outside into a nearby storm drain manhole. If approved by the local fire authorities, specify drainpipe for controlled flow testing

to terminate to an approved receptor within the building. Show the exterior test drain provisions for full flow test and drain receptor for controlled flow tests on the plumbing and sprinkler plans.

- Coordinate sprinkler drain locations with plumbing drawings.
- Specify sprinkler head guards to be installed on any heads subject to possible damage.

Fire Pump Requirements

Evaluate fire pump requirements based on building size, number of floors, occupancy, and available city water pressure. Specify fire pump, jockey pump, and associated control system in accordance with NFPA requirements.

- Specify that a single manufacturer furnish pumps, motors, transfer switches, and all controls, and be UL listed.
- Require the pump manufacturer to provide the services of a qualified engineer for startup and acceptance test, in the presence of local fire and underwriting authorities.

Fire Hose Racks and Cabinets

When required by local fire authorities, specify the fire hose cabinets to be listed for the application, and made by a recognized industry manufacturer. Locate the fire hose racks and cabinets at intervals so that all building areas may be reached with 75' maximum hose length.

- Specify flush mounting cabinets for fire hose racks, with wire plate glass doors and space for a 2.5-gallon fire extinguisher. Door shall have chrome-plated piano hinges and chrome plated, unpainted handle.
- Specify racks complete with wall flange, hose, fog nozzle, hose coupling, 1½" valve, and spanner, with chrome plated finishes. Both ends of racks shall lie in the same horizontal plane with a maximum tolerance of +/- 1/8".
- Specify 1½", UL yellow label, unlined linen hoses, 75' long, fitted with fog nozzle.
- Specify National Standard hose thread, for valve and hose, as adopted by the NFPA.

Standpipes

Where code-required, provide wet and dry standpipes in all buildings. Install dry standpipe and fire sprinkler pumper connections together at locations approved by local fire authorities. Specify National Standard hose threads, as adopted by NFPA, for all hose valves.

- Specify that all wet and dry standpipes shall be hydrostatically tested and proved tight under 200 psi of water or to actual pressure if higher than 200 psi. The test must be maintained a minimum of two hours and shall be witnessed by local fire authorities. Where any pipe connections are concealed, the tests shall be conducted before covering.
- Specify that before testing, all systems shall be thoroughly flushed of foreign material. The flushing of the system should be started at the highest point in the system to lowest drain point. All portions of the system shall be back flushed.
- Provide piping and valving as necessary to facilitate full flow testing. Test discharge water shall be directed to prevent water damage.

Piping Requirements

- Specify all aboveground sprinkler piping to be Schedule 40, black steel, ASTM A-135 and all underground sprinkler piping to be ductile iron, class 50, AWWA C151with cement mortar lining conforming to AWWA C104, with 1-mil thick exterior petroleum asphalt coating. For corrosive soil areas, the underground piping shall be encased in polyethylene encasement in accordance with AWWA C105.
- For aboveground pipe system with system pressure 175 psig and below, specify threaded cast iron fittings for sizes 2" and smaller. For 2½" and larger size, specify mechanical joints with cut grooved end.
- The sprinkler system drainage piping shall be specified as galvanized steel pipe with galvanized threaded malleable iron fittings.
- Specify corrosion protection for buried ductile iron pressure piping and supports. All wrapping shall be site installed. Specify cathodic protection as necessary for local conditions.

- Underground piping shall be provided, cleaned, and tested per NFPA-24. Terminate underground service where indicated on contract documents.
- Installation: Install aboveground pipe, fittings, and hangers in accordance with NFPA-13 and local code requirements, including seismic sway and uplift bracing. Additional requirements per earthquake bracing shall be in accordance with NFPA-13, or a structural engineer shall sign the sway bracing details.
- Reducers: Make reductions in pipe sizes with one-piece reducing fitting. Bushings will not be acceptable, except when standard fittings of proper size are not manufactured.
- Provide next to sprinkler main risers a framed, printed sheet protected by transparent plastic, safety glass, or Plexiglas cover with brief instructions regarding all necessary aspects of sprinkler controls, and emergency procedure.
- Drains: Install main drain at riser and auxiliary drains at all low points in the system on each floor. Install inspector's test drains on sprinkler system at main riser assembly. Five or fewer trapped heads may be drained through a plugged fitting.
- Sprinkler head clearance between deflectors and walls or ceilings, roof decking, or roof joists shall be in accordance with the requirements of the latest edition of NFPA-13.
- Exposed piping supplying chrome plated hose valves or fire department connections shall be chrome plated. Chrome plated wall or floor escutcheons shall be provided at point of concealment.
- Install a hinged chrome plated escutcheon at all visible wall, floor, and ceiling pipe penetrations.
- Do not run piping through elevator hoistways, machine rooms, machinery spaces, or enclosures unless piping is serving these spaces. Branch sprinkler piping serving those spaces shall be provided with a supervised branch shut-off valve located at an accessible location outside these spaces. Furnish tamper switch at these valves.

Valve Requirements

Specify valves that are UL listed for the application and pressure classification and manufactured by companies with a full line of fire protection system components. Acceptable manufacturers shall be Crane, Jenkins, Stockham, Nibco-Scott, Milwaukee, or approved equal. Model numbers given are for Stockham, unless noted otherwise.

Piping Specialties

- Specify piping specialties that are UL listed and made by a single manufacturer.
- Specify pressure gauges to be 3½" dial with dial range twice the system working pressure, ¼" bottom connection, and shutoff valve.
- Specify vane flow switches with adjustable time delays, UL listed. Each must have two contacts for local and remote alarms, DPDT.
- Specify valve supervisory switches on main and other shutoff valves that can interrupt flow to sprinklers.
- Specify inspector's test valve and drain assembly in accordance with NFPA-13.
- Specify the valve tamper switch to be UL listed, 120 VAC/30 V DC, with DPDT.
- Other specialty items shall be specified as by NFPA-13 or local conditions and codes.

Automatic Sprinkler Head Requirements

Specify the sprinkler heads to be UL listed and FM approved automatic sprinklers in accordance with the following:

- Specify fusible links for 155°F–165°F, except when application requires higher rating.
- Specify 200°F fusible links for sprinkler heads in all switchgear rooms, electrical rooms, elevator machine rooms, mechanical rooms, skylights, and where required by NFPA.
- Specify wax coated sprinkler heads for heads exposed to weather.
- Specify concealed quick response sprinkler heads in courtrooms and public areas, and semirecessed in offices.

- Specify security detention grade quick-response heads for holding cell areas.
- Specify standard type heads, either upright or pendant, in open ceiling areas and for switchgear rooms, electrical rooms, elevator machine rooms, mechanical rooms, and other service areas.

Fire Department Connections

Specify the fire department connections (FDC) to be provided in accordance with NFPA, California Fire Code, and local fire department requirements. Threads shall conform to standards of all responding fire departments.

The FDC shall be cast brass or ductile iron body with drop clappers. Chrome plated brass plate with lettering as required by the local fire authorities. Chrome plated brass double female snoots with rigid pin lug hose thread swivels, pin lugs, and chains. Hose inlets and threads, National Standard Thread (NST), shall conform to local fire department requirements.

Sprinkler Control Valves

Specify sprinkler control valves to be UL listed, FM approved, all with tamper switches. Specify control valves for 3" and smaller to be ductile iron body ball valves. Specify for sizes 4" and larger control valves to be ductile iron butterfly valves.

Double Check Detector Valve assembly

Specify double check detector valve (DCDV) assembly, consisting of two independently operated spring loaded center guided check valves, and a bypass assembly. The bypass shall consist of a 5/8" water meter in series with a backflow preventor, both mainline and bypass assembly supplied with two full port resilient seated shutoff valves for shutoff and four resilient seated ball valve test cocks, cast iron and fusion epoxy coated maincase inside and out with an FDA-approved material. Entire unit serviceable in-line. 175 psi rated operating pressure. Assembly shall be UL, FM, ASSE (No. 1048), and USC/FCCC labeled, and be furnished with tamper switches on both mainline shutoff valves.

All double check detector valve assemblies shall comply with local Department of Health requirements.

Post Indicator Valve Assembly

When required by the local authorities, specify UL listed FM approved post indicator valve (PIV) assembly. PIVs shall be monitored by the building fire alarm system.

Water Motor Alarm Requirements

Specify water motor alarm where the local jurisdiction requires them to be provided. The water motor alarm shall be UL, FM, and California State Fire Marshal listed, rated for a working pressure range of 7 to 175 psig, Nozzle K-factor of 0.7 gpm/psi.

Data Center, Control Centers, and Server Room Protection

For smaller server rooms and telecom rooms of less than 200 sq. ft., specify a fire sprinkler system.

For server rooms and telecom rooms in excess of 200 sq. ft., consider either preaction fire sprinkler system or similar chemical fire suppression systems with standard fire sprinkler system.

FM 200 system shall comply with the most current requirements of ANSI/NFPA-72 Standards, Factory Mutual Guide, and NFPA 2001.

Identification

Specify that proper identification and signage be provided at each sprinkler valve with a brass sign indicating what portion of the system the valve controls. Provide signage at each fire department connection: a brass sign indicating what portion of system the connection supplies.

The fire protection risers shall be provided with brass hydraulic data plates permanently attached to the riser, indicating basis of design, water supply, and pressure requirements of hydraulically designed systems.

Coordination

Fire protection systems shall be coordinated with other specification sections, such as earthwork, architectural, site utilities, concrete, plumbing, structural, electrical, sheet metal, and mechanical.

All electrical equipment provided under fire protection systems shall be specified with wiring diagrams for interfacing with electrical work.

Coordinate with the building fire alarm system for transmitting all flow and tamper alarms, and integrating with fire alarm and smoke control systems.

Guarantee

Specify that fire protection work shall be free from defects of workmanship and materials for one year after filing notice of completion, and remedy any defects developing during this period, free of charge. Manufacturers whose equipment has a longer guarantee period shall provide a written guarantee.

Flushing, Tests, and Adjustments

Specify that after piping installation has been completed, the entire system be flushed to remove foreign substances under pressure as required. Flushing shall continue until water is clear and checked to ensure that debris has not clogged sprinklers.

Specify all testing to be done in the presence of the following personnel: local fire authorities, municipal inspector, Office of the State Fire Marshal, and owner's representative.

Test all piping at not less than 200 psig pressure, unless fire authorities require stricter tests. Test duration shall be two hours for piping downstream of the floor control valves, provided the test is performed during normal working hours. Flush and test until accepted: all underground piping before connecting above grade piping at riser connection.

Specify to perform operational and alarm tests under simulated or actual service conditions, including one test of complete fire protection system installation with all appliances connected. Should any material or work fail in any of these tests, it shall be immediately removed and replaced by new material, and the portion of the work replaced shall be retested.

Installation Contractor Certification

Specify that the fire protection system shall require the installation contractor to submit all certificates in triplicate indicating approval of work, approval or performance of tests, and final inspection issued by fire marshal before final acceptance of sprinkler system.

Cleaning

Specify that the sprinkler heads placed prior to painting be covered with small paper bags, UL approved, which shall be removed only after painting is completed. After painting is completed, remove bags, then clean and polish each head.

19.3 FIRE ALARM SYSTEM OBJECTIVES

Fire alarm system design shall provide safe installation and operations through standardization, installation, and testing requirements, based upon sound engineering principles, applicable state and local codes, and field experience. The criteria set minimum acceptable requirements for design and installation of the building fire alarm system.

Designers shall use these criteria to develop fire alarm systems for new buildings, retrofit of existing buildings, or interior renovation of existing buildings. When the criteria are applied to design of interior renovations of existing structures, the designer shall provide systems that meet either the design parameters of the existing building fire alarm system or these criteria, whichever result in a better system that satisfies applicable codes.

19.4 FIRE ALARM SYSTEM CRITERIA

The fire alarm and notification system shall be UL listed, California State Fire Marshal approved, and manufactured by firms regularly engaged in manufacturing of fire detection, alarm, and communications systems; of types, sizes, and electrical characteristics required; and whose products have been in satisfactory use in similar service for not less than five years. The fire alarm system shall be fully addressable Class B wiring throughout, with all wire in conduit a minimum of ¾".

The fire alarm system shall be specified with the following:

- Fire alarm system shall use closed loop initiating device circuits with individual zone supervision, individual indicating appliance circuit supervision, incoming, and standby power supervision.
- Fire alarm system annunciator panel shall be located in the security control room or fire control room of the building, indicating in summary form the zone alarmed. The annunciator shall be equipped with: indicating lights for each floor indicating the location of the alarm; lights showing the source of the alarm, pull station, duct detector, smoke detector, elevator lobby detector, sprinkler flow or tamper switch, or PIV valve; and shall

provide a full level of information for fire department personnel arriving at the building.

- Provide individually addressable pull stations at each stairwell at each level and at each exit.
- Provide individually addressable smoke detectors in all elevator lobbies, electrical rooms, telephone rooms, utility rooms, and elevator machine rooms.
- Provide individually addressable duct detectors on all supply fan outputs for fans exceeding 2,000 CFM, and on any associated ducted return fans.
- Provide horn-strobes to meet state and federal standards at each corridor, elevator lobby, restroom, open office area, and all other locations required by code.
- Any other zoning or features required by the fire department or other code authorities.
- The fire alarm system shall be fully addressable type with Class B wiring throughout. All wiring shall be in minimum ¾" size conduit. The system shall be complete with initiation and annunciating devices including but not limited to the manual pull stations, ceiling and duct mounted product of combustion detectors, alarm speakers, horns, strobe lights, fire protection water flow detection, valve position indicators, door unlocking, and holding devices.
- The fire control and command panels shall be located adjacent to the fire department emergency response location at the facility exterior. The facility security control and command center shall not be combined with fire control, command panels, and center, without AOC approval.
- The fire control and command panels shall be located adjacent to the fire department emergency response location.

Quality Assurance

All materials specified shall be the best available, new, and approved by UL and the California State Fire Marshal.

Specify that all panels and peripheral devices shall be the standard product of a single fire alarm system manufacturer, under the appropriate UL category.

- Installer shall be qualified with at least five years of successful installation experience on projects with fire detection, alarm, and communications systems installation work similar to that required for the project.
- Comply with NEC as applicable to construction and installation of fire detection, alarm, and communication system components and accessories.
- The fire detection, alarm, and communication system components and accessories shall comply with all federal and state standards.

Identification

Specify that the proper identification and signage be provided at each fire alarm panel, conduits, branch circuits, pull boxes, and J-boxes using industry standard materials and methods.

Coordination

The fire alarm system shall be coordinated with other specification sections, such as architectural, site utilities, plumbing, fire sprinkler system, electrical, telephone, data, security, building management system (BMS), and mechanical systems.

Guarantee

Specify that the fire alarm work shall be free from defects of workmanship and materials for one year after filing notice of completion and remedy any defects developing during this period, free of charge. Manufacturers whose equipment has a longer guarantee period shall provide a written guarantee.

Tests and Adjustments

Specify that after installation has been completed, the entire system be tested in accordance with the NFPA-72 by the contractor in the presence of the local fire and building authorities, and the owner's insurance underwriter.

Installation Contractor Certification

Specify that the fire alarm system installation contractor shall submit all certificates in triplicate indicating approval of work, approval or performance of tests, and final inspection issued by local authorities.

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APPENDIX

All new facilities designed and constructed using the Facilities Standards shall, to the maximum extent feasible, comply with the following codes and any other applicable nationally recognized codes. Requirements exceeding those expressed in the list below are described in the Facilities Standards text.

20.1 BUILDING CODES AND STANDARDS

The following codes and standards shall apply:

- California Building Code (edition in effect as of the commencement of schematic design phase of a particular court project)
- California Government Code
- California Code of Regulations, Title 24
- California Energy Code
- Americans With Disabilities Act (ADA)
- American Disability Act Accessibility Guidelines (ADAAG) (Section 11)
- Principles of Universal Design
- Division of the State Architect (DSA) Access Checklist

20.2 STRUCTURAL DESIGN CODES AND STANDARDS

- California Building Code (edition in effect as of the commencement of schematic design phase of a particular court project)
- International Building Code (edition in effect as of the commencement of schematic design phase of a particular court project)

20.3 MECHANICAL DESIGN CODES AND STANDARDS

Unless specifically directed otherwise by the program document, the following HVACR codes, standards, and preferred design concepts below shall be used as guidelines for design.

The latest editions of publications and standards listed below are intended as guidelines for design. They are mandatory only where referenced as such in the text of this chapter or in applicable codes. The list is not meant to restrict the use of additional guides or standards. When publications and standards are referenced as mandatory, any recommended practices or features shall be considered "required."

Codes

- California Mechanical Code
- California Electrical Code
- California Fire Code
- California Plumbing Code
- California Code of Regulations Title 8, Industrial Safety Orders

Standards

- ANSI/EIA/CEA - 709.1- B-2000 Control Network Protocol Standards
- AMCA: Air Movement and Control Association Inc. Certification Ratings
- American National Standards Association Standards
- American Society of Testing and Materials

- American Society of Mechanical Engineers: ASME Manuals
- American Society of Plumbing Engineers: ASPE Data Books
- ARI: Air-Conditioning and Refrigeration Institute Standards
- ASHRAE: Standard 15: Safety Code for Mechanical Refrigeration
- ASHRAE: Standard 52.2: Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency by Particle Size
- ASHRAE: Seismic Restraint Manual Guidelines for Mechanical Systems
- ASHRAE: Standard 55: Thermal Environmental Conditions for Human Occupancy
- ASHRAE: Standard 62n: Ventilation for Acceptable Indoor Air Quality
- ASHRAE: Standard 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings
- ASHRAE: Standard 100: Energy Conservation in Existing Buildings
- ASHRAE: Standard 105: Standard Method of Measuring and Expressing Building Energy Performance
- ASHRAE: Standard 111: Practices for Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems
- ASHRAE: Standard 114: Energy Management Control Systems Instrumentation
- ASHRAE: Standard 135n: BACnet: A Data Communication Protocol for Building Automation and Control Networks
- ASHRAE HVAC System Duct Design
- California Energy Code: Nonresidential Alternative Calculation Manual Standards
- CISPI Standards: Cast Iron Soil Pipe Institute
- EIA/TIA Standard 862: Building Automation Systems Cabling Standards for Commercial Buildings
- Factory Mutual Standards
- National Fuel Gas Code Standard 54
- National Fire Protection Association: Standard 96
- National Fire Protection Association: Standard 13
- Sheet Metal and Air Conditioning Contractors' National Association, Inc. (SMACNA)
- SMACNA HVAC Duct Construction Standards: Metal and Flexible
- SMACNA HVAC Air Duct Leakage Test Manual
- SMACNA Fire, Smoke, and Radiation Damper Installation Guide for HVAC Systems
- Underwriters Laboratories Standards

Design Guides

- ASHRAE: Guideline #4: Preparation of Operating and Maintenance Documentation for Building Systems
- California Energy Code: Nonresidential Alternative Calculation Manual Guidelines
- California Public Utilities Commission: Pacific Gas and Electric Company: Saving By Design Program
- California Public Utilities Commission: Pacific Gas and Electric Company and Portland Energy Conservation, Inc. (PECI): Building Commissioning Design Guidelines
- California Public Utilities Commission: Pacific Gas and Electric Company Title 24 Nonresidential Mechanical and Acceptance Test Requirements
- IRI: International Risk Insurance
- ISA: Instrument Society of America: Instrument Data Sheet Formats
- IRI: International Risk Insurance

- Lonmark Protocol Guidelines
- National Institute for Occupational Safety and Health: Guidance for Protecting Building Environments from Airborne Chemical, Biological, or Radiological Attacks 20.3 Electrical Codes and Standards

Codes

- NFPA-70 National Electrical Code
- ANSI Std. C-2 National Electrical Safety Code
- NFPA-101 Life Safety Code
- California Code of Regulations, Title 24, all parts, and California Building Code

Standards

- ANSI Standard 241 Recommended Practice for Electric Power Systems in Commercial Building (IEEE Gold Book)
- ANSI Standard 493 Recommended Practice for Design of Reliable Industrial and Commercial Power Systems (IEEE Gold Book)
- ANSI Standard P-1110 Recommended Practice for Powering and Grounding Sensitive Electronic Equipment (IEEE Emerald Book)
- Underwriters Laboratories (UL)

Codes

- California Code of Regulations, title 24
- California Building Code
- California Fire Code
- California Electric Code
- California Mechanical Code
- California Energy Code
- National Electric Code

Standards

- ANSI/EIA/CEA - 709.1- B-2000 Control Network Protocol Specification
- ASHRAE: Standard 62.1: Ventilation for Acceptable Indoor Air Occupancy
- ASHRAE: Standard 111: Practices for Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems
- ASHRAE: Standard 114: Energy Management Control Systems Instrumentation
- ASHRAE: Standard 135n: BACnet: A Data Communication Protocol for Building Automation and Control Networks
- ASHRAE: Guideline #4: Preparation of Operating and Maintenance Documentation for Building Systems
- EIA/TIA Standard 862, Building Automation Systems Cabling Standards for Commercial Buildings
- California Nonresidential Alternative Calculation Method (ACM) Approval Manual, California Energy Code
- ISA: Instrument Society of America: Instrument Data Sheets
- Lonmark Standards by Echelon

Guidelines

- AMCA: Air Movement and Control Association Inc.
- California Public Utilities Commission: California Pacific Gas and Electric Company and Portland Energy Conservation, Inc. (PECI): Energy Design Resources
- California Public Utilities Commission: Pacific Gas and Electric Company and Portland Energy Conservation, Inc. (PECI): Pacific Energy Center, Building Commissioning Design Guidelines
- California Public Utilities Commission: Pacific Gas and Electric Company: California title 24 Energy Code, Pacific Energy Center, Nonresidential Mechanical and Acceptance Test Requirements
- California Public Utilities Commission: California Pacific Gas and Electric Company: Pacific Energy Center, DDC Control Sequences for Demand Reduction and Energy Savings
- Specifying Digital Controls: www.ddc-online.org

- Specifying Lonmark: www.echelon.com, Lonmark Interoperability Guidelines

20.4 HVACR AUTOMATIC CONTROLS CODES AND STANDARDS

Codes

- California Code of Regulations, title 24
- California Building Code
- California Fire Code
- California Electric Code
- California Mechanical Code
- California Energy Code
- National Electric Code

Standards

- ANSI/EIA/CEA - 709.1- B-2000 Control Network Protocol Specification
- ASHRAE: Standard 62.1: Ventilation for Acceptable Indoor Air Occupancy
- ASHRAE: Standard 111: Practices for Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems
- ASHRAE: Standard 114: Energy Management Control Systems Instrumentation
- ASHRAE: Standard 135n: BACnet: A Data Communication Protocol for Building Automation and Control Networks
- ASHRAE: Guideline #4: Preparation of Operating and Maintenance Documentation for Building Systems
- EIA/TIA Standard 862, Building Automation Systems Cabling Standards for Commercial Buildings
- California Nonresidential Alternative Calculation Method (ACM) Approval Manual, California Energy Code
- ISA: Instrument Society of America: Instrument Data Sheets
- Lonmark Standards by Echelon

Guidelines

- AMCA: Air Movement and Control Association Inc.
- California Utilities Commission: California Pacific Gas and Electric Company and Portland Energy Conservation, Inc. (PECI): Energy Design Resources
- California Utilities Commission: Pacific Gas and Electric Company and Portland Energy Conservation, Inc. (PECI): Pacific Energy Center, Building Commissioning Design Guidelines
- California Utilities Commission: Pacific Gas and Electric Company: California title 24 Energy Code, Pacific Energy Center, Nonresidential Mechanical and Acceptance Test Requirements
- California Utilities Commission: California Pacific Gas and Electric Company: Pacific Energy Center, DDC Control Sequences for Demand Reduction and Energy Savings
- Specifying Digital Controls: www.ddc-online.org
- Specifying Lonmark: www.echelon.com, Lonmark Interoperability Guidelines

20.5 ELECTRICAL CODES AND STANDARDS

Codes

- NFPA-70 National Electrical Code
- ANSI Std. C-2 National Electrical Safety Code
- NFPA-101 Life Safety Code
- California Code of Regulations, title 24, all parts, and California Building Code

Standards

- ANSI Standard 241 Recommended Practice for Electric Power Systems in Commercial Building (IEEE Gold Book)
- ANSI Standard. 493 Recommended Practice for Design of Reliable Industrial and Commercial Power Systems (IEEE Gold Book)
- ANSI Standard P-1110 Recommended Practice for Powering and Grounding Sensitive Electronic Equipment (IEEE Emerald Book)

- Underwriters Laboratories (UL)

20.6 LIGHTING CODES AND STANDARDS

Lighting design shall comply with CCR, title 24, Building Codes for energy efficiency standards, and shall strive to achieve a 15 percent efficiency increase above title 24 requirements. This could be accomplished by reducing the connected lighting load, by using controls that exceed minimum code requirements, or by a combination of both.

The Illuminating Engineering Society of North America (IESNA) provides lighting design criteria. Applicable design criteria for spaces typically found in AOC facilities are listed below. While these are guidelines, there may be extenuating circumstances where the criteria are inadequate. In those cases, the design team shall provide an analysis explaining why the IESNA recommendations are inadequate, and an analysis of the proposed system that shall meet user requirements.

20.7 TELECOMMUNICATIONS STANDARDS

Apply the following standards when designing telecommunications systems:

- Judicial Branch of California, Administrative Offices of the Courts, LAN/WAN Network Architecture and Standards (September 16, 2002, Version 2.0)
- ANSI/TIA/EIA-568-B-1 - Commercial Building Telecommunications Cabling Standard Part 1: General Requirements
- ANSI/TIA/EIA-568-B-2 - Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components
- ANSI/TIA/EIA-568-B-2 - Optical Fiber Cabling Components Standard
- ANSI/TIA/EIA-569-A - Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/TIA/EIA-598-B - Fiber Optic Cable Color Coding
- ANSI/TIA/EIA-606-A - Administration for Telecommunications Infrastructure for Commercial Buildings
- ANSI/J-STD-607-A - Commercial Building Grounding and Bonding Requirements for Telecommunications
- ANSI/TIA/EIA-758 - Customer-Owned Outside Plant Telecommunications Cabling Standard
- TIA-942 - Telecommunications Infrastructures for Data Centers (Proposed)

Bulletins issued by ANSI/TIA/EIA in conjunction with the above referenced standards.

20.8 AUDIOVISUAL STANDARDS

The following standards shall apply:

- ANSI Y32.9: Graphic Symbols for Electrical Wiring and Layout Diagrams Used in Architecture and Building Construction
- EIA RS-310-C: (ANSI C83.9) Racks, Panels, and Associated Equipment
- EIA RS-453: Dimensional, Mechanical, and Electrical Characteristics Defining Phone Plugs and Jacks
- National Electric Code (NEC)
- Society of Motion Picture and Television Engineers
- Underwriters Laboratories (UL)

20.9 NOISE ATTENUATION CODES AND STANDARDS

The following codes and standards shall apply:

- ASHARAE HVAC, Sound and Vibration Control Guidelines, American Society of Heating, Refrigerating and Air-Conditioning Engineers
- ARI 443, Air-Conditioning and Refrigeration Institute: Standard for Sound Rating of Fan Coil Air Conditioner
- ASTM E 477, American Society for Testing and Materials: Test for Duct Lining and Silencer Performance
- ASTM C 423, American Society for Testing and Materials: Method for Measuring Sound Absorption

- ASTM E 90, American Society for Testing and Materials: Method for Measuring Sound Transmission Loss
- ASTM E 413, American Society for Testing and Materials: Determination of Sound Transmission Class
- SMACNA, Sheet Metal and Air Conditioning Contractors National Association

20.10 FIRE PROTECTION CODES AND STANDARDS

Fire protection design shall comply with the requirements of the prevailing State of California Building Code, California Fire Code, applicable NFPA Standards, and the local jurisdiction requirements.

Prevailing Codes

- California Building Code
- California Fire Code
- Plumbing Code
- California Electrical Code

Standards

- NFPA-10 - Portable fire extinguishers
- NFPA-13 - Installation of sprinkler systems
- NFPA-14 - Installation of standpipe and hose systems
- NFPA-20 - Installation of centrifugal fire pumps
- NFPA-24 - Installation of private fire service mains and their appurtenances
- NFPA-25 - Water-based fire protection systems
- NFPA-70 - National Electric Code
- NFPA-72 - National Fire Alarm Code
- NFPA-2001 - Clean Agent Fire suppression System
- Underwriters Laboratories (UL)
- Factory Mutual (FM)
- Owner's Underwriter requirements

20.11 SUSTAINABILITY STANDARDS

- LEED (Leadership in Energy and Environmental Design) Green Building Rating System, United States Green Building Council (USGBC)

20.12 ACCESSIBILITY STANDARDS

- Principals of Universal Design, latest version
- California Disabled Accessibility Guidebook 2003 (CALDAG)
- Americans With Disabilities Act (ADA)
- Uniform Federal Accessibility Standards (UFAS)
- ADA Accessibility Guidelines (ADAAG) (Section 11)
- Updated ADAAG (July 2004)
- California Code of Regulations, Title 24
- Division of the State Architect (DSA) Access Checklist

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GLOSSARY

AABC	Associated Air Balance Council
AC	Alternating Current
ADA	America With Disabilities Act
ADPI	Air Diffusion Performance Index
ADR	Alternate Dispute Resolution
AHU	Air Handling Unit
AISC	American Institute of Steel Construction Inc.
ALS	Assistive Listening System
ANSI	American National Standards Institute
AOC	Administrative Office of the Courts
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASSE	American Society of Safety Engineers
ASTM	American Society for Testing and Materials
AV	Audio Visual
AWWA	American Water Works Association
AWG	American Wire Gauge
AWI	Architectural Woodwork Institute
BGSF	Building Gross Square Feet
BMS	Building Management System

BOC	Board of Corrections
CBC	California Building Code
CATV	Community Access Television
CCR	California Code of Regulations
CCTV	Closed Circuit Television
CEA	Consumer Electronics Association
CEA	Canadian Electrical Association
CEO	Court Executive Officer
CFM	Cubic Feet per Minute
CGSF	Component Gross Square Feet
CMP	Cable Management Panel
CMU	Concrete Masonry Unit
CPTED	Crime Prevention Through Environmental Design
CRI	Color Rendering Index
CSO	Court Security Officer
CV	Constant Velocity
DC	Direct Current
DCDV	Double Check Detector Valve
DCV	Demand Controlled Ventilation
DDC	Direct Digital Control
DEPS	Digital Evidence Presentation System
DNA	Deoxyribonucleic Acid
DNL	Day-Night Average Level
DP	Differential Pressure
DPDT	Double-Pole, Double-Throw
DVD	Digital Versatile Disc

DX	Direct Expansion
EIA	Electronic Industries Alliance
ELFEXT	Equal-Level Far-End Crosstalk
EMS	Energy Management System
EMT	Electrical Metallic Tubing
ENG	Electronic News Gathering
ENT	Electrical Nonmetallic Tubing
EPA	Environmental Protection Agency
EPDM	Ethylene Propylene Dimonomer
fc	Foot Candle
FCC	Federal Communications Commission
FCCC	Federal City Communications Corporation
FCS	Family Court Services
FDC	Fire Department Connections
FEMA	Federal Emergency Management Agency
FEMP	Federal Energy Management Program
FPM	Foot per Minute
GPM	Gallon per Minute
GUI	Graphical User Interface
HEPA	High Efficiency Particulate Air
HP	Horsepower
HVAC	Heating Ventilation, Air Conditioning
HVACR	Heating, Ventilation, Air Conditioning and Refrigeration
IAQ	Indoor Air Quality
IHW	Instantaneous Hot Water
IIC	Impact Insulation Class

IMC	Intermediate Metallic Conduit
IPLV	Integrated Part-Load Values
IS	Information Systems
ISO	International Organization for Standardization
IT	Information Technology
IVR	Interactive Voice Response
KPa	Kilo-Pascal
LAN	Local Area Network
LCCA	Life Cycle Cost Analysis
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LPS	Litres per Second
MERV	Minimum Efficiency Reporting Value
MCC	Motor Control Center
MW	Mega Watt
MSF	Modular Systems Furniture
NC	Noise Criteria
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NEXT	Neat-End Cross Talk
NFPA	National Fire Protection Association
NIC	Noise Isolation Class
NRC	Noise Reduction Coefficient
NSC	Nonstructural Seismic Coordinator
NSF	Net Square Feet

NST	National Standard Thread
OCCM	Office for Court Construction and Management
OSHA	Occupational Safety & Health Administration
OTDR	Optical Time Domain Reflectometer
PC	Personal Computer
pH	Potential of Hydrogen
PH	Phase
PIV	Post Indicator Valve
PoE	Power over Ethernet
PPM	Parts per Million
PS-ELFEXT	Power-Sum Equal Level Far-End Crosstalk
psi	Pounds per Square Inch
psig	Pounds per Square Inch Gauge
psi-msec	Pounds per Square Inch Milli-second
PSNEXT	Power-Sum Near-End Crosstalk
PVC	Polyvinyl Chloride
RMS	Root-Mean-Square
RPM	Revolution per Minute
RT	Reverberation Time
SF	Square Feet
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
STC	Sound Transmission Class
TBE	Test and Balance Engineer
TEFC	Totally Enclosed Fan-Cooled
THHN	Thermoplastic High Heat Resistant Nylon Coated
THW	Thermoplastic Heat and Water Resistant Insulated Wire

THWN	Thermoplastic Heat and Water Resistant Nylon Coated
TIA	Telecommunications Industry Association
TTY	Teletype
TVSS	Transient Voltage Surge Suppressor
UL	Underwriters Laboratories
UPS	Uninterruptible Power System
USC	United States Code
USGBC	United States Green Building Council
UTP	Unshielded Twisted Pair Cabling
VAC	Volts Alternating Current
VAV	Variable Air Valve
VAV	Variable Air Volume
VCR	Video Cassette Recorder
VCT	Vinyl Composition Tile
VDT	Video Display Tube
VFD	Variable Frequency Drives
VOC	Volatile Compounds
WAN	Wide Area Network
WG	Water Gauge
WLAN	Wireless Local Area Network
WRB	Weather Resistive Barrier
XHHN	Cross-Linked High Heat Water Resistant Insulated Wire