SUPERIOR COURT OF CALIFORNIA, COUNTY OF LOS ANGELES

NEW GLENDALE COURTHOUSE

EXISTING COURTHOUSE FEASIBILITY REPORT

MARCH 2, 2012

ZGF
ZIMMER GUNSUL FRASCA ARCHITECTS LLP

PREPARED BY:

ZGF Architects LLP
515 South Flower Street
Suite 3700
Los Angeles, CA 90071

Arup North America Ltd.
12777 W. Jefferson Blvd., Suite 100
Los Angeles, CA 90066

Hinman Consulting Engineers
1 Bush Street, Suite 510
San Francisco, CA 94104

Davis Langdon
301 Arizona Avenue, Suite 301
Santa Monica, CA 90401

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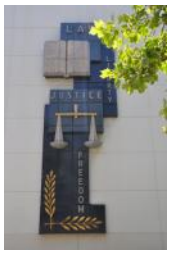
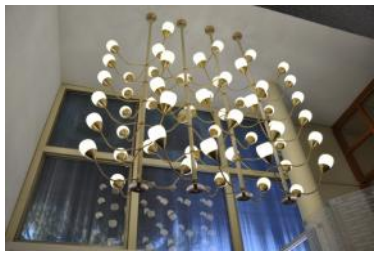


EXECUTIVE SUMMARY

The New Glendale Courthouse project for the Superior Court of California, County of Los Angeles (Court) was initially envisioned to replace the existing courthouse facility due to its many physical and functional deficiencies. Constructed in the mid-1950s, the courthouse is now significantly undersized and has numerous structural, security, life safety and accessibility problems that prevent the Court from providing safe and efficient services in the Glendale area.

The proposed project entails approximately 116,350 square feet, in 3 to 5 stories (maximum) and a basement with a structured parking garage for accommodating up to 323 vehicles on site. These numbers include County Administrative space, added since the original Project Feasibility Report.

Space limitations currently prevent the Court from providing essential services on-site, such as jury assembly, which now must be handled at the Burbank Courthouse 6 miles away. The nearest Self-Help Center is more than 15 miles away. Waiting and queuing areas for the public are severely undersized and the existing 5 courtrooms are significantly smaller than current California Trial Court Facilities Standards. Holding areas are limited and antiquated such that only 3 existing courtrooms can handle in-custody defendants.

There are numerous safety concerns with the existing structure ranging from the lack of a fire-suppression system (sprinklers) to undersized corridors and unprotected exiting. The facility does not meet any currently acceptable level of seismic protection for a public courthouse. Since the structure pre-dates contemporary concerns about blast-resistance, it does not offer the minimal level of protection from threats afforded modern court facilities. Internally, judges and in-custody defendants now share the same corridor with only one door of separation.

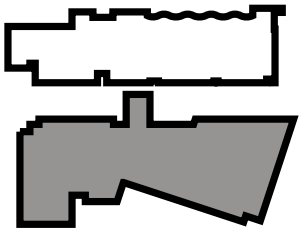
For these reasons and more, the proposed project is intended to remedy these deficiencies by providing a modern, efficient, safe and secure courthouse facility capable of providing needed basic services that are currently unavailable at the existing facility.

In November 2010, ZGF Architects LLP conducted a feasibility study for the Administrative Office of the Courts (AOC) to help determine site selection for the New Glendale Courthouse project. At the time, several options had existed for new sites nearby, but the City of Glendale and community strongly urged the AOC to locate the new facility on the same site of the existing courthouse to reinforce the Civic Center.

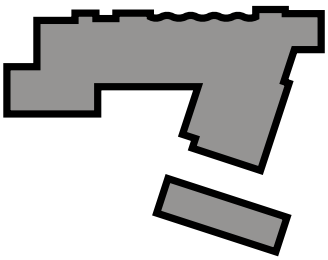
The decision to locate the new facility on the existing courthouse site introduced several new variables into the project's planning: whether to tear-down, incorporate, avoid, re-purpose or preserve the 1956 Courthouse in part or in total. A renovation incorporating the old courthouse requires additional resources and logistics to accommodate continuous court operations during construction. Further, preserving or incorporating elements of the old courthouse introduces a variety of new opportunities and challenges to the project, previously not anticipated.

November 2010 Site Feasibility Study

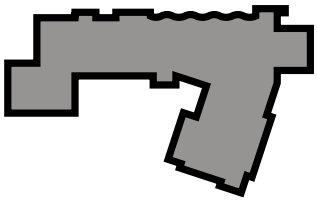
The November 2010 Site Feasibility Study explored numerous options in providing a new modern facility meeting current codes and trial court standards on the existing courthouse site. Options ranged from preserving the 1956 courthouse in total to saving only the Broadway facade and making new connections to the existing public lobbies. Fourteen (14) options and variations were studied by ZGF and of those 3 were selected for publication in the report.



Strategy 1



Strategy 2A



Strategy 2B

Those 3 were deemed the most viable for meeting the Court's mandate to provide a facility compliant with the Trial Court Facilities Act of 2002 (California Government Code Section 70301 et. seq.), its subsequent master plan, SB 1470 (2008), and in particular the California Trial Court Facilities Standards, while respecting the community's wishes to retain some portions of the old courthouse. Each of these referenced mandates have the primary objective of increasing and ensuring the safety and security of California's courthouses for the public, litigants, jurors and families who do business in the courts.

The 3 selected studies from the November 2010 Site Feasibility Report included:

Strategy 1 - build a new facility behind the old courthouse; find another use / tenant for the old courthouse

Strategy 2A - retain the Broadway facade and incorporate a new facility behind with a separate building for County program

Strategy 2B - retain the Broadway facade and incorporate a new facility behind, including the County program within

Following a comparative analysis of pros and cons, Strategy 2B was selected as the preferred alternative as it met the project's objectives with the highest degree of efficiency, feasibility and flexibility.

August 2011 Draft EIR

In June 2011, the AOC published a Notice of Preparation (NOP) and issued the Draft Environmental Impact Report (DEIR) for the project in August 2011. The DEIR identified several areas of potential controversy and issues to be resolved (DEIR Section 2.6), including the evaluation of alternatives to protect the historic resources of the existing courthouse.

The DEIR narratives indicate the AOC's willingness to work with the City of Glendale and the community to retain many of the character defining elements of the old courthouse where practical and feasible. Necessarily, the caveat remains that some architecturally significant elements may not be able to be retained where court functionality, security, seismic, accessibility and life safety matters dictate otherwise.

The DEIR included both an Archaeological Literature Study by Cogstone (July 2011) and an extensive Historic Resources Assessment Report by Daly & Associates (July 2011). The Historic Resources Assessment includes recommended mitigation measures where adverse impacts are unavoidable. In the DEIR, the AOC has indicated its willingness to comply with the Alternative Mitigation Measure (AMM) strategy which entails preparation of documentation to Historic American Building Survey (HABS) Level 2 standards.

October 2011 Draft EIR Comments

As part of the EIR process, the AOC received written letters from 6 agencies and 2 citizens during the 45-day public comment period. Among these comments were several expressing concern that the November 2010 Site Feasibility Study did not show enough due diligence as to why the existing courthouse could not be preserved in its entirety or near entirety and / or refurbished for its original trial court function.

To address these concerns, the AOC engaged ZGF Architects LLP and their engineering consultants to more thoroughly analyze options for feasibly preserving the existing structure and / or its adaptive re-use. The design and engineering team was also charged to describe in greater depth the opportunities, and challenges involved in incorporating the 1956 design with the requirements of the Trial Court Facilities Act of 2002, its subsequent master plan and the 2011 California Trial Court Facility Standards.

The goal of this study is to provide the key stakeholders for the New Glendale Courthouse the ability to re-assess the options and recommendations to make further informed decisions on the future configuration of the facility.

March 2012 Existing Courthouse Feasibility Study

This study analyzes in greater depth the architectural functionality, accessibility, fire & life safety, structural, seismic, mechanical, plumbing, electrical and data systems as well as the physical security conditions under several scenarios of retaining the existing structure.

In response to comments to the DEIR that not enough options for a preservation alternative were included in the original study, options previously studied by the AOC and the Architect and dismissed, due to their not meeting the project objectives, are included in Section 2.3. The bulk of this study, however, focuses on the current conditions of the existing structure and how it may or may not be feasible to utilize as a part of the new expanded courthouse facility.

Four conceptual planning strategies are examined in this study to provide a new comparative analysis of alternatives including:

Strategy 2B - the preferred alternative from the November 2010 Site Feasibility Study - optimizing compliance with the California Trial Court Facility Standards by retaining the Broadway facade and incorporating a new facility behind

Strategy 3 - the preservation alternative - maximizing building preservation by retaining the original courtrooms for their original purpose and building a new facility behind the old courthouse with 3 new courtrooms to current standards and re-furbishing the old courthouse to the greatest extent feasible including re-utilizing the 5 existing courtrooms for their original purpose

Strategy 4A - the adaptive re-use alternative - by building a new facility behind the old courthouse with 8 new courtrooms to current standards on 4 levels; preserve and re-furbish the public concourses of the old courthouse to the greatest extent feasible but adaptively re-use the interiors for administrative (office) functions

Strategy 4B - same as Strategy 4A but with 8 new courtrooms on 2 levels with jury services located in the old courthouse and a new public lobby between buildings.

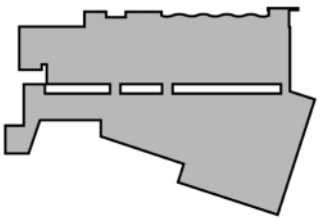
Existing Courthouse Feasibility Study Findings

This study found the following key factors for consideration in determining the feasibility of a preservation alternative:

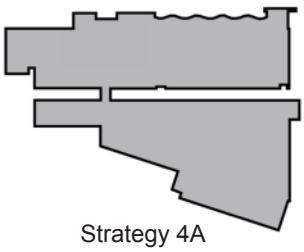
Architectural

Court Functionality

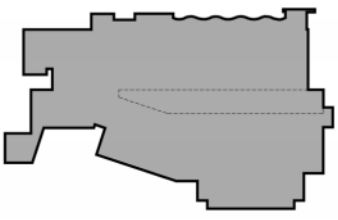
- Original courtrooms and support spaces cannot meet current Trial Court Standards without a full gut and redo of the existing building
- Original courtrooms are significantly undersized and will be reduced further with necessary accessibility and seismic upgrades
- Providing a mix of old and new courtrooms results in lack of parity and trial flexibility
- Retaining original courtrooms at ground level maintains the dangerous condition of judges and in-custodies sharing same corridor
- Retaining existing sub-standard holding area for in-custody defendants maintains current high-risk for a security breach
- Existing public concourses too narrow for proper weapons screening and traffic flow - a new enlarged lobby is needed to meet current acceptable standards



Strategy 3



Strategy 4A



Strategy 4B

Architectural

Court Functionality (continued)

- Existing concourses potentially too small and narrow for increased facility demand

Public Accommodations

- Difficult to create one single point of entry for weapons screening in combined (new + old) facility
- Difficult to provide universal accessibility to meet current law and codes without compromising character defining features

Character Defining Features

- Character Defining Features primarily limited to Broadway facade and public concourses
- Interior ceilings will require replacement to accommodate new building systems and fire suppression
- Some interior courtroom walls will likely require removal and replacement for seismic upgrade
- Existing restrooms should be gutted and replaced to meet current codes

Fire and Life Safety

- Existing structure lacks fire suppression (sprinklers); interior ceilings will require replacement to accommodate
- Existing structure lacks rated exit enclosures; will likely need variance retain as is or modifications that will compromise character defining features
- Existing structural vulnerabilities to threat would likely make existing stairs and exits impassable for evacuation and rescue efforts

Accessibility

- Majority of existing entrances are not accessible
- NE entrance will require extensive modification to meet current law and code
- Courtroom entrances will require modification to meet current law and code
- Courtroom benches, witness boxes, jury boxes will require difficult and extensive modifications to meet current law and code, which will reduce size of usable court space further
- Existing restrooms should be gutted and replaced to meet current code
- Existing public counters require modifications to meet current law and code
- Existing stairs require extensive modification to meet current law and code

Structural

- Annex, or Probation Wing, has major structural non-conformances and weaknesses
- Annex bridges are not adequately isolated and could cause additional damage to main building in a seismic event
- Main building requires extensive seismic upgrades to current standards which will impact and potentially alter character defining elements
- Seismic upgrades to main building will be more costly and difficult if preserved in current configuration
- Seismic upgrades and blast-resistance improvements to main building will be less costly and more readily achieved if interiors are sacrificed, and a new structural system is installed behind the Broadway facade.
- Seismic upgrade to main building preserved in current condition may require extensive modifications to foundations, which could require removal of portions of terrazzo floor

Building Systems

Mechanical

- Existing dual-duct air distribution system is inefficient and should be replaced with single duct VAV system if original courtrooms are maintained
- Alternate, more energy efficient, HVAC systems may be used if original building is adaptively re-used for office functions

Electrical

- Existing equipment is original to 1957 and is difficult to find parts and maintain - all infrastructure should be removed and replaced
- Existing lighting fixtures would be costly to remove, be refurbished and re-fitted to meet current energy requirements; replacement would be less expensive
- Existing building lacks lightning protection
- Existing fire alarm system is minimal
- Existing building lacks code compliant egress lighting

Plumbing

- Existing structure lacks code required overflow roof drains
- Existing restrooms should be gutted and replaced to meet current codes and accessibility law
- Existing fire suppression in basement is cross connected to domestic water supply and needs to be separated
- Existing structure lacks required backflow prevention
- Existing structure lacks earthquake valve for gas supply
- Existing fire water supply pipe needs to be enlarged and replaced back to city main
- Existing sanitary drain line cannot be re-used for any of the schemes and needs replaced

Fire Suppression

- Existing structure lacks fire suppression (sprinklers); interior ceilings will require replacement to accommodate

Telecommunications

- Existing equipment is well managed, relatively functional and clean, but does not meet current standards
- Existing main comm. room size is adequate for an expanded facility if well planned; room should not be used for storage to avoid disruptions to service that could cause a security breach
- Existing abandoned cabling and equipment should be removed to comply with NFPA

Physical Security and Threat Risk

- Existing building has unreinforced masonry and glass curtain walls likely to cause significant damage if explosive device activated on Broadway side
- Existing floor slabs are thin and likely to fail from an air blast
- Existing north stairwells most susceptible to damage from brittle Broadway facade which would impede evacuation and rescue efforts
- If Broadway facade is retained, it should be 'hardened' to meet current standards for blast mitigation
- Facade hardening techniques may have impact on character defining features
- Removal of Annex, or Probation wing, would improve building response to explosive attack
- Strategies with bridge connections are vulnerable to being impassable after explosive attack
- Strategy 2B offers best configuration for blast mitigation design

Construction Feasibility

- Courts will need to temporarily relocate during construction if existing structure is renovated to accommodate court program
- A hybrid facility of old + new courthouse will be less efficient and gross square footage will likely be significantly higher than current allocated program
- Strategy 2B has least gross square feet and is closest to program allocation; Strategy 3 has greatest gross square feet
- Construction costs do not vary considerably across schemes considered. Higher cost of preservation / refurbishment is offset by less new square footage of construction
- If main building is preserved, required seismic upgrades will significantly impact some existing interior finishes and some facades.
- If main building is preserved, required seismic upgrades may extend the construction schedule for additional foundation work and care in surgical interventions

Maintenance & Operations

- A newer facility, built to current codes, construction technologies and energy efficiency standards will have lower maintenance and operational costs than retaining the existing envelope and older components

Existing Courthouse Feasibility Study Conclusions

Incorporation of the existing 1956 Glendale Courthouse building into the New Glendale Courthouse project poses a variety of challenges, opportunities, and constraints. All of the strategies developed and examined in this study will require compromises, either from a functional standpoint or from preserving historic resources.

Based on this study's wide range of analysis on the existing structures and how they might be utilized in an expanded courthouse facility, a full preservation of the existing courthouse and annex cannot be attained without significant compromises to public safety, accessibility, security, long-term operational costs, court functionality and meeting of the program's established criteria and standards. Methods by which one could address some of the deficiencies through renovation will likely alter and compromise the character defining features in the existing structures.

The primary objective of the proposed project is to develop a new courthouse facility to protect the safety and security of and to provide sufficient capacity to the public, litigants, jurors, and families who are served by California's courts. Immediately needed improvements identified in the EIR include, but are not limited to:

- Replacing the unsafe, overcrowded and physically and functionally deficient court - occupied space in the existing Glendale Courthouse
- Providing space for increased criminal and civil court proceedings
- Creating a modern, secure courthouse
- Providing appropriately-sized courtroom waiting areas and jury deliberation rooms, appropriately-sized public counter queuing areas, and adequately-sized in-custody holding
- Creating operational efficiencies through the new courthouse design

The EIR also provides that the California Trial Court Facility Standards require, among many things, that 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
- 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
- be economical to build, operate, and maintain
- provide a healthy, safe, and accessible environment for all occupants
- be designed and constructed using proven best practices and technology with careful use of natural resources

To meet the project objectives, as defined by the EIR, flexibility in the design and engineering approach will be required to accommodate the desired program and to feasibly comply with current building codes, established safety protocols, and accessibility law.

Design approaches to the existing building that retain or refurbish the most meaningful character defining elements, while accommodating the specific needs of the new program and building systems, will result in less compromises to the primary objectives of the project, and therefore, the goals and mandates of the Trial Court Facilities Act of 2002, etc. A quick summary of the design approaches in this study indicates:

Strategy 2B (Preferred Alternative)

- best meets the primary objectives of the project
- preserves meaningful character defining elements
- will best comply with all current codes, laws, standards and modern construction practices
- is the best configuration for effective blast mitigation design
- is the most efficient and functional layout of program spaces
- has the least GSF
- will have the lowest operating and maintenance costs
- offers the best opportunity for an enhanced civic presence

Strategy 3 (Preservation Alternative)

- requires the most compromises to project objectives and program
- provides the greatest degree of historic preservation
- has the least effective blast mitigation design
- requires most compromises to public safety
- requires most compromises to accessibility
- has the least efficient and functional layout of program spaces
- has the most GSF
- will have the highest operating and maintenance costs
- retains civic presence as-is

Strategies 4A & 4B (Adaptive Re-Use Alternatives)

- meet some of the primary objectives of the project
- preserve meaningful character defining elements
- require some compromises to current codes, laws, standards and modern construction practices
- require some compromises to public safety
- require some compromises to accessibility
- retain civic presence as-is
- in 4B, the parking garage is less efficient

The fourteen (14) previous conceptual planning options and the 4 options considered in this study have included a wide spectrum of preservation alternatives. All strategies have in common the following:

- The Annex, or Probation Wing, has significant structural and safety weaknesses and its removal is strongly recommended.
- All existing restrooms require significant modifications to meet current accessibility code and law; a full gut and redo is strongly recommended

In comparing the various pros & cons and opportunities & challenges across the strategies, Strategy 2B carries the most opportunities for meeting the project objectives, the program, the standards, current codes & law, and for employing modern construction practices for high performance structures. Strategy 2B can also preserve the most meaningful character defining elements of the existing structure with the least compromises to the primary objectives of the project.

Strategy 3, the full preservation alternative, requires many compromises to the project objectives, program, public safety, security and accessibility and will still likely result in needed compromises to the existing character defining elements. To a slightly lesser extent, Strategies 4A & 4B would also require similar compromises.

Therefore, it is recommended that Strategy 2B remain the Preferred Alternative for the New Glendale Courthouse project.

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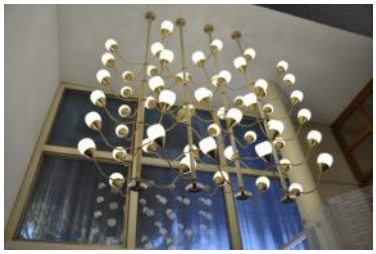
2.0 INTRODUCTION



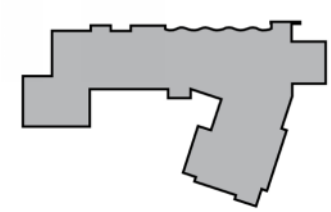
2.1 OVERVIEW

This feasibility study analyzes in greater depth the architectural functionality, accessibility, fire & life safety, structural, seismic, mechanical, electrical, plumbing and data systems as well as the physical security conditions under several scenarios of retaining the existing 1956 courthouse structure.

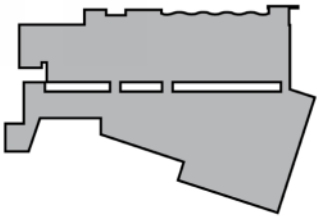
The bulk of the study focuses on the current conditions of the existing structures (main building and Annex (Probation Wing) and how they may or may not be feasible to utilize in the new expanded courthouse facility.

Four conceptual planning strategies are examined in this study to provide a comparative analysis of alternatives. Each study is intended to be as feasible as possible, while meeting as many of the project's objectives as possible. These studies follow on numerous previous studies conducted by the AOC and the Architects.

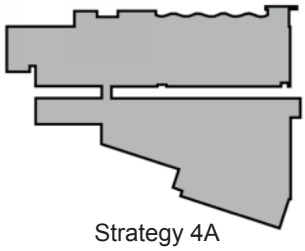
This section covers the general assumptions common to all schemes, an overview of previous studies that have led to the four included in this report and a detailed synopsis of each of the schemes.



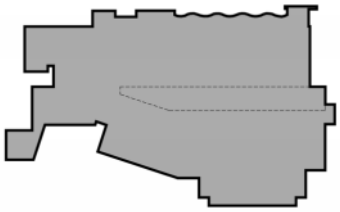
Strategy 2B



Strategy 3

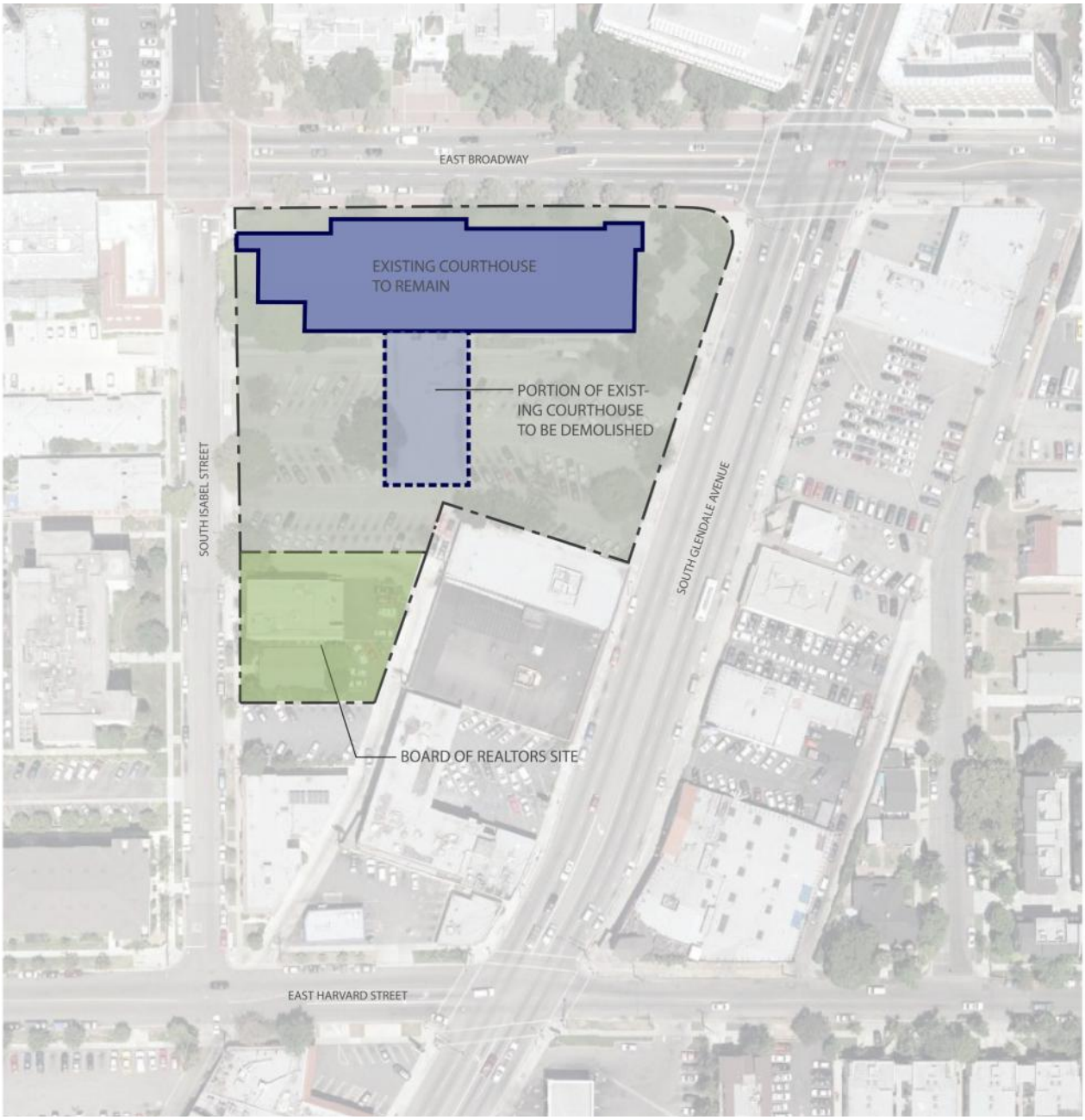


Strategy 4A



Strategy 4B

Existing Glendale Courthouse site and surroundings



2.2 GENERAL ASSUMPTIONS

This detailed study on the feasibility of retaining the existing Glendale courthouse has made several general assumptions that are common to all strategies created and analyzed:

- Removal of the Annex
- Acquisition of the Board of Realtors (BOR) Site
- Structured Parking On site
- Sallyport Off Isabel Street With Ramp Down to New Subterranean Holding Area
- Gut and Redo of all Restroom Facilities
- Existing Office Space and Back Corridors not considered Character Defining Features
- Each Strategy Houses All the Required Program Elements
- All Strategies Will Exceed Program Efficiency Targets
- New Additions Containing Courtrooms Will Have Compliant Floor to Floor Heights
- No Surface Parking Provided

Removal of the Annex

The Annex, or Probation Wing, is structurally a separate building from the main courthouse, being connected by two narrow bridges (16' and 8' wide) at the second level with seismic separation joints. The Annex is elevated on pilotis, freeing the ground space below for automobile parking.

Originally conceived and designed for offices, the Annex has in subsequent years been gutted and re-modeled to accommodate two additional courtrooms (Traffic / Small Claims and Superior Court Department F) as the demand for court functions have exceeded the original capacity of the main building. Materials and finishes used in the remodel differ from the main building, are generally uninspiring and have a look and feel of a different era. Having not been originally planned for public court functions, the court spaces are awkward, undersized and project the image of an after-thought or temporary arrangement that results in spaces noticeably inferior to the courtrooms in the main building.

Outside of the serpentine soffit over the parking area, the Annex exhibits few, if any, exemplary character defining elements from an historic resources standpoint. The west-side aluminum louvers, metal staircase and brick supporting wall at the south end mentioned in the Historic Resources Assessment are similar to elements within the main structure.

The structural analysis conclude that the Annex is considerably weak. It is seismically unstable, largely due to the design of a structure elevated on piloti and the structural design employed to meet lesser seismic codes at the time of construction. The seismic separation joints between it and the main building are undersized. In a seismic event the Annex could do additional harm to the main building.

The security / threat assessment analysis concludes that the Annex makes for a significantly soft target with free vehicular access beneath it. The existing parking lot allows vehicles well inside of the 25' minimum set-back to the main building. The south end of the Annex is also within the 25' set-back zone to the property to the south (see Section 3.6 Existing Floor Plans).

The Annex is also centrally located within the south portion of the site, situating it in a difficult position for adaptation in an enlarged Glendale Courthouse facility.

Given its inefficiencies, lack of exemplary character defining elements, subsequent alterations and its severe deficiencies in terms of public safety, all strategies have the Annex as being removed.

Acquisition of the Board of Realtors (BOR) Site

With the decision to locate the New Glendale Courthouse facility on the site of the existing courthouse, the November 2010 Site Feasibility Study was undertaken to look at how to fit the program and whether additional properties would be needed to accommodate the program.

Several sites in the area were analyzed for functional configurations, particularly in regards to vehicular parking and pedestrian connections. Another important consideration was how to create a civic presence for the new facility. Two sites east of Glendale Blvd. (Honda) and the Board of Realtors site immediately south of the existing courthouse on Isabel Street were considered.

For this study, only the BOR site has been considered for the additional land necessary to accommodate the expanded facility and required parking.

Structured Parking On-Site

Each strategy places a 4 or 5 level (not including judges secure parking in the basement) public parking structure for 240 cars in the same location on the southwest corner of the consolidated site. Strategy 4B shortens the parking structure to accommodate all new courtrooms on 2 levels, which necessitates a 5th level. The other 3 schemes are 4 levels.

The parking structure is located off Isabel, internal to the site, leaving the Glendale Blvd. street frontage available for the courthouse facility to take a more prominent civic position.

Sallyport off Isabel Street

Each strategy places the vehicular sallyport on the west side of the site with a pull-off from Isabel Street, mid-block. Each strategy also plans for a sloping ramp / tunnel down into a subterranean in-custody holding area.

In Strategy 3, the new holding area connects via a new elevator and stairs to the old holding area in the existing building. This is done to continue in-custody defendant access to the existing courtrooms on the ground level of the original courthouse.

Gut and Redo of Restroom Facilities

The public and staff restroom facilities in the original courthouse were designed and built decades before accessibility guidelines and law was enacted. As such, restrooms throughout the building are constrained by dimensions that cannot physically accommodate improvements to the facilities to meet or come close to current ADA law and building codes. Because the restrooms are not character defining elements of the building, each strategy provides opportunities to gut and redo the restroom facilities to bring them up to compliance and to better serve both the public and staff.

Existing Office Space and Back Corridors not considered Character Defining Features

The primary character defining features identified in the Historic Resources Assessment Report were exterior features and the public concourses. Offices and back corridors are given no mention in the report and recent site visits by the design team confirm that there are no significant architectural elements present. Therefore, in each strategy, office space and back corridors are considered available for adaptive re-use.

Each Strategy Houses All The Required Program Elements

The required program is for 99,552 gross square feet (GSF) and an additional 16,800 GSF for County Administration lease space (a total of 116,352 GSF). The strategies in this report are conceptual only and the floor area allotments are not exact on the plan diagrams. However, all program elements, including 8 courtsets and the County space are included in each scheme. Sizes of program elements vary across the schemes due to the existing conditions within the original courthouse and the concept tested. Below is the current departmental program summary.

LIST OF SPACES DEPARTMENT	Court-rooms	Court Staff	ASF	DNSF	TOTAL GSF
COURT FUNCTIONS					
1.0 Court Administration		10	1,516	1,895	2,653
2.0 Courtsets	8	16	21,562	28,031	39,243
3.0 Judicial Chambers & Courtroom Support		9	3,264	4,080	5,712
4.0 Criminal/Traffic Division		21	3,216	4,342	6,078
5.0 Civil/Small Claims Division		13	2,490	3,362	4,706
6.0 Self-Help Center		2	566	708	991
7.0 Jury Services		2	3,341	4,176	5,847
8.0 Public Area: Entry Lobby & Security		-	2,034	2,441	3,417
9.0 Court Operations		24	1,791	2,239	3,134
10.0 Sheriff Operations		7	1,134	1,418	1,985
11.0 Central In-Custody Holding		-	4,632	6,485	9,079
12.0 Building Support		4	9,920	11,934	16,708
GRAND TOTAL	**8**	**108**	**55,466**	**71,108**	**99,552**
GSF per Courtroom					**12,444**
20.0 County Administration		-	10,000	12,000	16,800

Key:

ASF = Assignable Square Feet

DNSF = Departmental Net Square Feet (includes variable grossing factor between 20% - 35% for internal circulation)

GSF = Gross Square Feet (includes 1.4 grossing factor for building support spaces and interdepartmental circulation)

All Strategies Will Exceed Program Efficiency Targets

The original Project Feasibility Report for the New Glendale Courthouse Facility indicated that the facility would encompass approximately 99,552 GSF. A subsequent update to the program to include approximately 10,000 ASF for County Administration has the current number at 116,352 GSF. These numbers had assumed a brand new, ground up facility that could be designed for maximum efficiency.

Incorporating all, or portions of, the existing courthouse facility naturally introduces inefficiencies based on existing conditions. Whereas the design team will endeavor to create the most efficient use of space as possible during the actual design of the facilities, it is very unlikely that these efficiencies will be reached and the resulting facility will likely be significantly larger than originally allocated.

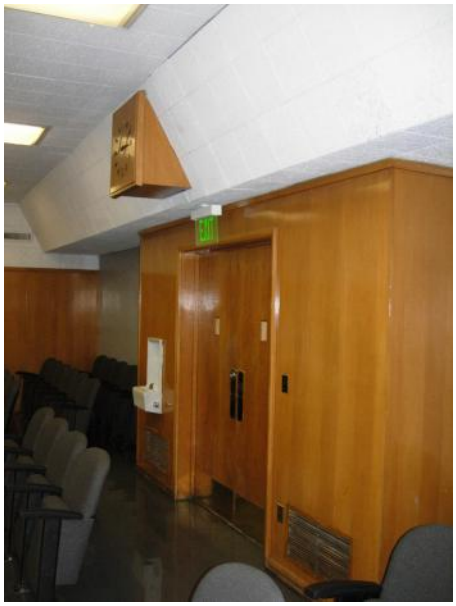
Strategies 2B, 3, 4A and 4B shown in this report range in size from about 128,850 GSF for Strategy 2B to 144,000 GSF for Strategy 3. It should be noted that these are conceptual level estimates and that allowances for building support spaces have not been thoroughly vetted. A more accurate number will be derived during Acquisition Phase programming.

New Additions Containing Courtrooms Will Have Compliant Floor to Floor Heights

The existing 1956 courthouse has 14'-6" floor to floor heights. 2011 California Trial Court Facility Standards require floor to floor heights of 16' to 18', due to the larger sizes of courtrooms, maintaining proper sight lines, etc. Taller floor heights also allow for the possibility of introducing some natural daylighting into the courtrooms and better lighting distribution in general.

All conceptual design strategies need to connect to the existing courthouse in some manner at the ground level if court related functions are housed within. Some strategies may want to connect at the 2nd level as well. In those instances, one of the levels in the new structure may be several feet lower or higher than the existing courthouse. This would entail interior ramps, a partial height lift or a new elevator that can stop at multiple levels to ensure accessibility throughout the facility.

The south facade of the existing courthouse currently negotiates with a lower grade than at the Broadway facade. Each south elevation entrance has several steps to mitigate the grade change from the parking lot. The final design will determine the best floor elevations in the new structure. However, for the purposes of this study, the new structure is assumed to have 18' floor to floor heights at all levels containing new courtrooms and 15' floor to floor heights at levels with administrative functions only.



No Surface Parking Provided

The current program calls for 10 surface parking spots designate for short-term use for visitors and ADA accessibility. Additionally, structured parking is to be provided for 240 cars for staff and public and 15 separate secure spaces at the basement level. Optionally 58 more spaces are to be provided for the County space, either structured or surface.

Due to the site constraints with the existing Glendale Courthouse parcel, all program parking is shown in each strategy to be structured. 10 surface spaces would require approximately 4,000 SF of site area plus driveway approaches. Accommodating this amount of area outside of the 25' blast set-back zone is difficult. Strategy 2B is the only scheme in this study that could potentially accommodate a surface parking area.

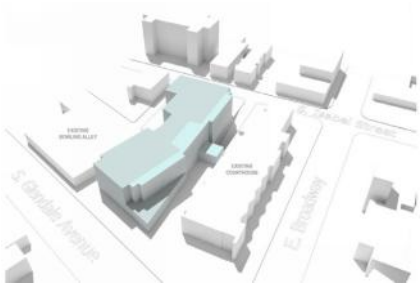
2.3 PREVIOUS STUDIES

Prior to the issuance of the November 2010 Site Feasibility Study, ZGF and the AOC studied numerous options, a few of which are included here and on the next pages, for locating and configuring the New Glendale Courthouse project in a manner that would preserve the existing 1956 Arthur Wolfe courthouse or key aspects of it.

Two main points emerged from these studies:

1) the project does not comply with the California Trial Court Facilities Standards when the original courthouse is utilized for housing the required court set program functions

2010 09 28 STRATEGY 1



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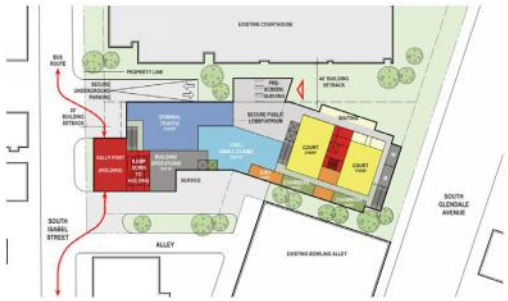
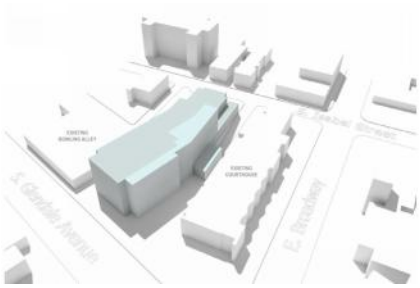
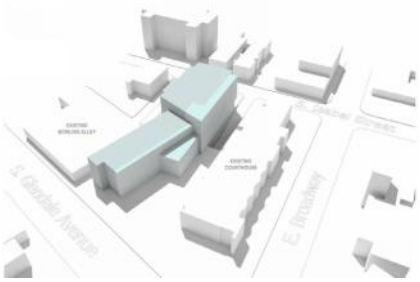
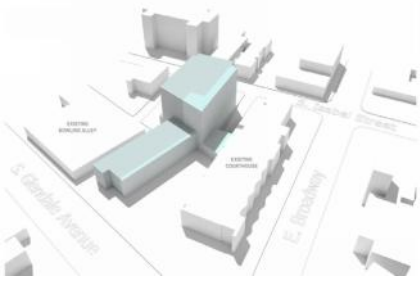




2010 09 28 STRATEGY 3



2010 09 28 STRATEGY 4



2) locating the new facility behind the existing facility diminishes the opportunity to create a civic presence commensurate with the size, scope and function of the expanded facility

As such, the studies concluded that the best approach for meeting the project criteria was to allow for preservation of the most critical character defining elements while allowing design flexibility to provide compliant program spaces within and without the original courthouse in a manner that serves the best opportunities for a grand civic presence coupled with efficient court functionality. Or leave the original courthouse intact and leave it for future program or re-use by others.

2010 10 15 STRATEGY 1A

2010 10 15 STRATEGY 1B

2010 10 15 STRATEGY 2A

2010 10 15 STRATEGY 2B

2010 10 15 STRATEGY 2C

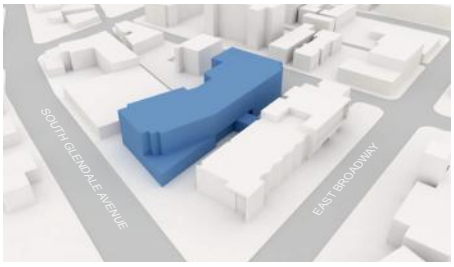
2010 10 15 STRATEGY 3A

2010 10 15 STRATEGY 3B

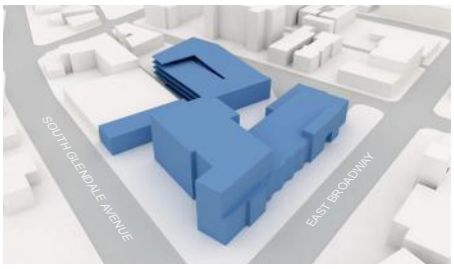
The November 2010 Site Feasibility Study identified and put forth just 3 of the best strategies from the conceptual design effort to meet the project's goals and objectives.

It should be noted that these studies are all conceptual in nature and are not intended to be final design solutions.

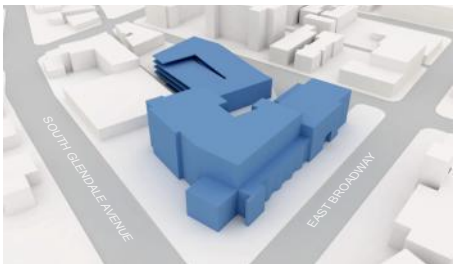
2010 11 22 STRATEGY 1



2010 11 22 STRATEGY 2A



2010 11 22 STRATEGY 2B



* Identified as the Preferred Alternative in the November 2010 Site Feasibility Study

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2.4 CONCEPTUAL STRATEGIES

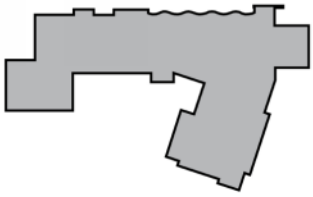
Four conceptual strategies are included in this Existing Courthouse Feasibility study to form a basis for a comparative analysis of approaches to configuring the New Glendale Courthouse:

STRATEGY 2B:
PREFERRED ALTERNATIVE - OPTIMIZING COMPLIANCE WITH THE CALIFORNIA TRIAL COURT FACILITY STANDARDS

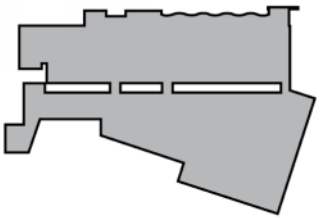
STRATEGY 3:
MAXIMIZING PRESERVATION - RETAINING COURTROOMS FOR THEIR ORIGINAL PURPOSE

STRATEGY 4A & 4B:
ADAPTIVE RE-USE - CONVERTING COURTROOMS TO ADMINISTRATIVE FUNCTIONS

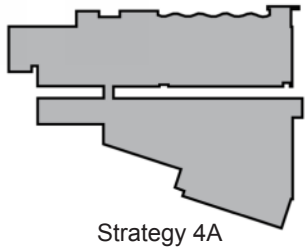
Each strategy addresses the retention of character defining elements and compliance with the California Trial Court Facility Standards from a different approach. Strategy 2B is taken directly from the November 2010 Site Feasibility Report, having been previously identified as the preferred alternative. The remaining strategies were generated for this further study on whether the existing courthouse can or should be preserved in its current configuration.



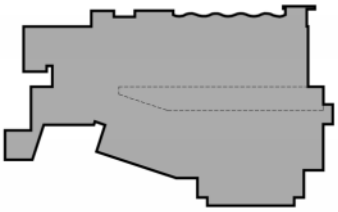
Strategy 2B



Strategy 3



Strategy 4A



Strategy 4B

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STRATEGY 2B:

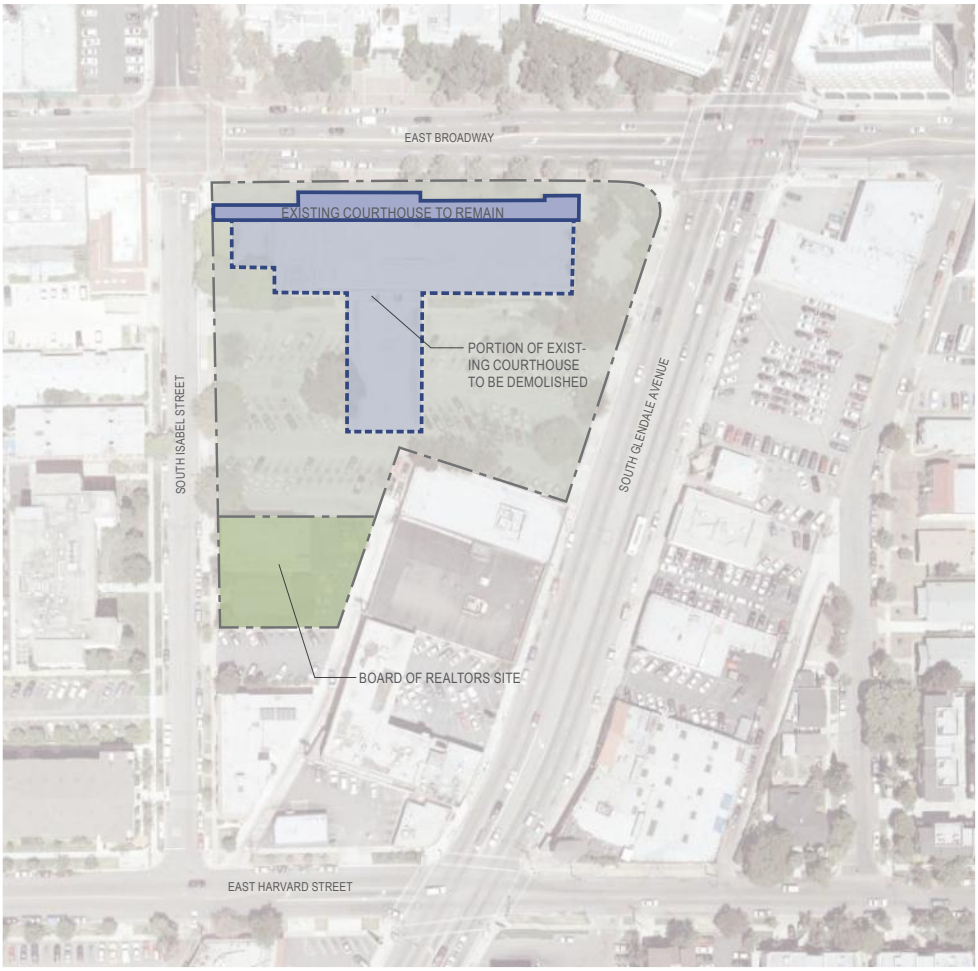
PREFERRED ALTERNATIVE - OPTIMIZING COMPLIANCE WITH THE CALIFORNIA TRIAL COURT FACILITY STANDARDS

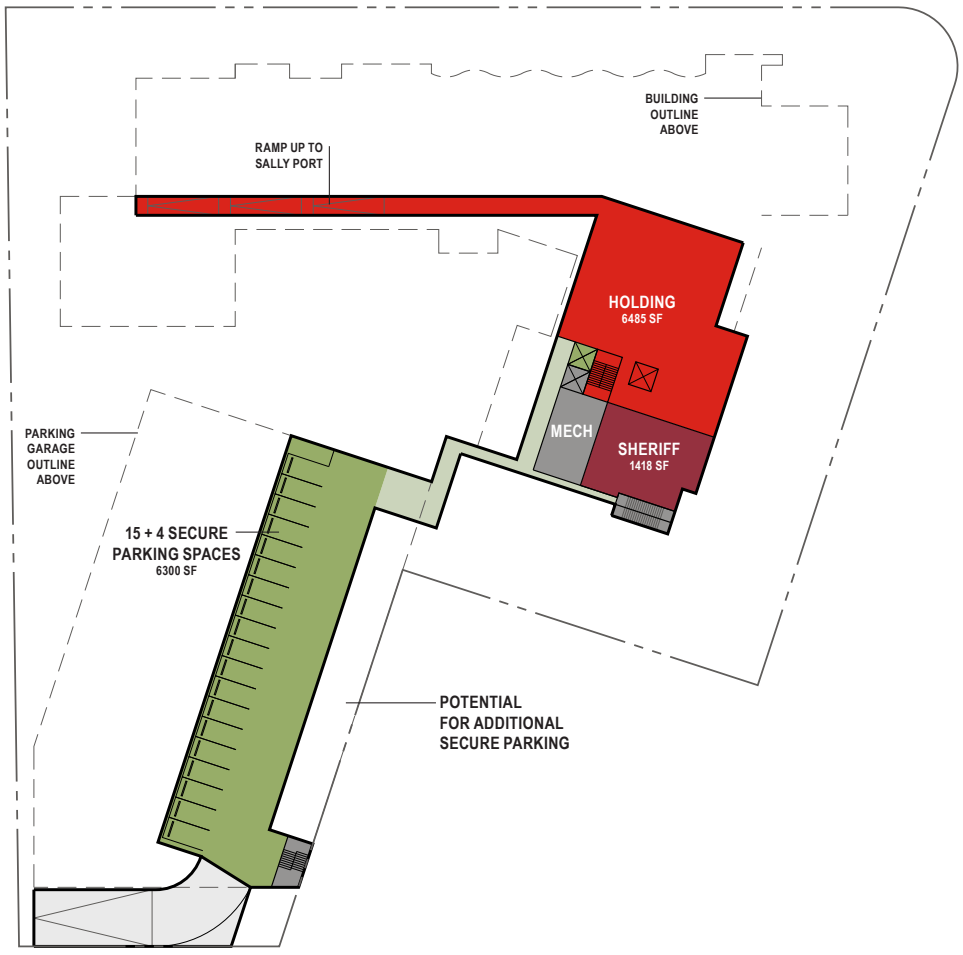
This strategy retains the primary character defining elements of the existing public spaces (lobbies, stairs, benches, chandeliers) and the Broadway facade as outlined by the Historic Resources survey.

New courtrooms and support spaces are provided south of the old public lobby to meet current California Trial Court Facilities Standards, current safety protocol for the transference and holding of in-custody defendants, current fire and life safety codes, and current accessibility law.

To facilitate secure public circulation contiguously through the new and existing spaces, the new addition necessarily connects to the old lobby at the northeast entrance. To facilitate restricted and secure circulation (jurists, jurors and defendants), the new addition necessarily connects to the existing building along the south facade.

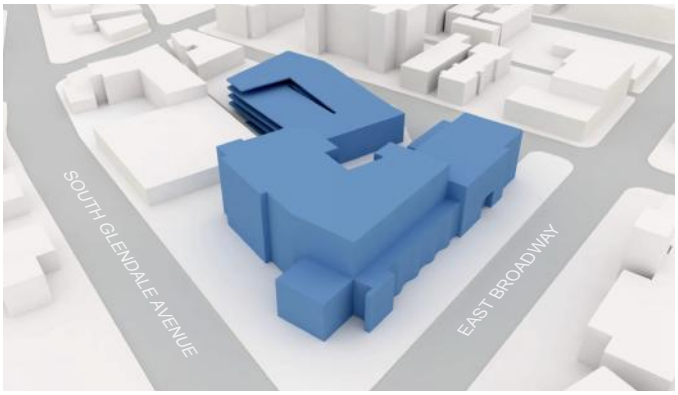
Interior spaces within the existing structure are optimized with programmed space that is logical to court functioning within the context of retaining portions of the existing structure. New construction is proposed south of the old public lobby, which will seismically upgrade the existing building to current code requirements.




BUILDING OUTLINE ABOVE
RAMP UP TO SALLY PORT
HOLDING
6485 SF
MECH
SHERIFF
1418 SF
PARKING GARAGE OUTLINE ABOVE
15 + 4 SECURE PARKING SPACES
6300 SF
POTENTIAL FOR ADDITIONAL SECURE PARKING

Basement

NE Aerial



Ground


EXISTING COURTHOUSE FACADE
OPEN TO BELOW
W
M
STF. SUP.
W
M
COURT OPERATIONS
2239 SF
COURT ADMIN
1895 SF
JURY SERVICES
4176 SF
JURY
410 SF
OPEN TO BELOW
ROOF
ROOF
W
M
COURT
1750 SF
A/C
A/C
CHMBR
400SF
CHMBR
400SF
COURT
1750 SF
A/C
A/C
WAITING
PARKING GARAGE
(4 LEVELS)
PROPERTY LINE

Floor 2


ROOF
COUNTY
10,000 SF
AOC
390 SF
STAFF
SUPPORT
1901 SF
OPEN
TO
BELOW
JUS.
AGEN.
360 SF
EX.
STOR.
480 SF
JURY
410 SF
W
M
COURT
1750 SF
A/C
A/C
CHMBR
400SF
CHMBR
400SF
WAITING
COURT
1750 SF
A/C
A/C
PARKING
GARAGE
(4 LEVELS)
PROPERTY LINE

Floor 3


ROOF
MECHANICAL
OPEN
TO
BELOW
JURY
410 SF
W
M
COURT
1750 SF
A/C
A/C
CHMBR
400SF
CHMBR
400SF
COURT
1750 SF
A/C
A/C
WAITING
PROPERTY LINE

Floor 4

STRATEGY 2B
SUMMARY OF OPPORTUNITIES AND CONSTRAINTS

HISTORIC PRESERVATION

- Retains character defining elements of the Broadway Facade and interior public concourses
- Sacrifices original courtroom interiors for adaptive re-use; modifies east facade with new public lobby

URBAN AND CIVIC RESPONSE

- Provides new civic presence and entry at corner of Broadway & Glendale with high level of visibility to community
- Opportunity to create new landmark image for the City
- Public and Staff parking immediately adjacent to facility with pedestrian access from parking along Glendale Avenue

ARCHITECTURE / FUNCTIONALITY

- Requires court to move during gut and renovation of interior spaces
- Adds third floor to existing building increasing civic presence along Broadway
- Provides 8 new courtrooms to current California Trial Court Facilities Standards
- Provides all court program elements and public services to current California Trial Court Facilities Standards
- Maximizes flexibility for interior space planning for now and in future
- Creates internal landscaped courtyard
- Courts are arranged 2 per floor on 4 levels
- Most efficient planning strategy / least gross square feet

ACCESSIBILITY

- Maximizes flexibility for providing universal access to all points of facility

STRUCTURE

- Provides new code compliant structural system to original building with minimal disruption to Broadway facade and interior public concourses

MECHANICAL, ELECTRICAL, PLUMBING, DATA

- Optimizes lowest costs when installing new MEP and Data systems
- Least ceiling space constraints
- Least interferences with existing construction to remain in place

FIRE PROTECTION

- Optimizes lowest costs when installing new fully automatic sprinkler system

THREAT AND PHYSICAL SECURITY

- Provides maximum building setbacks from street
- Provides maximum new facades to current California Trial Court Facilities Standards
- Provides least amount of vulnerable bridge connections that could become impassable in attack
- Provides best configuration for cost-effective blast mitigation design

CONSTRUCTION FEASIBILITY

- Limits additional costs for careful refurbishment and renovation of some interiors
- Condensed building footprint limits exterior surface area
- Limits expensive maintenance of old exterior components

MAINTENANCE AND OPERATIONS

- Least long-term costs for upkeep of original components and energy expenditures

SUSTAINABILITY

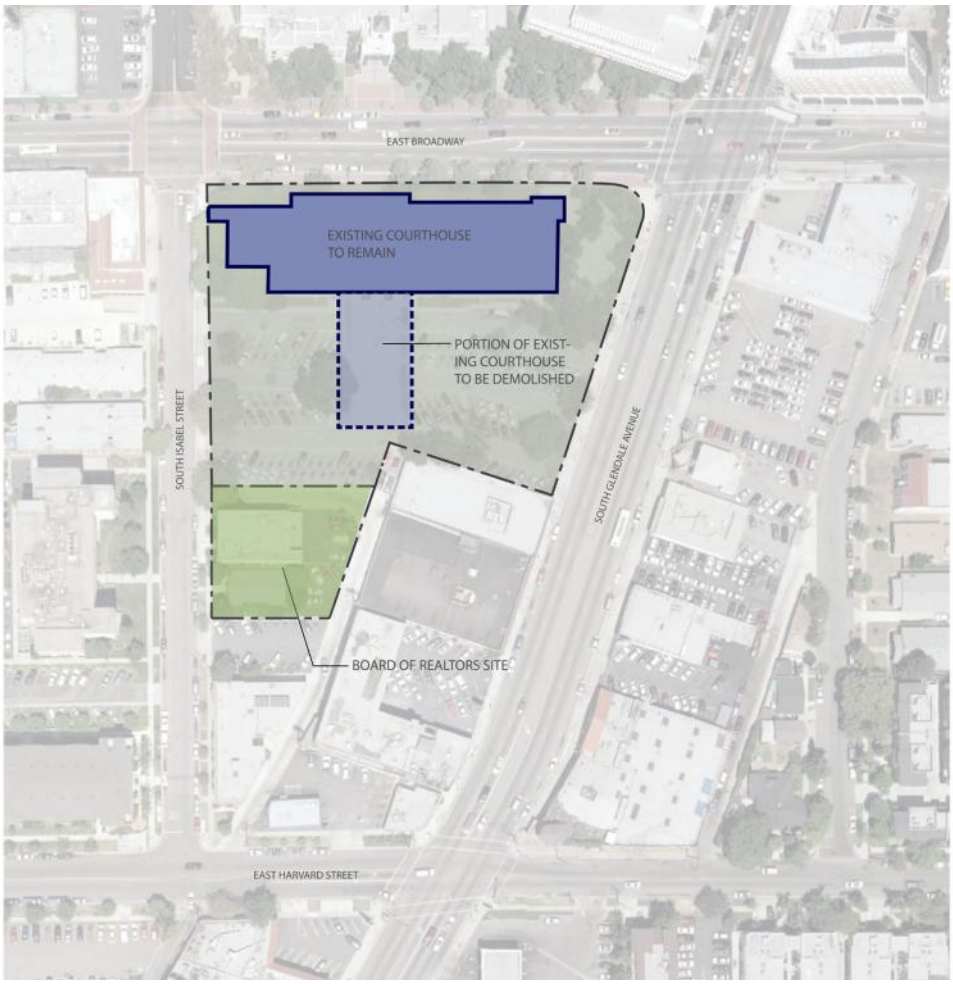
- Retains some portions of existing building
- Maximizes renovation of old building to current energy efficiency standards
- Maximizes new building construction to current energy efficiency standards
- Minimizes building footprint for more permeable surfaces and landscaped areas

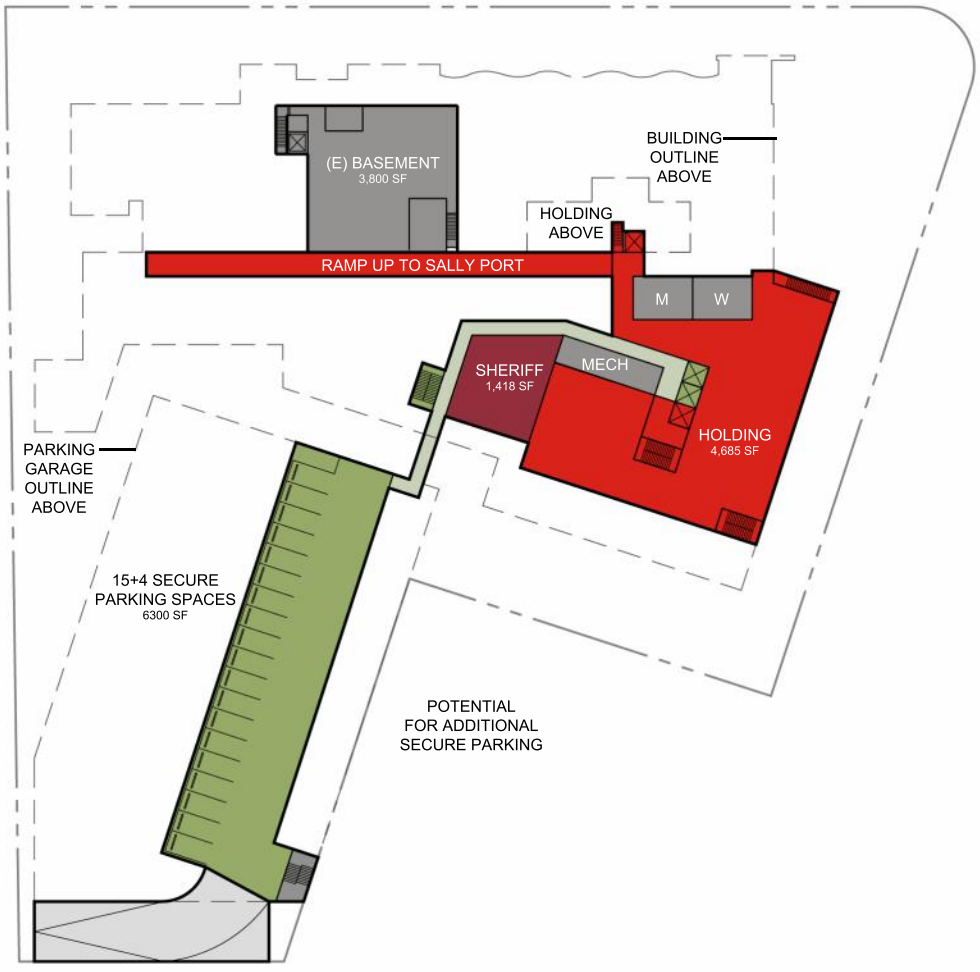
STRATEGY 3:
MAXIMIZING PRESERVATION - RETAINING COURTROOMS FOR THEIR ORIGINAL PURPOSE

This strategy retains most of the existing interiors and their original functions. The 5 original courtrooms are maintained, as are their support spaces (attorney-client conference rooms, jury deliberation rooms, judges chambers). Administrative office functions remain largely in place. Public and private restrooms are shown to be gutted and replaced to meet current code requirements.

In order for as many of the original courtrooms to function for criminal trials (with in-custody defendants), the old holding area has been retained on the ground level and is shown with a new elevator and stair connecting to the subterranean Holding area in the new addition. It should be noted that the 3 original courtrooms on the Second Floor cannot be utilized for criminal trials.

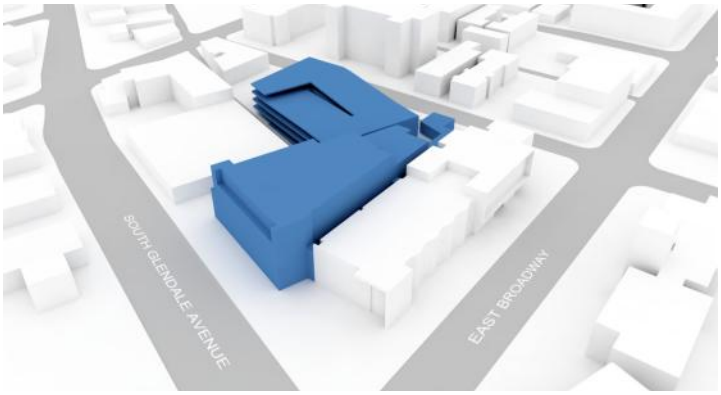
To facilitate tie-ins to the existing public and restricted circulation patterns, the new addition connects to the original structure at multiple points along the south facade.




(E) BASEMENT
3,800 SF
BUILDING OUTLINE ABOVE
HOLDING ABOVE
RAMP UP TO SALLY PORT
M
W
SHERIFF
1,418 SF
MECH
HOLDING
4,685 SF
PARKING GARAGE OUTLINE ABOVE
15+4 SECURE PARKING SPACES
6300 SF
POTENTIAL FOR ADDITIONAL SECURE PARKING

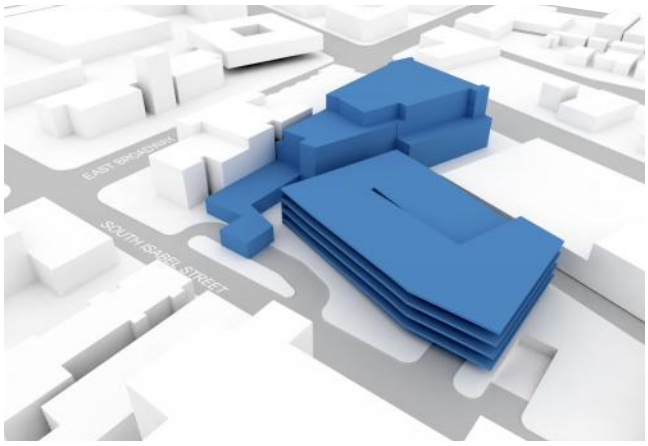
Basement

NE Aerial



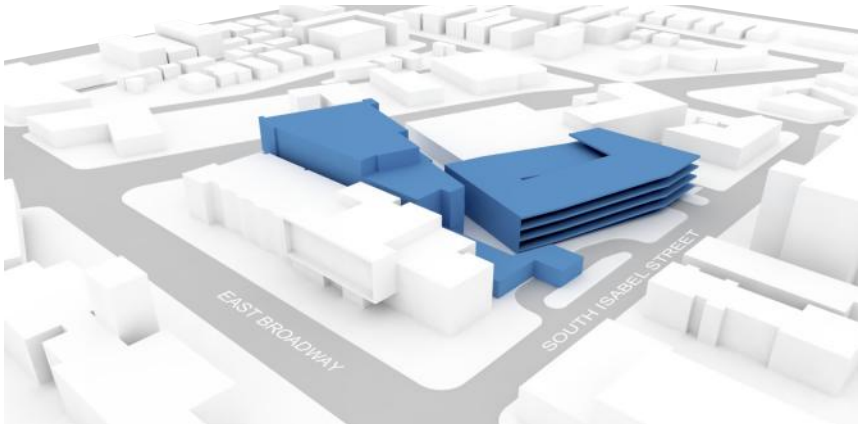
Ground

SW Aerial



Floor 2

NW Aerial



Floor 3


(E)
ROOF
MECHANICAL
7,000 SF
PARKING
GARAGE
(4 LEVELS)
PROPERTY LINE

Floor 4

STRATEGY 3
SUMMARY OF OPPORTUNITIES AND CONSTRAINTS

HISTORIC PRESERVATION

- Retains maximum character defining elements of majority of facades, interior public concourses and original courtrooms
- Retains Spanish Courtyard by Arthur Barton at NE corner and Employee Courtyard at NW corner of site
- Implementation of new building systems constrained, especially at ceilings
- Some walls of original courtrooms may need removal, modification and re-installation for structural upgrades
- Courtroom elements will likely be compromised in order to bring up to accessibility compliance

URBAN AND CIVIC RESPONSE

- Retains civic presence as-is along Broadway
- Creates new security entry/ main lobby between garage, Jewel City Bowl and Glendale Blvd
- Limits opportunity to create a new landmark image for the City
- Public and Staff parking immediately adjacent to facility with pedestrian access from parking toward Glendale Avenue
- Main entry point largely hidden from view
- Building retains low profile - 3 stories maximum

ARCHITECTURE / FUNCTIONALITY

- Requires court to move during seismic upgrade of existing structure
- Retains 5 under-sized courtrooms, 3 of which cannot accommodate in-custody defendants
- Requires difficult modifications to bring courtrooms into accessibility compliance
- Provides 3 new courtrooms to current California Trial Court Facilities Standards
- Retains some original in-custody holding space for existing courtrooms, which share corridor with judges
- Requires new stair and elevator within shell of existing structure to link original and new In-Custody Holding areas
- Minimizes flexibility for interior space planning for now and in future
- Creates circuitous circulation for public and restricted areas
- Courts are scattered throughout facility

ACCESSIBILITY

- Maximum challenges for attaining compliance at original building
- Likely will not fully comply with law by taking compromises through historic structure exceptions

STRUCTURE

- Maximum challenges for incorporating major seismic upgrades (new shear walls and fiber reinforced polymers) while minimizing disruptions to existing interiors
- Likely require upgrades to foundation system

MECHANICAL, ELECTRICAL, PLUMBING, DATA

- Maximizes additional costs for careful intervention when installing new MEP and Data systems throughout the existing building
- Requires localized structural upgrades for new equipment room and riser locations
- Maximum ceiling space limitations
- Possible re-use of some HVAC equipment and distribution routes pending asbestos study

FIRE PROTECTION

- Maximizes additional costs for careful intervention when installing new fully automatic sprinkler system throughout the existing building

THREAT AND PHYSICAL SECURITY

- Retains maximum original facades that are may not be fully compliant with current California Trial Court Facilities Standards
- Provides greatest amount of vulnerable bridge connections that could become impassable in attack

CONSTRUCTION FEASIBILITY

- Maximizes additional costs for careful refurbishment and renovation of some interiors
- Requires more highly-skilled trades to carefully remove, refurbish and re-install components
- Maximizes expensive maintenance of old exterior components, inefficient building envelope
- Extends construction schedule for careful seismic upgrade within original building
- Maximizes costs for careful seismic upgrade interventions in existing building (foundation modifications, shear walls, fiber reinforced polymers)

MAINTENANCE AND OPERATIONS

- Highest long-term costs for upkeep of original components and greatest energy expenditures

SUSTAINABILITY

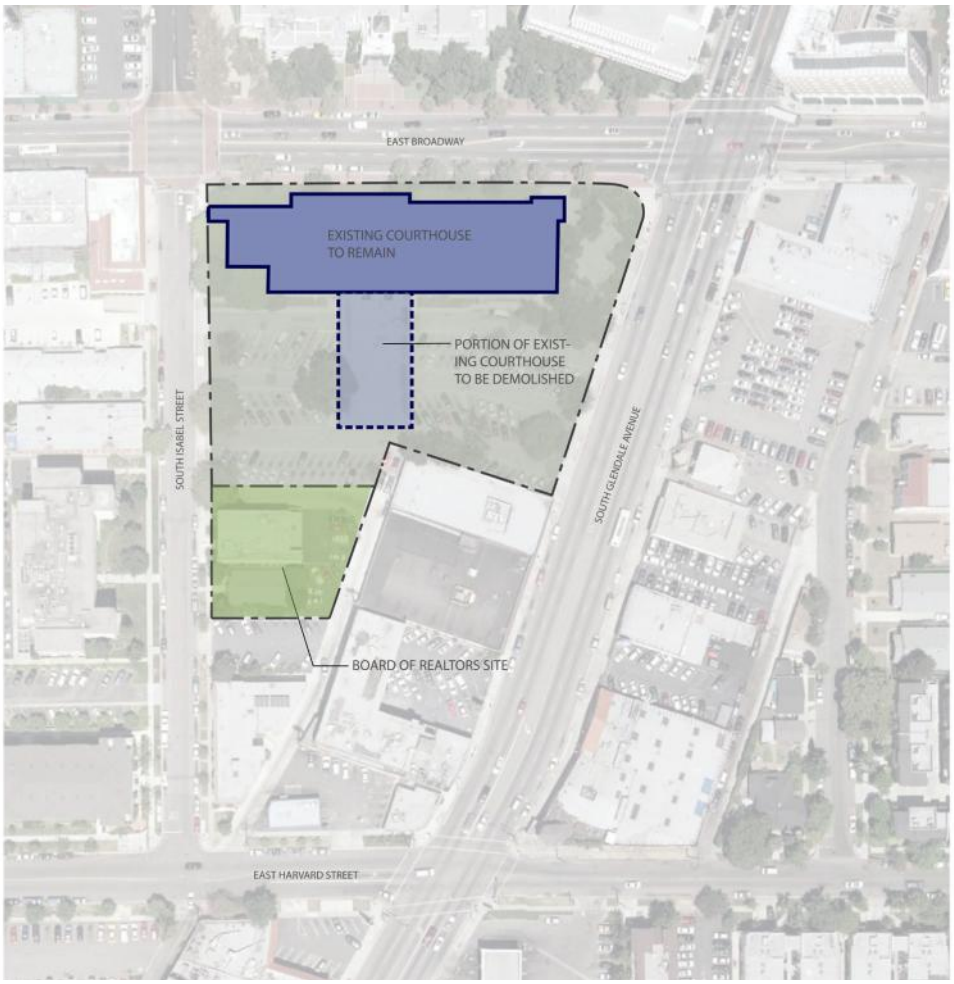
- Retains most portions of existing building
- Limits ability at old building to meet current energy efficiency standards
- Large building footprint limits site permeability and landscaping

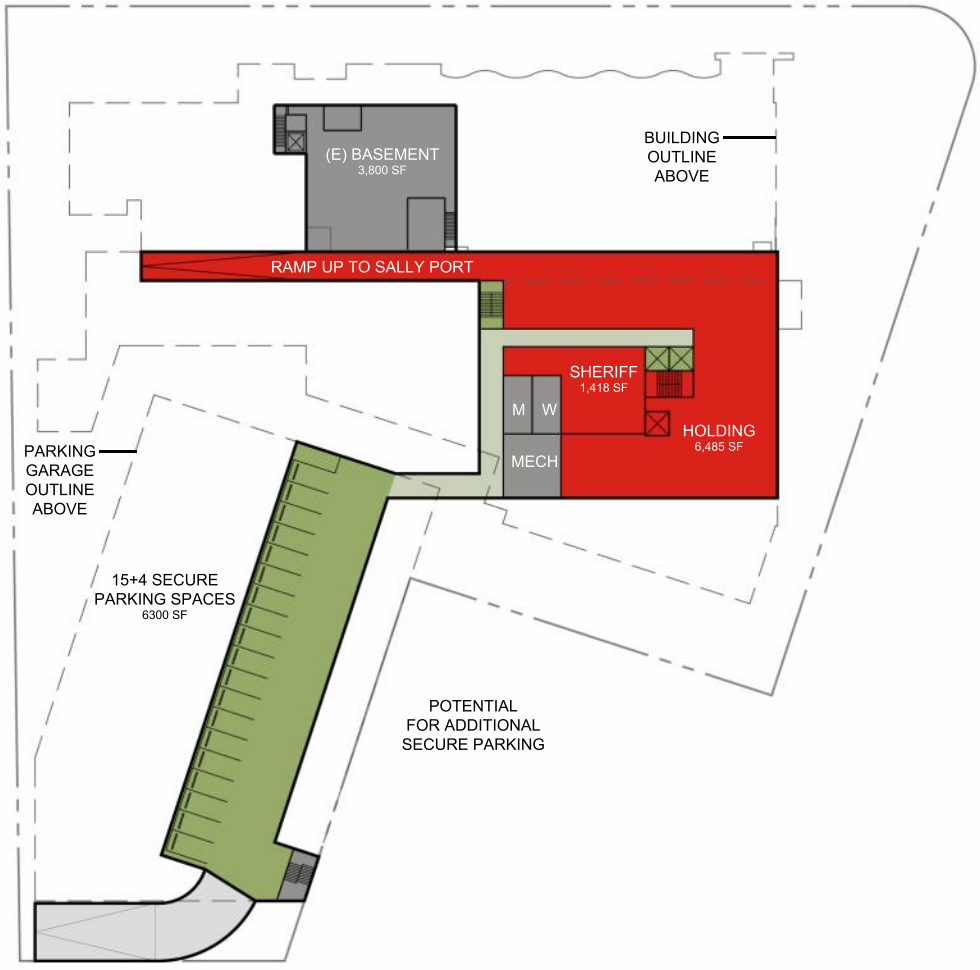
STRATEGY 4A:
ADAPTIVE RE-USE - CONVERTING COURTROOMS TO ADMINISTRATIVE FUNCTIONS

This strategy foregoes re-use of the original courtrooms for trials and instead converts all interiors of the existing courthouse into administrative offices. Functions requiring public counters are placed on the First Floor (Civil / Small Claims and Criminal / Traffic), whereas the Second Floor is primarily given over to lease space for the County.

The original Courtrooms as large column-free spaces are conducive to open office workstation layouts (cubicles), but do not provide staff with access to daylight and views. Skylights could be added to provide natural daylight to the Second Floor spaces with minimal impact on the historic character defining elements. However, the majority of spaces would still lack access to views outside (horizontally).

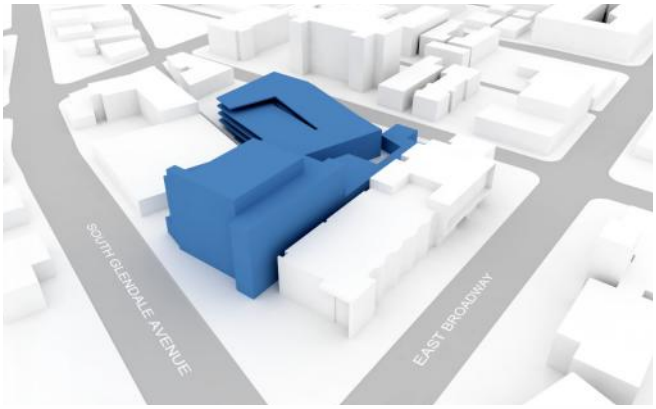
The new addition houses all 8 programmed courtrooms distributed on 4 floors, support spaces, public lobby and weapons screening, and jury services. These spaces will meet current California Trial Court Standards, as well as all other applicable current building codes.




(E) BASEMENT
3,800 SF
BUILDING OUTLINE ABOVE
RAMP UP TO SALLY PORT
SHERIFF
1,418 SF
M
W
MECH
HOLDING
6,485 SF
PARKING GARAGE OUTLINE ABOVE
15+4 SECURE PARKING SPACES
6300 SF
POTENTIAL FOR ADDITIONAL SECURE PARKING

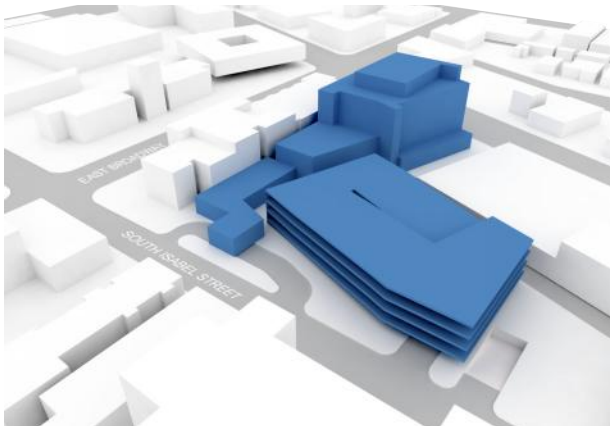
Basement

NE Aerial



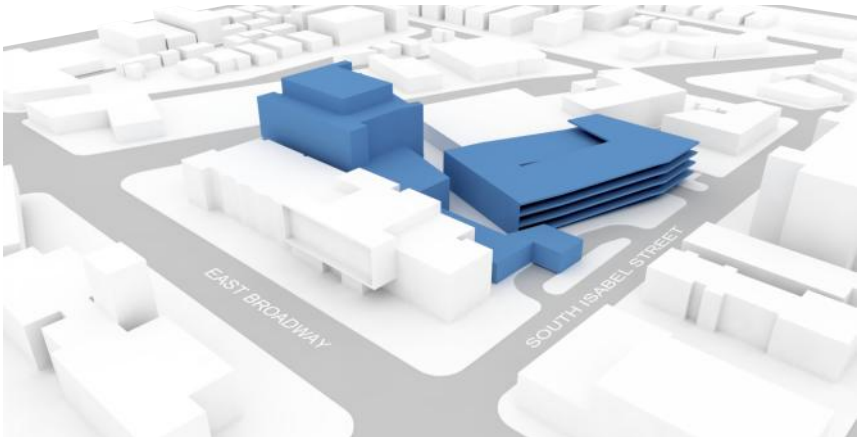
Ground

SW Aerial

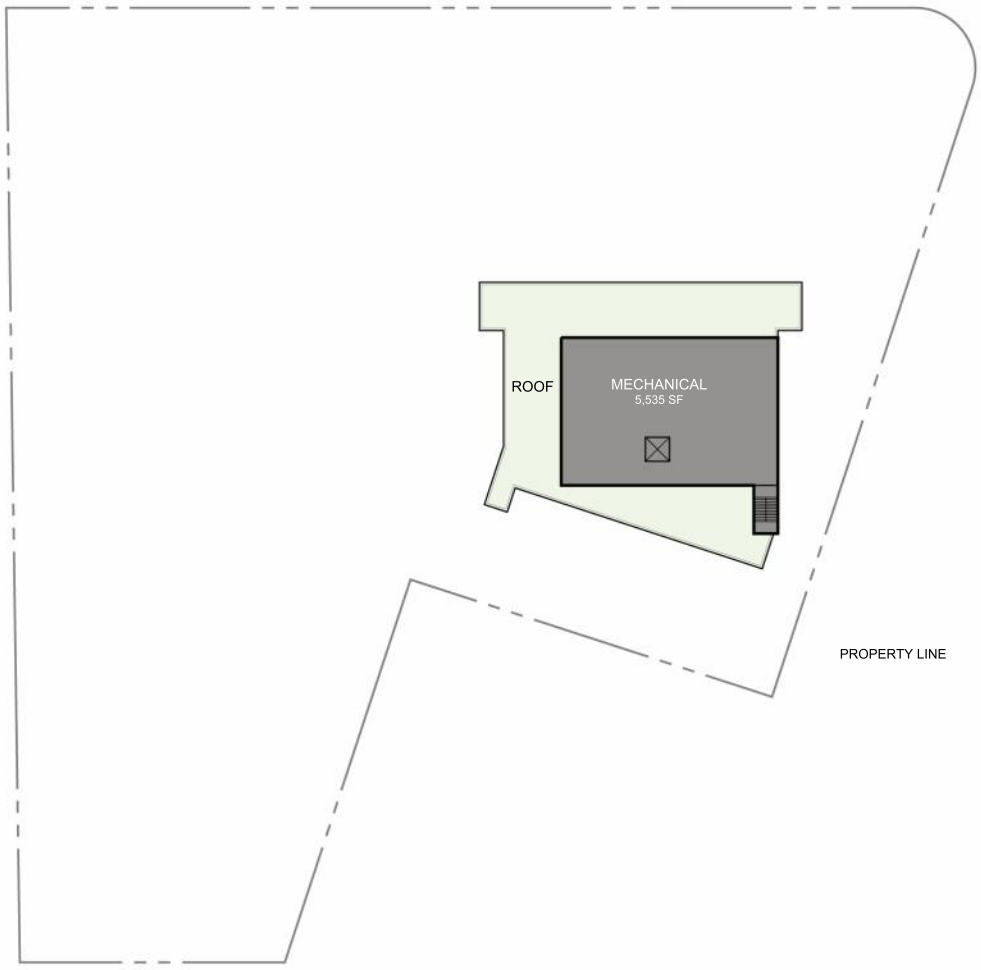


Floor 2

NW Aerial



Floors 3 & 4



Floor 5

STRATEGY 4A
SUMMARY OF OPPORTUNITIES AND CONSTRAINTS

HISTORIC PRESERVATION

- Retains character defining elements of the Broadway & Glendale Facades, interior public concourses
- Retains Spanish Courtyard by Arthur Barton at NE corner and Employee Courtyard at NW corner of site
- Sacrifices original courtroom interiors for adaptive re-use; modifies east facade with new public lobby

URBAN AND CIVIC RESPONSE

- Retains civic presence as-is along Broadway
- Creates new security entry/ main lobby between garage, Jewel City Bowl and Glendale Blvd
- Limits opportunity to create a new landmark image for the City; provides small 5 story tower on Glendale Blvd
- Public and Staff parking immediately adjacent to facility with pedestrian access from parking toward Glendale Avenue
- Main entry point largely hidden from view

ARCHITECTURE / FUNCTIONALITY

- Requires court to move during gut and renovation of interior spaces
- Provides 8 new courtrooms to current California Trial Court Facilities Standards
- Provides all court program elements and public services to current California Trial Court Facilities Standards
- Maximizes flexibility for interior space planning for now and in future
- Courts are arranged 2 per floor on 4 levels

ACCESSIBILITY

- Maximizes flexibility for providing universal access to most points of facility
- Doesn't address accessibility at existing Broadway entries
- Provides fully accessible new courtrooms

STRUCTURE

- Provides new code compliant structural system to original building with minimal disruption to Broadway facade and interior public concourses
- Some costs for careful seismic upgrade interventions in existing building (foundation modifications, shear walls, fiber reinforced polymers)

MECHANICAL, ELECTRICAL, PLUMBING, DATA

- Limits additional costs for careful intervention when installing new MEP and Data systems throughout the existing building
- Moderate ceiling space constraints
- May requires some localized structural upgrades for new equipment room weight and possible new riser positions

FIRE PROTECTION

- Limits additional costs for careful intervention when installing new fully automatic sprinkler system throughout the existing building

THREAT AND PHYSICAL SECURITY

- Provides good building setbacks from street
- Provides some new facades to current California Trial Court Facilities Standards
- Avoids vulnerable bridge connections that could become impassable in attack

CONSTRUCTION FEASIBILITY

- Limits additional costs for careful refurbishment and renovation of some interiors
- Moderate sized building footprint limits exterior surface area

- Retains some expensive maintenance of old exterior components

MAINTENANCE AND OPERATIONS

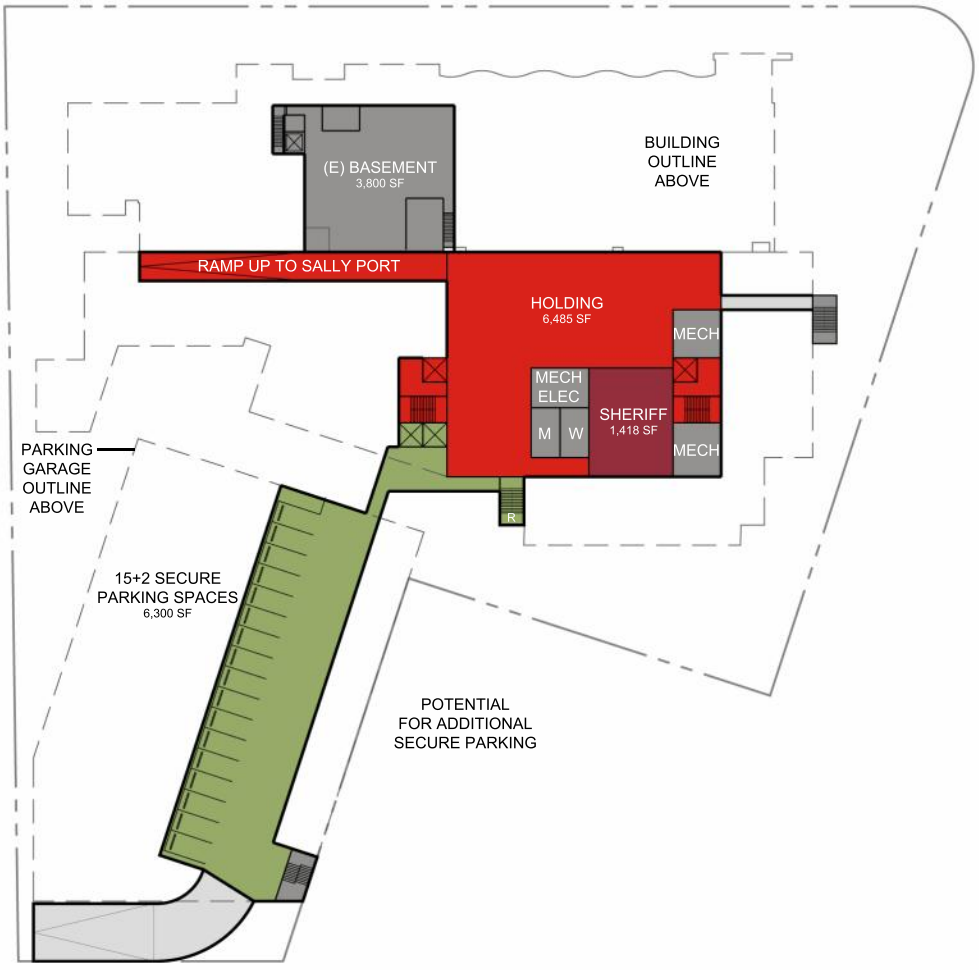
- Moderate long-term costs for upkeep of original components and moderate energy expenditures

SUSTAINABILITY

- Retains some portions of existing building
- Maximizes renovation of old building to current energy efficiency standards
- Maximizes new building construction to current energy efficiency standards
- Large building footprint limits permeable surfaces and landscaped areas

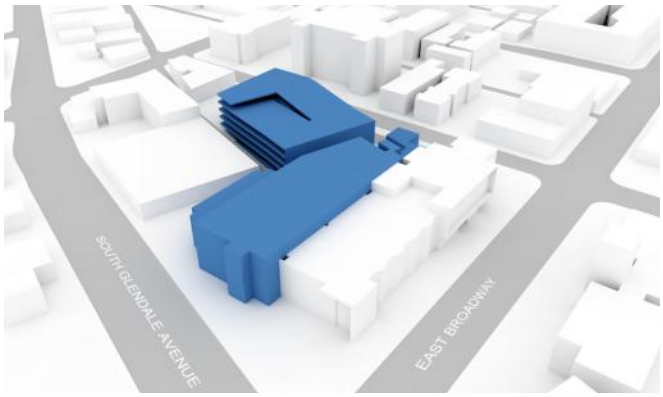
STRATEGY 4B:
ADAPTIVE RE-USE - CONVERTING
COURTROOMS TO ADMINISTRATIVE FUNCTIONS

This strategy is the same as 4A, but places the 8 new courtrooms on 2 levels of a new 3 story building behind the old courthouse. The new addition is held off the old building by 25' feet creating a public atrium and jury services are located within the old building. This approach requires a slightly more aggressive reconfiguration of the interiors to create an adequate security screening area between the old public lobby and the new atrium.


(E) BASEMENT
3,800 SF
BUILDING
OUTLINE
ABOVE
RAMP UP TO SALLY PORT
HOLDING
6,485 SF
MECH
MECH
ELEC
M
W
SHERIFF
1,418 SF
MECH
PARKING
GARAGE
OUTLINE
ABOVE
R
15+2 SECURE
PARKING SPACES
6,300 SF
POTENTIAL
FOR ADDITIONAL
SECURE PARKING

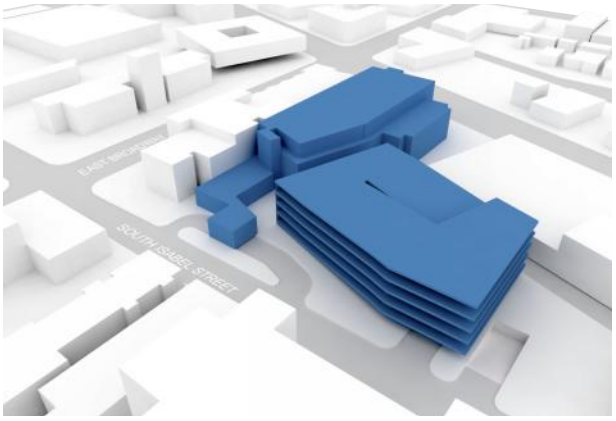
Basement

NE Aerial



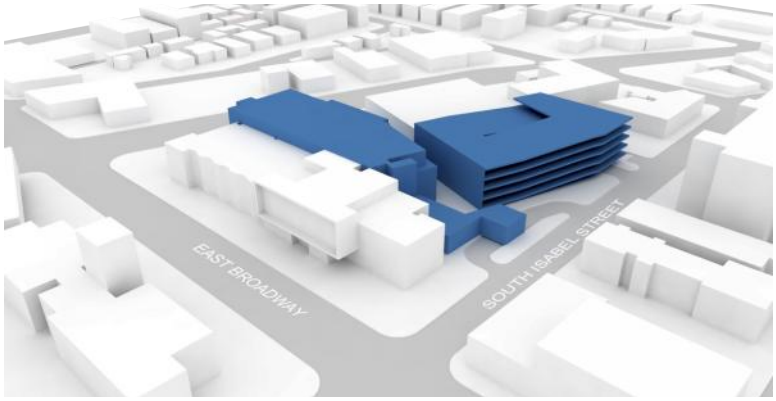
Ground

SW Aerial



Floor 2

NW Aerial



Floor 3

STRATEGY 4B
SUMMARY OF OPPORTUNITIES AND CONSTRAINTS

HISTORIC PRESERVATION

- Retains character defining elements of the Broadway & Glendale Facades, interior public concourses
- Retains Spanish Courtyard by Arthur Barton at NE corner and Employee Courtyard at NW corner of site
- Sacrifices original courtroom interiors for adaptive re-use; modifies east facade with new public lobby

URBAN AND CIVIC RESPONSE

- Retains civic presence as-is along Broadway
- Retains single point of security entry off Broadway
- Limits opportunity to create a new landmark image for the City; provides small 3 story facade on Glendale Blvd
- Public and Staff parking immediately adjacent to facility; pedestrian access poor from garage crosses sallyport along Isabel

ARCHITECTURE / FUNCTIONALITY

- Requires court to move during gut and renovation of interior spaces
- Provides 8 new courtrooms to current California Trial Court Facilities Standards
- Provides all court program elements and public services to current California Trial Court Facilities Standards
- Maximizes flexibility for interior space planning for now and in future
- Courts are arranged 4 per floor on 2 levels
- Provides new public 2 story space between original building and new building
- Provides unsecure public lobby to public counters on ground level Broadway concourse
- Parking garage is shortened, 5 levels and thus slightly less efficient;

ACCESSIBILITY

- Maximizes flexibility for providing universal access to most points of facility
- Doesn't address accessibility at existing Broadway entries
- Provides fully accessible new courtrooms

STRUCTURE

- Provides new code compliant structural system to original building with minimal disruption to Broadway facade and interior public concourses
- Some costs for careful seismic upgrade interventions in existing building (foundation modifications, shear walls, fiber reinforced polymers)

MECHANICAL, ELECTRICAL, PLUMBING, DATA

- Limits additional costs for careful intervention when installing new MEP and Data systems throughout the existing building
- Moderate ceiling space constraints
- May require some localized structural upgrades for new equipment rooms and riser positions

FIRE PROTECTION

- Limits additional costs for careful intervention when installing new fully automatic sprinkler system throughout the existing building

THREAT AND PHYSICAL SECURITY

- Provides good building setbacks from street
- Provides some new facades to current California Trial Court Facilities Standards
- Avoids vulnerable bridge connections that could become impassable in attack

CONSTRUCTION FEASIBILITY

- Limits additional costs for careful refurbishment and renovation of some interiors

- Moderate sized building footprint limits exterior surface area
- Retains some expensive maintenance of old exterior components

MAINTENANCE AND OPERATIONS

- Moderate long-term costs for upkeep of original components and moderate energy expenditures

SUSTAINABILITY

- Retains some portions of existing building
- Maximizes renovation of old building to current energy efficiency standards
- Maximizes new building construction to current energy efficiency standards
- Large building footprint limits permeable surfaces and landscaped areas

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3.0 ARCHITECTURAL EVALUATION




3.1 COURT FUNCTIONALITY

The Trial Court Facilities Act of 2002 and the California Trial Court Facility Standards outline the critical minimum design and planning guidelines for achieving the functional, technical and security requirements of new court facilities for the State of California. The design principles include planning for flexibility to accommodate future growth, clear circulation and way-finding for the public (often using the facility on a first-time basis), sustainable design, physical durability, functional usefulness and accessibility.

Courthouses must maintain 3 distinct circulation systems to adequately protect all users of the facility: public, private and detention. Compromises in how these circulation zones interconnect and work could result increased security risks and are generally not acceptable.

The Trial Court Facilities Act of 2002 and the subsequent 20 year facility master plan that resulted intends to improve and modernize the state's court facilities, many of which are small, over-crowded and no longer efficiently serve the public's needs. Courts that do not function efficiently create delays in services, risk security breaches, cause tensions and aggravations for visitors and diminish the dignity of the judicial system and open access to democracy.

In considering the re-use of the existing courthouse in the New Glendale Courthouse project, there are many important factors that need to function properly. We have identified several areas for study:

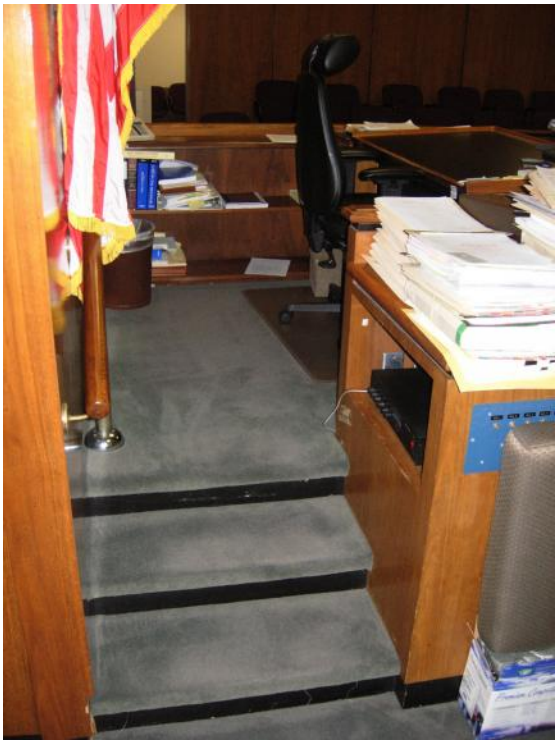
- Courtrooms
- Judges Chambers, Security and Parity
- Security Screening
- Public Waiting and Queuing

Courtrooms

Architectural Strategy 3 in this report, examines the possibility of re-using the existing 1956 courtrooms for their original purpose. The Historic Resources Assessment notes that the courtrooms retain their original Philippine Mahogany panels. There are 2 existing courtrooms on Level 1 (ground floor) and 3 existing courtrooms on Level 2. There are 2 additional existing courtrooms in the Annex or Probation Wing, but none of the approaches retain the Annex for reasons discussed elsewhere in this report. There are multiple challenges to this approach.

First is courtroom size. As evidenced by the table below, the existing courtrooms are significantly smaller than current standards. The rooms were built to accommodate 53-74 seats in the Spectator area, but with no provisions or clearances for accessibility.

Original Courtrooms	Existing Courtroom NSF	Existing Entry Vestibule NSF	Courtroom CA Trial Court Facility Standards / Glendale Program	Vestibule CA Trial Court Facility Standards / Glendale Program	Differential NSF	% Deficient
Municipal Court 102	1,295	0	1,750	64	519	**28.6%**
Municipal Traffic Court	1,487	0	1,750	64	327	**18.0%**
Superior Court Department 3	1,352	0	1,750	64	462	**25.5%**
Superior Court Department D	1,234	24	1,750	64	556	**30.7%**
Superior Court Department E	1,393	0	1,750	64	421	**23.2%**



Current trial court standards are for 45-100 spectators depending on type of courtroom. 4 of the courtrooms lack a vestibule. Most of the issues regarding size between old and new however, center on providing universal access to all participants in the process for jurists, jurors, spectators, clerks, litigants and attorneys.

The existing Judges benches in the courtrooms are 65 SF and are on the minimum end of current standards. The bench is accessed by 3 narrow risers, approximately 27" wide. To make the benches accessible would require extensive modifications toe the casework and on the interior, which would reduce available square footage within the courtroom further and alter the original mahogany panelling.

Judges Chambers, Security and Parity

Existing Judges chambers average about 350 SF, including an existing toilet (not accessible) and closet, which is 12-16% under program.

The goal of flexibility is compromised when courts in a facility vary in size and accommodations. Re-using the existing courtrooms in Strategy 3 introduces a situation where the 3 courtrooms on the existing 2nd Floor cannot handle in-custody defendants due to the existing layout of the holding areas. The conceptual diagram connects a new enlarged holding area for the new courtrooms with a tie to the existing area to give in-custody defendant access to the 2 existing courtrooms on the Ground Level.

The existing Holding area represents a significant weak point in security for jurists as in-custody defendants essentially share the same corridor, separated by only one gate. Further, when in-custodies create disturbances such as noise or clog up toilets, the sounds and smells travel down the shared corridor into the judge's chambers.

Because the existing facility has 5 courtrooms and supporting spaces such as judges chambers and the program necessitates 8, the issue of parity is a concern. This is particularly problematic in Strategy 3, where there would be 3 modern compliant right-sized courtrooms and 5 restored / refurbished courtrooms that are undersized and perhaps not accessible in all manners. The issue regarding the shared corridor between jurists and in-custodies is also a likely parity issue.

Security Screening

A critical program element that must function exceptionally well is the security screening aspect of staff and public. One of the challenges in incorporating the existing courthouse is arrival point and pedestrian flow through the public spaces and to secure points. The existing public concourse on the Ground Level is accessible only at the northeast corner (not the original main entrance) and is on average 9.5' to 10' wide.

Weapons screening and the subsequent queuing areas by modern standards is 950 SF. The current Entry Lobby & Security Screening area occupies approximately 350 SF, or about 63% deficient.

Considering the narrowness of the existing public concourse, if the screening systems could be laid out dimensionally in width, the proper area would take up nearly the full length of the lobby, rendering it near useless for any other public counter functions. For the entry / lobby / screening area to be compliant with modern standards, it will likely need to move away from the existing entrances to a new position within the complex.

Public Waiting and Queuing

The narrowness of the existing public concourses discussed above also poses a challenge for public waiting outside of courtrooms and queuing at public counters. Originally designed for 5 courtrooms at an average of 1350 SF each, as the facility expands to 8 courtrooms at 1750-2100 SF, the public service capacity and public circulation areas need to logically expand at a similar scale (+200%) to handle increased traffic.

Original Judges Chambers	Existing NSF	CA Trial Court Facility Standards / Glendale Program	Differential NSF	% Deficient
Judges Chamber Level 1	347	400	53	**13.3%**
Judges Chamber Level 1	344	400	56	**14.0%**
Judges Chamber Level 2	334	400	66	**16.5%**
Judges Chamber Level 2	354	400	46	**11.5%**
Judges Chamber Level 2	351	400	49	**12.3%**




3.2 PUBLIC ACCOMMODATIONS

Many visitors to the courthouse are often one-time visitors. A clear sense of entry and clarity of wayfinding from the street or vehicular parking is critical. With modern security concerns and procedures, having one secure entry point for the facility is advantageous.

The existing Broadway facade offers reasonably clear entry points at the NE and NW corners of the building. Unfortunately, the NE corner facing the busy intersection of Glendale and Broadway and the corner clearly demarcated by the architecture as being the principal entry is not ADA accessible. Also, the main entry doors off Broadway are elevated by a couple steps, leaving a side door facing Isabel as the only accessible entry. This is where the weapons screening station is currently located.

As evidenced by the many concept studies conducted previously and as a part of this study, finding a single clear point of entry in an expanded complex is challenging.

To restore the primary building entrance to the NE corner, modifications would need to be made to the existing entrance and stair to make them ADA accessible. Currently, there is a 2 riser stair up to the main public concourse. Strategy 2B, the preferred alternative, locates the primary point of entry and security station at this former grand entrance. At this juncture, there is ample room for a compliant entrance that would clearly split secure (to court functions) and unsecure (to public counter) zones. Strategies 3 and 4A rely on creating a new security entrance off the back of the building close to the parking garage, whereas Strategy 4B requires some sacrifice of interiors to create a right-sized weapons screening area.


3.3 CHARACTER DEFINING FEATURES

The Historic Resources Assessment articulates several character defining features of the 1956 Arthur Wolfe design that make it exemplary of mid-century modern civic architecture. These are primarily related to the exterior facade along Broadway and the interior public concourses. The list includes

Exterior

- the massing and composition of the Broadway facade
- copper foil embedded mosaic glass tile columns
- serpentine brick walls
- ceramic sculpture by George Stanley “Law, Liberty, Justice, Freedom”
- northeast landscaped courtyard by Arthur Barton

Interior

- 2 custom lobby chandeliers
- terrazzo floors
- curved wood benches
- Philippine Mahogany paneling in Courtrooms


DEPARTMENT 1

The primary character defining elements of the interiors are largely limited to the public concourses. Although the wood paneling in the courtrooms is given mention in the Assessment, the rather straight-forward design and application of the paneling is not particularly exemplary or unique to mid-century modern architecture. The remaining courtroom casework in the spectator rail, judge's bench and witness box, as well as the ceiling treatments, are consistent with a modernist approach to clean, simple lines, but do not embody any distinctive characteristics, method of construction or contain any high artistic value.

Behind the courtrooms, the back corridors and offices do not appear to contain any significant elements of an historic nature. Light fixtures are not particularly unique, wall finishes are simple plaster and flooring appears to be vinyl asbestos tile.

A fairly straight line can be drawn through the facility that demarcates the public concourses from the rest of the buildings interiors. Thus, one could readily distinguish a way to refurbish and preserve the primary character defining elements in the public space while re-configuring the remaining non-public interiors.

3.4 FIRE & LIFE SAFETY

The existing courthouse poses several significant fire and life safety issues in its current configuration. Structural / Seismic and Physical Security issues are covered in Sections 4 and 6 respectively.

- No fire suppression system
- Exiting capacity of existing public concourses
- No rated / enclosed exit stairs

No Fire Suppression System

There is a fire sprinkler system located in the basement. However, there is none throughout the occupied spaces of the building. More detailed information on the system and the implications of not having a fully sprinklered building are discussed in Chapter 5.

Installation of an automatic fire sprinkler system will have some effect on any spaces to be architecturally preserved, requiring a careful and thoughtful intervention.

Exiting Capacity of Existing Public Concourses

Public exiting from the upper concourse currently happens through two non-rated open stairwells at each end of the building. Both stairs are accessed from the 2nd Level Lobby through a wood and glass partition that previously held a pair of 30” doors. The existing clear width is 56”, representing the most constrained (narrowest) exit width.

The stair widths are 54” nominal with a clear width in excess of 48” between handrails (CBC 1007.3).

Similarly, exiting from the second floor private spaces also exit through two non-rated, open stairwells at each end of the building. These stairs are also 54” wide nominally.

To calculate the Occupancy Load Factors for 2nd Level exiting, we used “40 net” (CBC Table 1004.1.1) for the court “well” area without fixed seating and the actual numbers of fixed seats for the spectator areas. The resulting number of occupants likely to be using the north concourse and stairways from the 2nd level in an emergency is approximately 250 people when all 3 courtrooms are in use. A smaller number would be expected to use the private corridor and southern stairwells. All spectators are assumed to use the north public concourse as are litigants. Judges, clerks, reporters and jurors are assumed to exit to the private corridor to the south.

The result at the north concourse is a required width of corridor and doorways leading to stairs is 50” and the required width of stairs is 75” overall (37.5” each). The existing widths are adequate, however the 40 net numbers calculated for the wells leave only 2-4 litigants exiting to the north concourse. In the case of a larger trial with multiple litigants, the actual number could be quite higher. As such, the existing clear width of the glass partitions is very near capacity.

No Rated / Enclosed Exit Stairs

None of the 4 interior exit stairways in the existing building are enclosed and therefore are not constructed as fire barriers or of fire resistance rated construction as required by current code (CBC 1022.1) for stairways serving an occupancy load greater than 10. Two stairs serve 4 levels. Courtroom Dept 3 exits directly into the NE stairwell. This issue will require discussions with the building official if the stairs remain in their current configuration.

3.5 ACCESSIBILITY

When the existing courthouse is renovated, a number of improvements should be made to bring the facility into compliance with current Americans with Disabilities Act (ADA) law and building codes. These include, but are not limited to:

- Entrances
- Exterior Terrazzo
- Courtroom Entrances
- Courtroom Judges Bench, Jury Box, etc
- Restrooms
- Public Counters
- Stairs

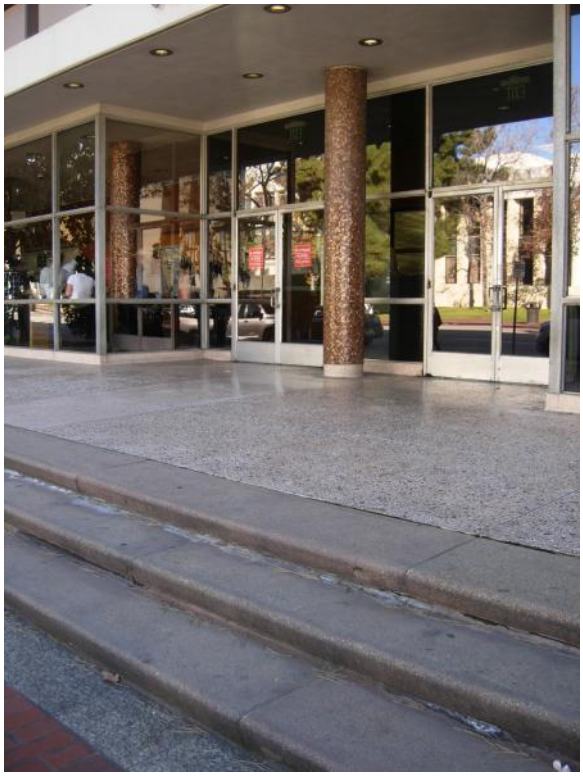
Entrances

The existing courthouse has 9 entrances and exits, which we have identified hierarchically on the floor plans in section 3.6 as “primary”, “secondary” and “tertiary” based on their function and civic presence.

Current accessibility code requires that all entrances and ground-level exits be accessible for persons with disabilities ((California Building Code (CBC) 1114B.1.3 and 1133B.1.1)) and that they be connected to an accessible route to public transportation stops, accessible parking and passenger loading zones and to public streets or sidewalks.

Only 3 of the 9 existing entrances nearly qualify as accessible. The current single point of entry for public and staff for security is actually a tertiary entrance served by a long continuous ramp that begins remotely from the nearest primary building entrance. Although this is the same entrance that everyone uses, the distance of the ramp away from the primary formal courthouse steps does not meet the intent of ADA law in providing equivalent access.

The primary entrance to the existing courthouse as originally envisioned by Arthur Wolfe in 1956 is



located in the NE corner of the facility facing the corner of Broadway and Glendale Blvd. and the Spanish Courtyard by Arthur Barton An existing 2-riser stair that is part of the grand communicating stair in the vestibule prevents wheelchair access. To make this entrance ADA accessible, a ramp would need to be introduced, or the lobby floor and exterior grade raised slightly to provide a level path. Either intervention will alter the existing terrazzo.

The second primary entrance to the existing courthouse is off a passenger loading zone on Broadway and is located centrally on the north facade up a series of formal steps between planters.

The other public entrance served by a ramp is located centrally on the south facade of the building from the parking lot.

A tertiary staff entrance on the NW corner of the building is located off the NW ramp, but accesses a very limited footprint of the building, due to steps in either direction once inside.

All other entrances and exits have existing steps to grade making them non-compliant with ADA.

The CBC allows exceptions for full compliance with accessibility law for qualified historic structures where technically infeasible (CBC 1135B.1 and State Historic Building Code, Part 8, Title 24). However, a state owned facility whose mission is providing fair and equal access to justice for all would be compromising in a fundamental area of federal law and state code if all aspects of the facility are not brought up to compliance.

Exterior Terrazzo

There is extensive terrazzo paving outside the primary public entrance off Broadway. The Historic Resources Assessment Report does not mention it, but the exterior terrazzo is a continuation of the color and design of the flooring on the interior. However, there are numerous structural cracks in the paving and portions of slab have lifted exceeding the minimum change of level (CBC 1124B.2) of up to 1/4” vertical for accessible paths. The slip resistance of the existing exterior terrazzo, especially when wet, should be further studied to verify it complies with current code (CBC 1124B).

It would be difficult and costly to repair the cracks or reset the broken pieces and would likely have unsightly results. Replacement of the terrazzo, either to match the original design or with a new and different material, is recommended.

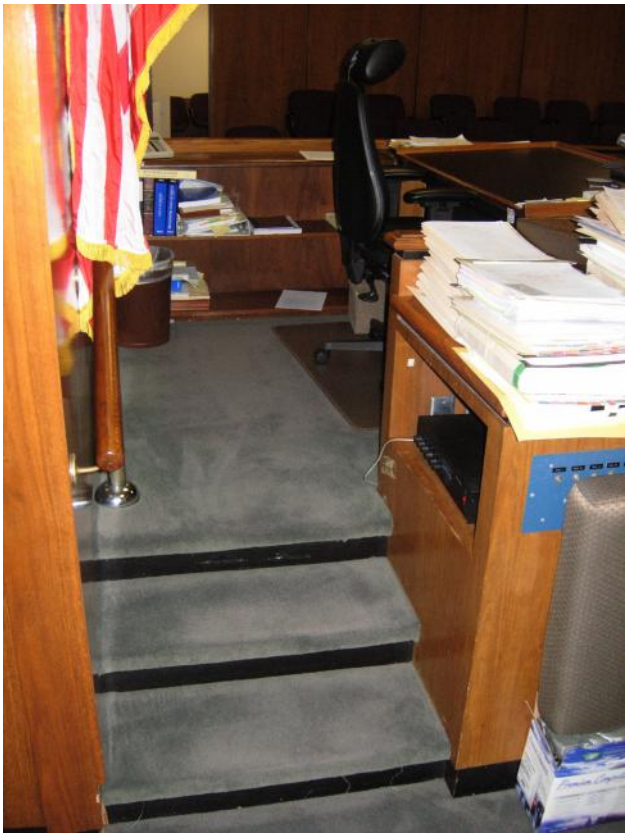
Courtroom Entrances

Each of the 5 existing courtrooms in the main building have double doors with 30” leafs, set inside custom wood millwork. The doors are manually operated and do not provide the minimum 32” clear width per code

(CBC 1133B.2.3.1) when opened 90 degrees. If the facility is renovated such that the courtrooms were to continue their use as courtrooms, the entrance doors should be replaced with code compliant hardware and with one leaf increased in width to 36” to achieve the minimum 32” clearance.

Courtroom Judges Bench, Jury Box, etc

All areas and seats of a courtroom are required to be fully accessible with separate paths of travel for the disabled to be avoided. Floor levels of components vary to provide proper sightlines. Although multi-stop lifts are allowable in retrofit situations, they are not preferable.



All 5 of the existing judges benches in the main building courtrooms are currently not accessible. The benches are elevated 18" and are accessed via 3 narrow risers, approximately 27" wide. To be brought up to compliance, the steps would need to replaced with a ramp or a two stop motorized lift. Neither is a viable option due to the small size of the existing courtrooms and both require extensive modifications to the casework to provide a minimum clear accessible width (32" for up to 24" distance; 36" otherwise)

A third option would be to raise the back corridor floor level in some manner or by a ramping system outside the courtroom. This would require an extensive effort to address the 3 different levels: courtroom, witness box and judges bench.

The existing witness boxes are elevated 12" and are accessed via 2 narrow risers, also approximately 27" wide. As with the judges benches, they are not currently accessible. They could be retrofitted with ramps or motorized lifts, but the existing courtrooms do not have sufficient space.

The existing jury boxes are bi-level and elevated 6" and 12" from the courtroom floor. They are currently not accessible and could also be retrofitted with ramps or motorized lifts if space were not an issue.

It will be very challenging to bring the existing courtrooms into compliance without extensive retrofitting of the existing wood paneling, millwork and casework and a significant portion of floor space will need to be sacrificed to accommodate ramps and or lifts.

Restrooms

The existing courthouse contains numerous small toilet facilities throughout the main building. Each Jury Deliberation room has two single toilets - one for men and one for women (10 total). Each Judges Chamber has a single toilet (5 total). Each floor has multi-toilet facilities for men, women, staff and 2 public areas (6 total). The In-Custody Holding area also contains toilet facilities. None of the existing 21+ toilet facilities are currently accessible. The courts are presently served by a nearly accessible facility at the back of the 2nd level of the Annex (Probation Wing).

To bring any of the existing toilet facilities into compliance will require extensive modifications. Existing wall locations do not come close to providing the necessary dimensional clearances per current code. Therefore, a full gut and redo is expected in any renovation to the original courthouse.

The existing toilet facilities do not contain any character defining features nor do they embody any distinctive characteristics of a type, period, or method of construction that represents the work of a master or possess any high artistic value.

Public Counters

The existing courthouse has several public walk-up counters such as for Criminal, Traffic and Public Defender on the Ground Level and Civil Small Claims on the 2nd Floor. The current service counters are not compliant with code (CBC 1122B.5) where a minimum of 36" in counter length is to be provided with a maximum height of 34". The transaction counters at the Criminal and Traffic windows are currently 42" above floor height.

Stairs

Two public communicating stairs exist, largely in their original form at both ends of the main public concourses on the north side of the building. Each is composed of similar materials and detailing, with terrazzo treads and risers, brass nosings, painted metal posts and hardwood guardrail caps and handrails.

Typically, the stairs have uniform tread and riser dimensions of 11" and +/- 6 1/2" respectively with a leading edge (nosing) projection of 1", which are compliant with current code (CBC 1009). Handrails are mounted 32" above the steps, whereas current code is 34" to 38". It appears that 42" high guardrails on the NE stair were retrofitted sometime after original construction. The NW stair lacks required 42" high guardrails where the stair is greater than 30" above the ground floor on the open side.

In all cases, handrails do not extend beyond the bottom and top treads per current code (CBC 1012.6) and post assemblies are large enough to allow a 4" or greater sphere to pass through (CBC 1013.3). Existing handrails are continuous but at 3" x 1 1/2" exceed graspability dimensions (CBC 1012.3).

The CBC allows exceptions for full compliance with accessibility law for qualified historic structures where technically infeasible (CBC 1135B.1 and State Historic Building Code, Part 8, Title 24). However, a state owned facility whose mission is providing fair and equal access to justice for all would be compromising in a fundamental area of federal law and state code if all aspects of the facility are not brought up to compliance.

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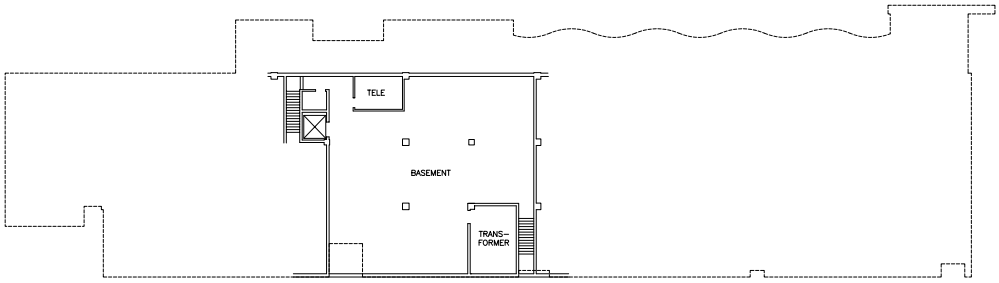
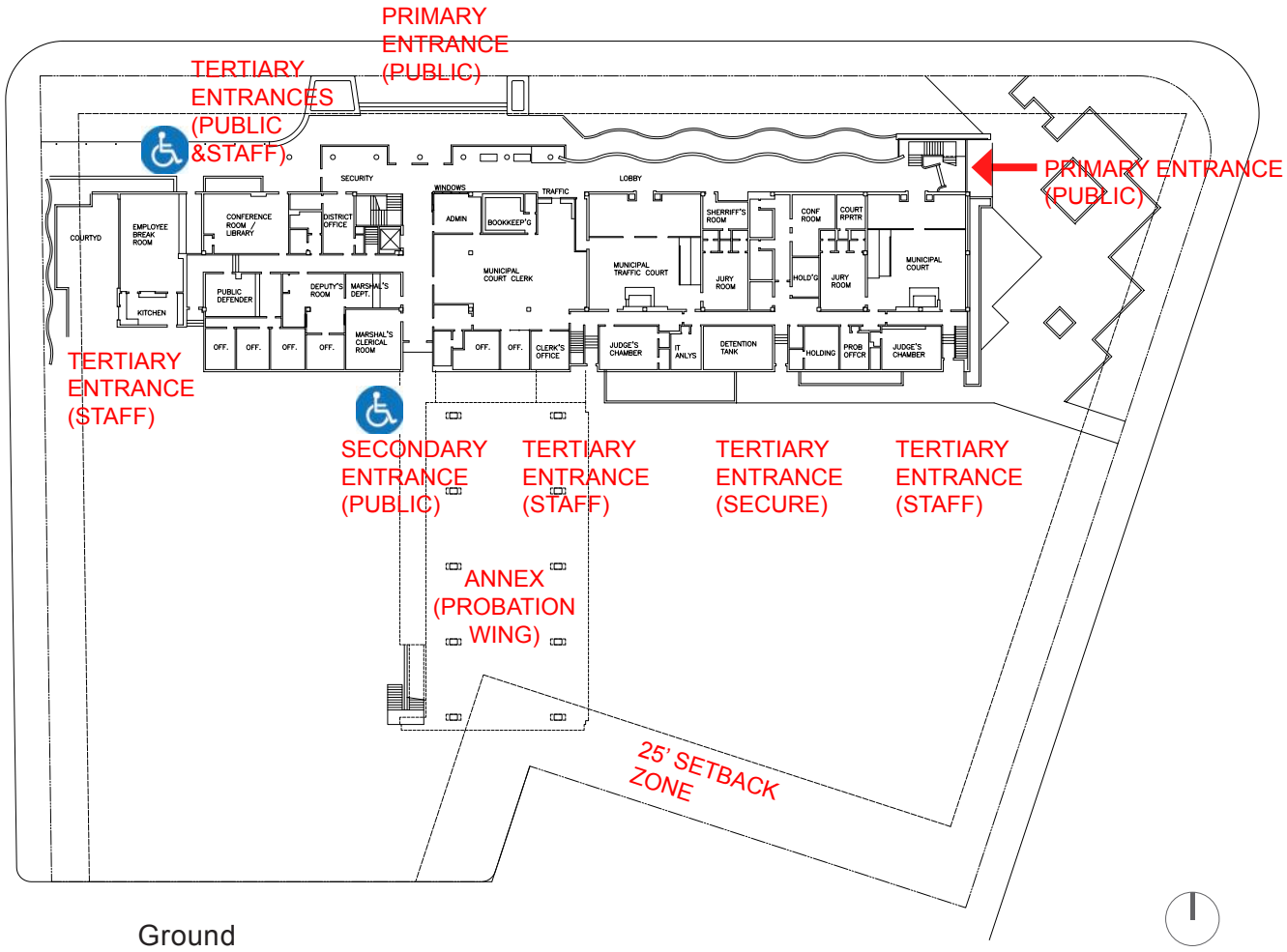
3.6 EXISTING FLOOR PLANS

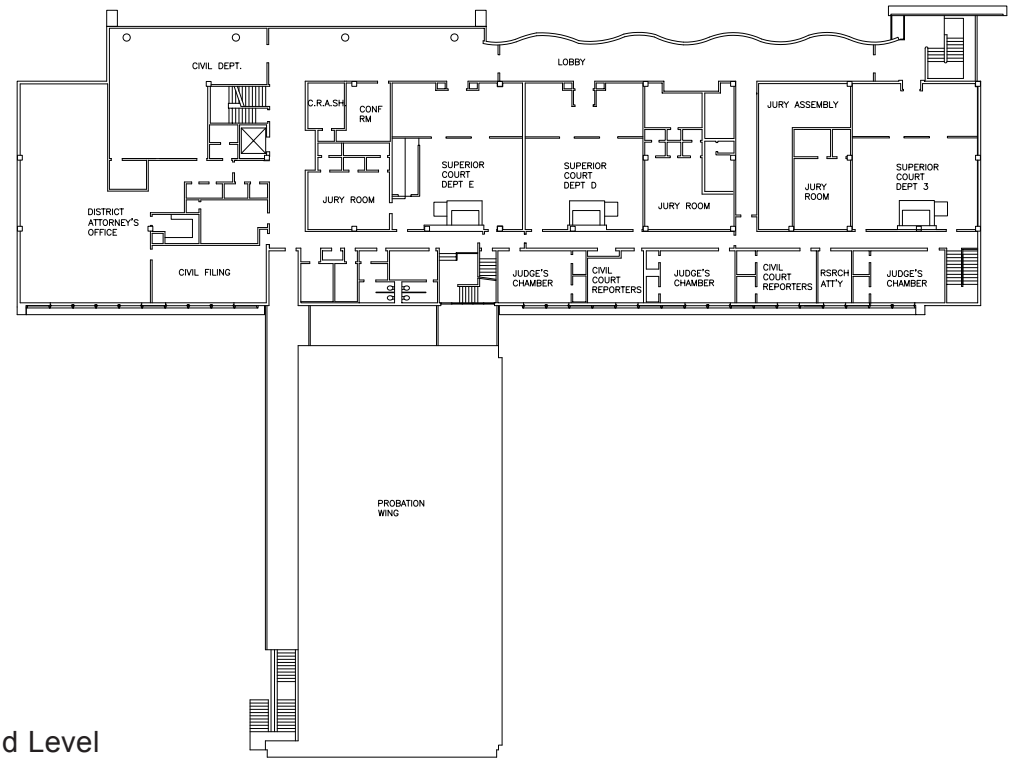


Basement

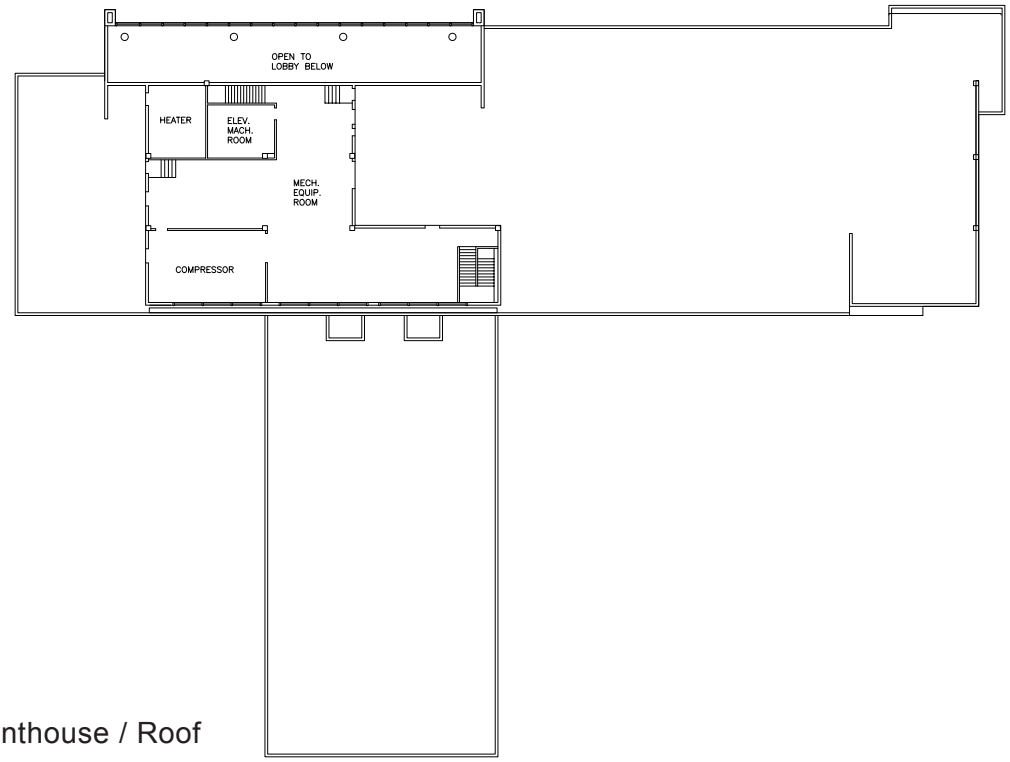


Ground

NOTE: Existing accessible entries have not been verified to be fully compliant with current ADA law and codes.



2nd Level



Penthouse / Roof

4.0 STRUCTURAL EVALUATION





4.1 INTRODUCTION

The objective of the seismic assessment is to form a professional opinion on the likely seismic performance of the existing courthouse building based on the review of existing drawings, site visits, preliminary 3D computer analysis of the seismic system, and industry best practice in seismic engineering.

The assessment methodology can be outlined as follows:

- Review of the existing drawings (Arthur Wolfe A.I.A. Architect, Los Angeles, CA. Dated October 1956).
- Site visit to visually observe the current condition of the existing building (site visit on January 27, 2012).
- Preparation of two 3D analysis models of the buildings using ETABS v9.7.3 analysis and design program.
- Combining ASCE 31-03 Tier-1 and Tier-2 methodologies to evaluate the likely seismic performance of the lateral load resisting system of the Main Building and Probation Wing.
- Presentation of preliminary seismic retrofit concepts tailored for the building to achieve improved seismic performance.
- Generate a report containing our findings, seismic performance predictions and recommendations.

4.2 CODE COMPLIANCE

Based on the findings from analysis and evaluation studies (see below), the existing drawings of the structural system, and our experience from past Southern California earthquakes as it relates to this building type, it is our opinion that the Glendale Courthouse is likely to perform poorly under a seismic event representing the seismic hazard prescribed in the current building code.

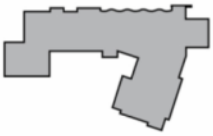
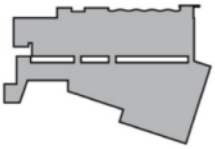
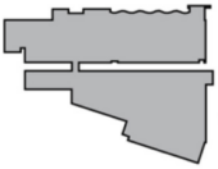
- Main building does not satisfy the ASCE 31-03 Tier-1 and Tier-2 “Life Safety” (Normal structural) performance objective when subjected to a fraction (2/3) of the current BSE-2 level seismic hazard.
- Probation wing showed significantly poor performance and does not meet the ASCE 31-03 Tier-1 and Tier-2 “Life Safety” performance objectives due to major structural non-conformances.

4.3 SUMMARY OF OPPORTUNITIES & CONSTRAINTS

ZGF has developed a series of strategies to establish the feasibility of the New Glendale Courthouse building on the existing courthouse site. These strategies investigate the use of portions of the existing courthouse along with the new construction. Implications of strengthening the existing Glendale Courthouse using the ZGF strategies are summarized at Table 4.1 below.

Information presented in Table 4.1 is derived from the preliminary retrofit scheme analysis of the existing Main building. In this analysis, reinforced shotcrete walls and Fiber Reinforced Polymers (FRP) have been introduced to achieve Life Safety and Improved performance. The summary of the results is presented on Figure 4.1 through Figure 4.4.

Table 4.1 Structural strengthening requirements for the Main Building

DESIGN STRATEGY		NORMAL "LIFE SAFETY" PERFORMANCE	ENHANCED "IMMEDIATE OCCUPANCY" PERFORMANCE
Strategies 2B 	Existing Building	• Retain North façade only. • Inspect and evaluate the attachment of existing North Façade to the structural system. Mitigate if necessary.	• Retain North façade only. • Inspect and evaluate the attachment of existing North Façade to the structural system. Mitigate if necessary.
	New Building	• Design new building per current building code.	• Design new building using Performance Based Seismic Design methodology to achieve Immediate Occupancy under a BSE-1 level seismic hazard.
Strategy 3 	Existing Building	• Add 280 ft of 10 in. thick reinforced shotcrete walls in the short direction (3,800 ft^3). • Add 160 ft of 12 in. thick reinforced concrete shear walls in lieu of the demolished existing walls in the long direction (4,640 ft^3). • Inspect and evaluate the attachment of existing North Façade to the structural system. Mitigate if necessary. • Existing foundations to be assessed	• Add 350 ft of 10 in. thick reinforced shotcrete walls in the short direction (4,750 ft^3). • Add 160 ft of 14 in. thick reinforced concrete shear walls in lieu of the demolished existing walls in the long direction (5,400 ft^3). • Inspect and evaluate the attachment of existing North Façade to the structural system. Mitigate if necessary. • Existing foundations to be assessed
	New Building	• Separate new construction from existing courthouse with a seismic joint • Design new building per current building code. • Provide seismic expansion joints at the bridges connecting the existing building to the new building.	• Separate new construction from existing courthouse with a seismic joint • Design new building using Performance Based Seismic Design methodology to achieve Immediate Occupancy under a BSE-1 level seismic hazard. • Provide seismic expansion joints at the bridges connecting the existing building to the new building.
Strategy 4B 	Existing Building	• Add 280 ft of 10 in. thick reinforced shotcrete walls in the short direction (3,800 ft^3). • Add 160 ft of 12 in. thick reinforced concrete shear walls in lieu of the demolished existing walls in the long direction (4,640 ft^3). • Inspect and evaluate the attachment of existing North Façade to the structural system. Mitigate if necessary. • Existing foundations to be assessed	• Add 350 ft of 10 in. thick reinforced shotcrete walls in the short direction (4,750 ft^3). • Add 160 ft of 14 in. thick reinforced concrete shear walls in lieu of the demolished existing walls in the long direction (5,400 ft^3). • Inspect and evaluate the attachment of existing North Façade to the structural system. Mitigate if necessary. • Existing foundations to be assessed
	New Building	• Separate new construction from existing courthouse with a seismic joint • Design new building per current building code.	• Separate new construction from existing courthouse with a seismic joint • Design new building using Performance Based Seismic Design methodology to achieve Immediate Occupancy under a BSE-1 level seismic hazard.

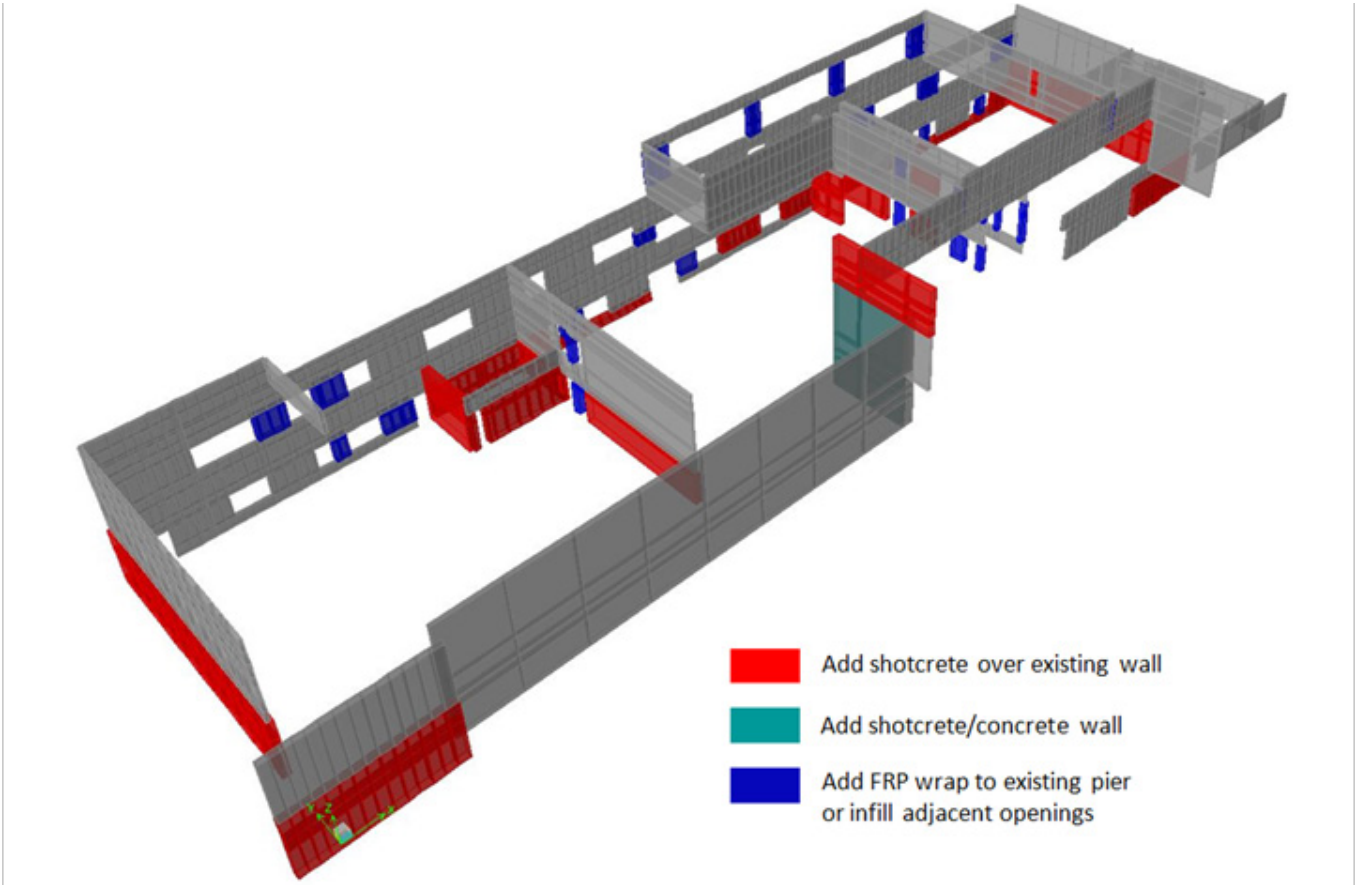


Figure 4.1 Seismic strengthening concept for Main Building to achieve Life Safety performance objective

Normal “Life Safety” standard requires;

- Add 410 ft of 10 in. thick reinforced shotcrete over existing walls (4,954 ft3, total value including both directions).
- Add 21 ft of 10 in thick reinforced shotcrete/concrete wall underneath the penthouse (761 ft3).
- Add 1,800 ft² of FRP to wrap wall piers.
- Inspect and evaluate the attachment of existing North Façade to the structural system. Mitigate if necessary.
- Existing foundations to be assessed

Enhanced “Immediate Occupancy” standard requires;

- Add 520 ft of 10 in. thick reinforced shotcrete over existing walls (6,283 ft3, total value including both directions in short and long directions)
- Add 21 ft of 12 in thick reinforced shotcrete/concrete wall underneath the penthouse (914 ft3).
- Add 1,800ft² of FRP to wrap wall piers
- Inspect and evaluate the attachment of existing North Façade to the structural system. Mitigate if necessary.
- Existing foundations to be assessed

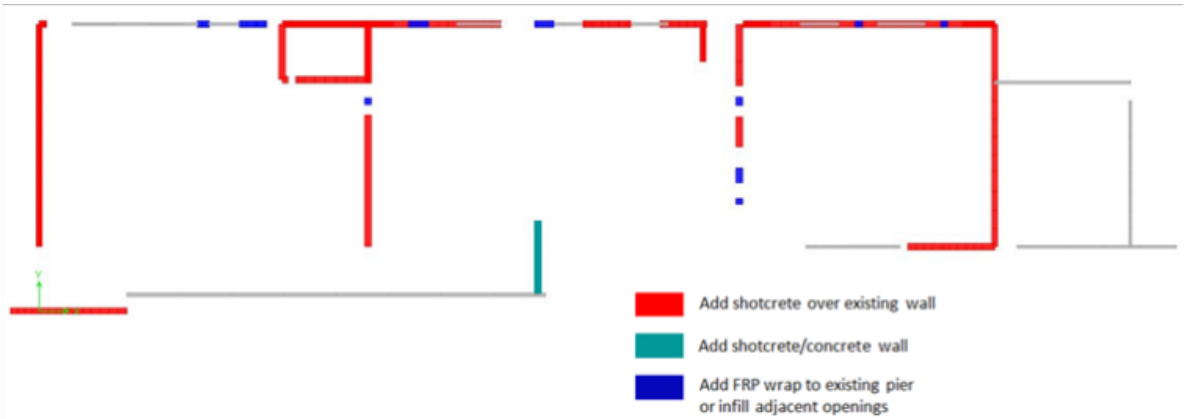


Figure 4.2 Seismic strengthening concepts for Main Building to achieve Life Safety performance - 1st Floor

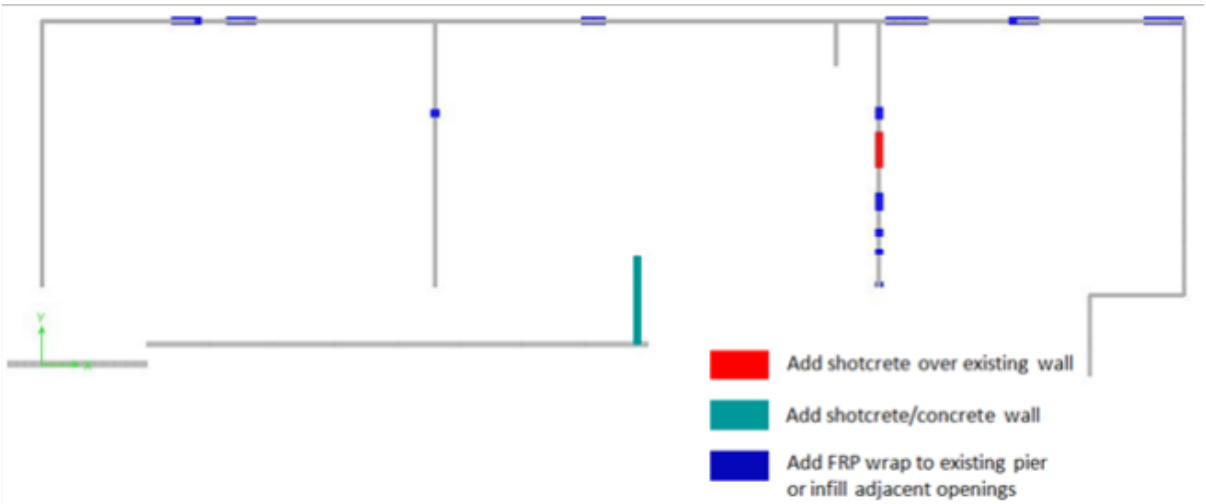


Figure 4.3 Seismic strengthening concepts for Main Building to achieve Life Safety performance – 2nd Floor

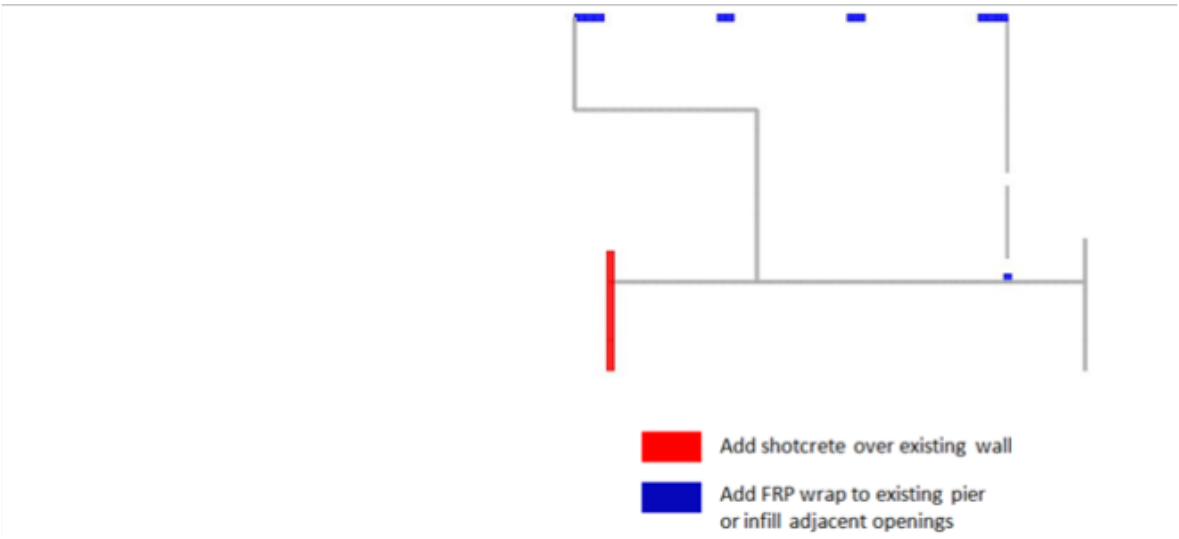


Figure 4.4 Seismic strengthening concepts for Main Building to achieve Life Safety performance – Penthouse

4.4 SITE EVALUATION, OBSERVATION AND DOCUMENTATION

The existing Glendale Courthouse Building is located at 600 East Broadway, Glendale, California. The geological coordinates of the site are 34.1462oN and 118.2483oW. The Glendale Courthouse was constructed in 1956 and is a shared-use facility with the County of Los Angeles. The Courthouse consists of two buildings; Main Courthouse building and Probation wing.

Glendale is classified as a high seismic zone by the current building code. Parameters that are used to define the seismic hazard at the building site have been obtained from USGS U.S. Seismic Hazard Data. Please see Appendix-B for the details about the seismicity of the site.

The Main building is a 2-story + Penthouse steel frame with concrete shear walls. There is a partial basement at the central portion of the building which consists of concrete walls laterally restrained by soil on all sides.

The building plan is rectangular shaped with approximate dimensions of 62 ft by 264 ft and typical floor heights of 14.5 ft. The approximate gross area of the Main Building is 48,000 square feet. Building type is S4, steel frames with concrete shear walls, based on the lateral-force resisting systems and diaphragm type as defined by ASCE 31-03. The gravity system of the Main Building consists of 3.5 in thick concrete slabs on top of concrete joists and composite wide flange steel beams, vertically supported by wide flange steel columns encased in concrete. Lateral system is comprised of reinforced concrete bearing/shear walls in both orthogonal directions. Existing shear walls include the serpentine brick wall façade. Steel frame is designed for gravity loads only.

The Probation Wing is an annex extension and a 2-story concrete moment frame building. There is no basement in this building and the first story is completely open and used for parking. The Probation Wing is separated by a seismic joint from the Main Building. The Probation Building plan is rectangular shaped with approximate dimensions of 113 ft by 64 ft and typical floor heights of 14.5 ft. The approximate gross area of the Probation Building is 7,400 square feet.

The gravity system of the Probation Building consists of 2 inch thick concrete slabs on top of concrete joists and composite wide flange steel beams, vertically supported by cast-in-place reinforced concrete bent columns. Lateral forces are resisted by moment frames, concrete columns and wide flange steel beams encased in concrete, through monolithic beam-column connections. The building type does not exactly match any of the ASCE 31 structural building system categories. However, the most similar building type is concrete moment frames, C1.

The Main Building foundation consists of shallow spread footings running along the basement walls and isolated concrete piers below the basement. The Probation Wing foundation also uses of shallow spread footings.

The site observation findings have limited structural significance and are captured in Appendix F.

4.5 ASSESSMENT METHODOLOGY AND SUMMARY OF FINDINGS

The likely seismic performance of the Glendale Courthouse was evaluated based on the Tier-1 and Tier-2 methodologies of ASCE 31-03 Seismic Evaluation of Existing Buildings.

The scope of the seismic assessment work presented herein is outlined in the Arup proposal dated January. 3, 2012 and is limited to lateral load resisting systems of the Main Building and Probation Wing. Review of the foundation system is beyond the scope of this study.

ASCE 31-03 Tier-1 procedure includes a site visit where structural aspects of the building are compared against Tier-1 screening checklist to identify any non-conformances building might have. A non-conformance does not confirm a deficiency, but it generally warrants a more detailed analysis/study per Tier-2 methodology. Tier-1 checklists for the Glendale Courthouse are presented in Appendix C. Each evaluation statement has been marked either “Compliant (C)”, “Non-compliant (NC)” or “Not Applicable (N/A)”. Compliant statements identify issues that are acceptable, whereas “Non-compliant (NC)” items identify issues that require further investigation. “Not Applicable (N/A)” statements either do not apply to this building or apply to cases where it was not possible to obtain the information due to as built conditions.

The initial assessment study based on Tier-1 methodology revealed several structural non-conformances in the Main building and many non-conformances in the Probation wing. Specifically, lateral load resisting elements of both buildings have failed to comply with the requirements of ASCE 31-03 “Life Safety” (Normal structural seismic performance) and “Immediate Occupancy” (Enhanced structural seismic performance) criteria under BSE-1 level seismic hazard.

Based on the ASCE 31-03 Tier-1 assessment methodology, main non-conformances related to the structural system of the Main building and the Probation wing can be listed as:

Main Building

- Weak Story: The strength of the lateral-force-resisting system of the penthouse level is less than 80 percent of the strength of the level below.
- Vertical discontinuities: There are vertical shear wall elements in the lateral-force-resisting systems that do not continue to the foundation. The shear walls at the second floor near the North entrance have this discontinuity.
- Shear Stress Checks: Inadequate shear strength of the lateral load resisting system. Shear stress on concrete shear walls is greater than the allowable 100 psi per ASCE 31-03 (Sec. 4.4.2.2.1).
- Foundation Dowels: For some wall members, existing 2#4 Dowels @10 O.C. are not adequate to resist uplift forces.
- Opening at shear walls: There are diaphragm openings immediately adjacent to the shear walls that are larger than the 25 percent of the wall length allowed by the code.

Probation Wing

- Soft Story: The stiffness of the lateral-load-resisting system at the second story is less than 80 percent of the strength of first story.
- Weak Story: The strength of the lateral-force-resisting system of the penthouse level is less than 80 percent of the strength of the level below.
- Vertical discontinuities: Lateral and gravity load resisting elements of the first and the second floors do not line up.
- Shear Stress Checks: Inadequate shear strength of the concrete bent columns. Shear stresses on concrete columns are greater than the allowable 100 psi per ASCE 31-03 (Sec. 4.4.1.4.1).
- Adjacent building: The clear distance between Probation Wing and Main Building is 4”. This is less than 4 percent of the height of the building (7”) and hence not adequate per the requirements by ASCE 31-03 Tier-2 (Sec. 4.3.1.2). Please refer to Appendix F, Photos 1 and 5.
- Geometry: There is a change in horizontal dimension of the lateral-force-resisting system of more than 30 percent in a story relative to adjacent story.

- Mass: There is a change in the effective mass of more than 50 percent from one story to the next.
- Torsion: The estimated distance between the story center of mass and the story center of rigidity is more than 20 percent of the building width.
- Redundancy: The numbers of bays of the moment frames in the short direction of the building do not satisfy the requirements of ASCE 31-03 Tier-2 (Sec. 4.4.1.1.1).
- Axial Stress Check: The axial stress due to gravity loads in columns subjected to overturning forces
  is more than 0.10 f'c.
- Captive Columns: There are columns at level 1 and 2 with height/depth ratios less than 50 percent of the nominal height/depth ratio of the typical columns.
- No Shear Failures: The shear capacity of the frame members cannot develop the moment capacity at the ends of the members.
- Strong Column/Weak Beam: The sum of the moment capacity of the columns is not more than 20 percent greater than that of the beams at frame joints.
- Beam Bars: Longitudinal top and bottom bars do not extend continuously throughout the length of each beam.
- Column-Bar splices: Column bar lap splice lengths are smaller than 35db for Life Safety, and are not enclosed by ties spaced less than 8db.
- Beam-Bar splices: The lap splices or mechanical couplers for longitudinal beam reinforcing are located within lb/4 of the joints.
- Column-Tie spacing: Frame columns have ties spaced more than d/4 or 8db at plastic hinge zones.
- Joint reinforcing: Beam-column joints' ties are spaced more than 8db.
- Stirrup and Hooks: The beam stirrups and column ties are anchored into the cores with hooks of less than 135 degrees.
- Deflection Compatibility: Secondary components do not have shear capacity to develop the flexure strength of the components.

ASCE 31-03 Tier-2 procedure consists of creating a linear model of the building and conducting analysis to estimate the seismic demands on the structural components. Capacities of the lateral load resisting members are computed based on the site investigations and the material strength values provided by the structural drawings. Demand capacity ratios are calculated and compared to the acceptable values given in ASCE/SEI 31-03.

ASCE-31 Tier-2 assessment has been conducted as a result of the Tier-1 non-conformances. Performance level objectives are summarized in Appendix A.

Findings of the Tier-2 methodology have confirmed the existence of these non-conformances. Analysis of the building structure revealed that the lateral load carrying members do not conform to the life safety and immediate occupancy acceptance criteria outlined in ASCE 31-03 Tier-2 requirements. Details of the Tier-2 analysis results for the Glendale Courthouse are available in Appendix D.

Other Observations, Findings and Recommendations:

- Gravity system: Current California Trial Court Facility Standards require floor gravity frames to be designed under minimum 20 psf partition and 80 psf uniform live loads. Preliminary floor framing gravity checks of a typical bay indicate that the existing floor framing satisfies the current load demand.
- Reinforced concrete details: In addition to the Tier-1 and Tier-2 non-conformances listed above, major structural deficiencies related to the reinforced concrete construction details were observed. These deficiencies are common for the buildings from the 1950s and substantially limit the cyclic strength of the lateral load resisting system. Inadequate lap-splice lengths and discontinuous longitudinal wall reinforcement are some of the observed deficiencies. More details are given in Appendix E and Appendix F.

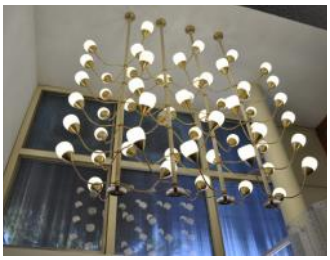
- Fire rating: Current design codes require minimum 4 1/2” thick slab for regular weight concrete and 3 1/4” thick slab for light weight concrete. The drawings show a typical 3” light weight concrete slab at the Roof Level and 3.5” regular weight concrete slab at Level 2. Current slab thicknesses do not provide two hours of fire protection.

- Blast: Current California Trial Court Facility Standards require floor slabs above high risk areas to be designed for upward forces by using continuous, symmetrical reinforcement at the top and the bottom of slabs. The bottom reinforcing is required to be continuous at the roof system beams and slabs. There is also a requirement to provide redundancy and alternative load paths to mitigate the blast loads. Currently, none of these prescriptive requirements are satisfied for the existing Glendale Courthouse.

- Site investigation by an independent material testing lab to confirm in-situ capacities of the existing concrete and reinforcement is recommended as it will be valuable to optimize future retrofit solutions.

5.0 SYSTEMS EVALUATION






5.1 MECHANICAL

Introduction

This section of the report addresses the Heating, Ventilation, and Air-conditioning (HVAC) systems in the building. The current building is served by 3 constant air-volume dual-duct air handling units dedicated to each of the following areas: probation wing, main building first floor, and main building second floor. These units are original as per the 1956 drawings, but still operational with motors and mechanical equipment appearing to be well maintained. Heating is provided from two relatively new boilers, and the Direct-Expansion (DX) cooling is provided from what appears to be a refurbished 100 HP compressor and two newer air-cooled condensers located on the roof.

Code Compliance

Three codes have jurisdiction over HVAC systems: the building code, the mechanical code and the California Energy Code (Title 24).

Mechanical Code

- Flue discharges appeared to be in compliance with the current code.
- Combustion air appeared to be provided through a wall louver: we have checked the total BTU/hr in the room (2,100,000 BTU/hr for heating boilers+ 398,000 Btu/hr for water heaters). There are two 48 x 24 louvers, one of which has a 66 x 14 duct that brings air to within 6" of the floor. At the required 1 in²/4000 Btu/hr sizing criteria for high and low level combustion air louvers, the room would require 6245 sq. inch per opening whereas only 1152 sq. inch is available. Therefore the room is not in compliance for combustion air openings
- The air handler rooms and compressor rooms appeared to have large areas of louvers, thereby defining these spaces as not enclosed and thereby avoiding the definition of the space as a refrigerant machinery room. Therefore these penthouse rooms comply for refrigerant leakage issues governed by the mechanical code.

Building Code

- It appears as though duct smoke detectors have been added to the air handling units: however it is not clear whether these are in compliance with current code requirements.
- The way in which the building HVAC is laid out is advantageous in that fire smoke dampers can be avoided at the main riser drops because each air handler is dedicated to a particular floor. Therefore riser exits are in compliance with the current code.
- From desk study of the drawings, it is apparent that fire dampers are installed in ductwork that passes from the hallway to the occupied areas. This is consistent with the older code requirements. It was not possible to observe the fire damper types above the ceilings. In most cases of retrofit for buildings this old, these fusible-link fire devices must be upgraded to more dynamic Fire-Smoke Dampers with the smoke-damper controlled to close by smoke sensed within the space served from room detectors or through a new duct-detector within 5' of the FSD.

California Energy Code

Buildings and equipment of this age which are left intact are not under the purview of current California Energy Code. However, if any Building-Code-defined occupancy change occurs, any mechanical equipment is touched, or any envelope is changed, the affected component must be upgraded to meet the prescriptive requirements of the new Energy Code. It should be noted that the existing HVAC approach consumes much more energy than that which would be allowed under current codes (see discussion and analysis results below).

Summary of Opportunities & Constraints

There are few functional constraints imposed by the existing systems so long as they are left alone, and so long as the fire safety systems are seen to be in compliance with a grandfathered approach to the preservation of the existing building. There are opportunities for efficiency improvements, however.

It is anticipated that newer technologies related to variable flow systems could substantially reduce the fan energy usage, and efficient water-based cooling systems would likely become economically viable given the expanded square footage that occurs by including the new portions of the building. This is explored further in an energy model.

Energy Model

An energy model was completed to see how the existing HVAC system compares to more standard systems used in current designs. Four alternatives were modeled to see the effects on system load and overall system energy usage. By changing the air-side system from a dual-duct system to a more modern VAV w/reheat system, the size of the air handling units decreases. The VAV system also allows for the plant to operate more efficiently by modulating based on building load, thereby reducing fan energy use. To make the system even more efficient, the cooling plant was changed to use a water-cooled chiller. Changing the building program to consist of all offices (alternative 4) had a slight decrease on system load and energy consumption as well.

Table 5.1-1 Mechanical Alternatives Considered

Alternative	Building Program	Air-side System	Cooling Plant	Heating Plant
Alternative M1	Existing program of offices and courtrooms	Constant-volume, dual duct	Split-system, unitary air-cooled condensing	Natural gas boilers
Alternative M2	Existing program of offices and courtrooms	VAV w/ reheat	Split-system, unitary air-cooled condensing	Natural gas boilers
Alternative M3	Existing program of offices and courtrooms	VAV w/ reheat	Water-cooled chiller, cooling tower, CHW and CW pump	Natural gas boilers
Alternative M4	New program of all offices	VAV w/ reheat	Water-cooled chiller, cooling tower, CHW and CW pump	Natural gas boilers

Table 5.1-2 Air Handler size comparison

Scenario	Level 1 AHU	Level 2 AHU	Probationary Wing AHU
	Block (cfm)	Block (cfm)	Block (cfm)
Existing	31,120	27,350	9,030
Alternative M1	29,535	25,365	9,205
Alternative M2	26,630	21,925	7,335
Alternative M3	26,630	21,925	7,335
Alternative M4	25,310	19,805	6,320

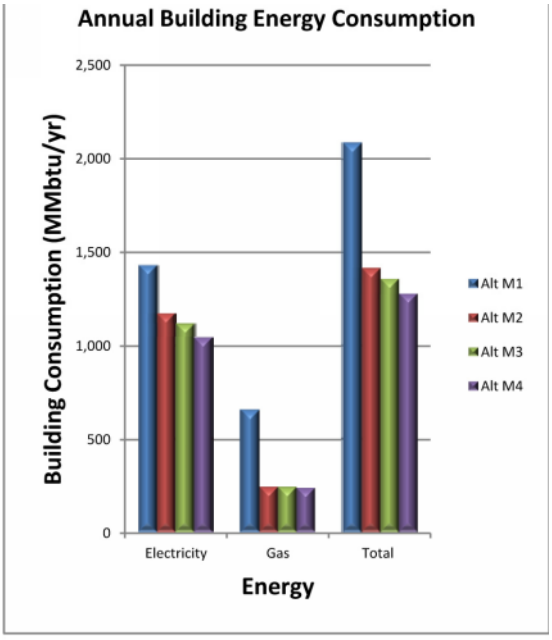


Figure 5.1-1 Annual Building Energy Consumption

Table 5.1-4 Estimated Annual Utility Cost

Alternative	Estimated Utility Cost		
	Electricity	Gas	Total
Alternative 1	$53,536	$4,595	$58,131
Alternative 2	$44,600	$1,968	$46,567
Alternative 3	$42,350	$1,968	$44,317
Alternative 4	$39,731	$1,968	$41,699

Comments on Proposed Architectural Schemes

Using the energy model developed for the existing building based on a VAV with reheat system and water-cooled chiller, the HVAC loads for the proposed architectural schemes were estimated by prorating the area based on type (courtroom or office) to match the various Building Design Alternatives under consideration.

Architectural Schemes

Building Design Alternative	Conditioned Area (sqft)	Total Supply cfm	Ton-nage	Heating MBTU/h
Current	50,725	55,885	130	970
Alternative 2	115,680	127,545	286	2240
Alternative 3	110,605	123,210	274	2165
Alternative 4B	117,280	130,475	292	2300

The increase in building and system size can be handled by the current natural gas supply for the heating plant, with a change in pressure. Per the electrical engineer, the current electrical plant will be getting redesigned and reconstructed, so the plant can be designed to handle the increased HVAC system size.

Site Evaluation/Observation Documentation

The main mechanical systems in the building are consistent to the original design intent as per the 1956 drawings with the following exceptions added over time:

- two additional DX fan coil units added in the basement to serve the IT room
- a toilet exhaust in the basement
- two small packaged units on the roof of the probationary wing (of a size that would serve small electrical/IT spaces)
- the two newer air-cooled condensers place outdoors on the roof to improve air movement for heat rejection

It was not possible to document model numbers or performance on all of the equipment, however visual observation versus the plans show nearly identical configuration, so it is assumed that the airflow performances are consistent with the drawings made available by the courts.

The equipment is primarily controlled through a pneumatic control system, however there are electronic sensors which have been applied to the devices in order to take readings at and to start/stop the motored fans from a centralized but remote county facility where a larger-scale building management system is located. Thermostats within the rooms are still of the pneumatic type, controlling the mixing dampers for the dual duct system.

Figure 5.1 2 Pneumatic damper controllers at the air handlers

Figure 5.1 3 Local non-electronic monitoring panels


5.1- 4

5.1- 5


5.1- 6


5.1- 7


5.1- 8


5.1- 9

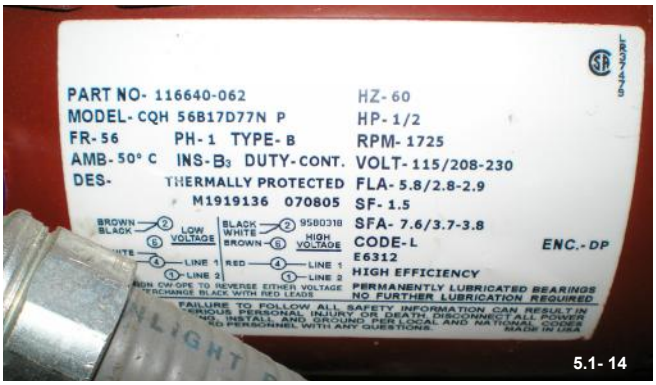


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Figure 5.1- 4
Evidence of retrofitted electronic controls devices

Figure 5.1- 5
Evidence of electronic sensors at air handlers

Figure 5.1- 6
Evidence of duct smoke detectors installed at air handlers

Figure 5.1- 7
New split system fan coil unit installed in basement IT room

Figure 5.1- 8
Well-maintained original mechanical fan, coil and ductwork equipment: disconnect upgrades and motor upgrades apparent

Figure 5.1- 9
Newer boilers

Figure 5.1- 10
Boiler flues slightly adjusted when new boilers installed

Figure 5.1- 11
Boiler with combustion opening and in-pipe primary circulating pump

Figure 5.1- 12
Boilers appear to be relatively new as South Coast Air Quality Management

Figure 5.1- 13
Heating hot water pumps in design-intent configuration

Figure 5.1- 14
Motor upgrade on pumps is evident from nameplate sticker

5.1- 15

5.1- 16


5.1- 17


5.1- 18


5.1- 19


5.1- 20


5.1- 21

Preceding Page and Left

Figure 5.1- 15 Pump bodies appear to be original

Figure 5.1- 16 Electronic monitor sensors are observed

Figure 5.1- 17 Refurbished Carrier Compressor observed *in situ*, other compressor is abandoned in place

Figure 5.1- 18 Newer air-cooled condensers placed outdoors for better air movement (instead of in compressor room as per original design intent)

Figure 5.1- 19 Wall of louvers provides outside air to ducting behind as well as ensuring that air handler and compressor rooms are not enclosed and thus not refrigerant machinery rooms by code

Figure 5.1- 20 Two small packaged units observed on probation wing

Figure 5.1- 21 Packaged units in adequate but weathered condition

Figure 5.1- 22 Courtrooms in original court building employ sidewall diffusers in most taller spaces

Figure 5.1- 23 Courtrooms in probation wing employ ceiling diffusers given low height rooms

Figure 5.1- 24 Holding area uses perforated face diffusers to be tamper- and suicide-resistant.

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5.2 ELECTRICAL

Introduction

This section of the report addresses the Electrical systems observed in the building. Incoming Utility service is from the rear of the building via overhead lines to a utility pole. From there it runs underground via ductbanks to an utility vault located in the basement. Two services are provided in the building. From the main boards it feed various panelboards on each level. The majority of the equipment is original to 1956 building.

Code Compliance

National Electrical Code (NEC)

- It appears that the majority of the equipment meets the 1956 codes, but any upgrades would have to comply with the current edition of the NEC.
- There are two services to the building one at 480v 3p, 600A, and one at 120/208V 3p 800A. This is not compliant with current codes.

NFPA

- It appears that some areas have some emergency lighting in the form of wall battery packs. Existing emergency egress lighting does not meet current codes.
- Minimal fire alarm devices were observed (duct detectors). Existing system does not meet current codes.

California Energy Code

Buildings and equipment of this age which are left intact are not under the purview of current California Energy Code. However, if any Building-Code-defined occupancy change occurs or any electrical equipment or lighting is touched, the affected component must be upgraded to meet the prescriptive requirements of the new Energy Code. It should be noted that the existing lighting does not meet the current Energy Code.

Summary of Opportunities & Constraints

The existing electrical service will have to be removed, along with the current underground utility right of way because it interferes with the new construction.

Building	Conditioned Area (sqft)	Estimated Service Size 480V 3p (Amps)
Current	50,725	1000
Alternative 2	115,680	2000
Alternative 3	110,605	2000
Alternative 4B	117,280	2000

Comments on Proposed Architectural Schemes

A new electrical service and a new distribution system will have to be provided for the new schemes.
A new Fire Alarm system will have to be provided.

Site Evaluation/Observation Documentation

Incoming Utility Service

The Electrical systems in the building are consistent to the original design intent as per the 1956 drawings. Very few renovations have been implemented.
The incoming service from the local Utility Company enters the back (south) of the property via overhead lines to a utility pole. Then runs underground thru the parking lot and enters a utility vault located in the basement. The incoming voltage is unknown but is assumed medium voltage. We also assume that there are two utility transformers located in the vault, one at 480V and the other at 120/208V, but were unable to enter the room.

There are two (2) services. One service is 480v 3p, 600A and serves the building mechanical loads, elevator and sump pump. The second service is 208/120V 3p, 800A and servers the building lighting and small power/receptacle loads.
Drawings indicate that existing utility lines remain under the building. A Civil survey indicating all services on and around the plot should be performed.

Metering

Electrical Metering is provided for each of the two (2) services to the building. Utility bills were not provided to determine the peak demand load of the building.

Main Switchboards

There are two services as mentioned above. One Main Board rated 480V 3 phase and is a center tapped Delta with a high leg of 397V to ground. This 480V main switchboard serves the elevator and the Motor Control Center (MCC).

The MCC is located in the Mechanical penthouse and serves all the mechanical loads. The other Main Switchboard is rated at 120/208V 3 phase. This 120/208V Board feeds all the lighting/small power panels located in the building on each level.

480V & 120/208V Distribution

All the distribution of feeders and branch circuits are in conduit. Most of the conduits are concealed in ceilings and wall voids. In the utility and back of house spaces some conduits are exposed.

Lighting

The majority of the lighting in the building appears to be original and consist of incandescent fixtures, linear fluorescent and HID fixtures. In most instances the incandescent fixtures have been retrofitted with screw in type compact fluorescent lamps.

Very little lighting control or dimming was observed. Existing lighting does not meet the California Energy Code.

Emergency Lighting

Emergency lighting was not provided in original building design. Wall mounted battery packs have been installed in a few locations. Code compliant emergency egress lighting is not provided.

Fire Alarm

Minimal Fire Alarm is provided and only duct detectors were observed.

Lightning Protection

No Lightning Protection System was provided.

Left

Figure 5.2-1 Main Switchboards by Square D. Original 1956 equipment**.**

Figure 5.2-2 Existing Utility vault in the basement

Left

Figure 5.2-3 MCC on top level mechanical room

Figure 5.2-4 Typical 1956 panelboard


5.2- 5

5.2- 7


5.2- 8

5.2- 6


5.2- 9

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Figure 5.2-5 Typical Exterior fixtures retrofitted with CF lamps

Figure 5.2-6 Exterior HID down lights are on during the day because they are circuited to the lobby fixtures

Figure 5.2-7 Corridor lighting Level 1

Figure 5.2-8 Typical Courtroom lighting

Figure 5.2-9 Courtroom Lighting

Figure 5.2-10 Judges back of house corridor lighting.

Figure 5.2-11 2nd level custom pendant fixture.

Left

Figure 5.2-12 2nd level corridor lighting.

Figure 5.2-13 Covered parking lighting under Annex building.

Figure 5.2-14 Emergency lighting in the Courtroom.

Figure 5.2-15 Recessed Exit signs.

5.3 FIRE PROTECTION & PLUMBING

Introduction

This section includes evaluation of the following systems:

- Fire Suppression System
- Domestic Cold and Hot Water Systems
- Natural Gas System
- Sanitary Waste and Vent Systems
- Storm Drainage System
- Plumbing Fixtures

Code Compliance

The following codes and standards have jurisdiction over the Plumbing and fire protection systems:

California Building Code

- The automatic fire suppression system only covers the basement area, not the entire building. The fire suppression system needs to be in compliance with the current Code.

California Plumbing Code

- The fire hose cabinets are directly connected to the domestic water supply lines. The current Plumbing Code does not allow the cross connection between the domestic water system and fire suppression system.
- There is no backflow device between water meter and building supply line. A backflow device needs to be installed to comply with the current Code.
- There is no earthquake-activated gas shutoff valve at the main gas line. An earthquake valve needs to be installed to comply with the current Code.
- The existing building does not have overflow drains on the roof. Therefore it is in non-compliance with the current Code and AOC Standard.

California Green Building Standard Code

- All existing plumbing fixtures are not water-efficient fixtures. These fixtures need to be in compliance with the current Code.

California Trail Court facilities Standard (AOC)

- The holding cells' plumbing fixtures are vitreous china, which are not in compliance with the standard.
- The floor drains are inside the holding cells, which are not in compliance with the standard.

Summary of Opportunities & Constraints

The existing domestic water meter is sufficient for additional future load.

The new gas demand load is likely to be increased. The gas supply pressure will be increased from ½ psi to 5 psi pressure service by the Gas Company. Since the new building fire suppression system needs to meet the current code, the fire water supply pipe size will be bigger than 6" and needs to be replaced all the way back to the city main.

The existing building sanitary drain line size is 6" and connected to the existing 8" sewer main at the alley, south side of the building. This existing 6" sanitary line cannot be reused for all three Architectural Schemes. A new sanitary line should be provided and connected to the existing 8" sewer main line at the alley.

Building	Estimated Domestic Water Demand (GPM)	Estimated Fire water Demand (GPM)	Estimated Sewer Discharge (GPD)	Estimated Gas Demand (CFH)
Current	150 (4")*	500 (6")	24,000 (6")	2,772 (3 ½")
Alternative 2	250 (4")	1,000 (8")	40,000 (6")	3,300 (4)**
Alternative 3	250 (4")	1,000 (8")	40,000 (6")	3,200 (4")**
Alternative 4B	250 (4")	1,000 (8")	40,000 (6")	3,350 (4")**

Site Evaluation/Observation Documentation

Fire Suppression System**.** The automatic fire sprinkler system water main is connected to the city water main at East Broadway. The fire water detector check vault is located at East Broadway. An automatic fire sprinkler riser is located at the basement (see figure 5.3-1).

Figure 5.3-1 - Fire Alarm and Fire Department Connection for the Basement

The rest of the building was not covered by automatic fire sprinkler system; however fire hose cabinets were present. These fire hose cabinets are connected to the domestic water distribution. The post indicator valve is located at the west side of the building inside the yard (see Figure 5.3-2).

Figure 5.3-2 - Post Indicator Valve for Fire Hose Cabinets

Domestic Cold and Hot Water Systems

The 4” domestic water main meter is located at South Isabel Street and 3” main line is entering to the courthouse from west side of the building. All fire hose cabinets are connected to the domestic cold water line (see Figure 5.3-3).

Figure 5.3-3 – Fire Hose Cabinet

The industrial cold water for the mechanical equipment is passing through the backflow preventer located inside the boiler room at the mechanical penthouse. The sub water meter is provided to record the mechanical water usage (see Figure 5.3-4).

Figure 5.3-4 – Industrial Cold Water’s Backflow Preventer and Sub-meter

The building domestic hot water is supplied by the two 100 gallons water heaters located at the mechanical penthouse, inside the boiler room (see Figure 5.3-5). One is recently replaced (not connecting to the system yet) and the other one is 14 years old. The domestic hot water circulating pump is also located between two water heaters.

Figure 5.3-5 – Domestic Water Heaters

An additional small domestic electric water heater is located at the basement for the basement toilet room (see Figure 5.3-6).

Figure 5.3-6 – Domestic Water Heater

The irrigation water supply is connected to the main domestic water supply located in south-west yard (see Figure 5.3-7).

Figure 5.3-7 – Irrigation Water Backflow Devices

Natural Gas System

The natural gas meter is located at the yard, at the south-west corner of building (see Figure 5.3-8). The majority of gas loads are for the mechanical space heating boilers. The main supply line size is 3 ½".

Figure 5.3-8 – Gas Meter

Sanitary Waste and Vent Systems

The main sanitary sewer line is connected to the existing 8" sewer line at south side of the building. Most of the sanitary sewer system is by gravity discharge, except the basement area sanitary sewer. There are two ¾ HP duplex sewage ejectors located at the basement (see Figure 5.3-9 & 10). The old one is located at the basement janitor room and the other is located south side of the IT room. The old ejector mainly served the basement floor drain and auto sprinkler drain. The new one is for the basement toilet room.

Figure 5.3-9 Sewage Ejector

Figure 5.3-10 Sewage Ejector

The sanitary waste piping, at basement, has evidence of leaking in multiple locations (See Figure 5.3-11).

Figure 5.3-11 Sanitary Piping at Basement

Storm Drainage System

The storm drainage system collects all rain water from the roof and spilling at the curb of the road. There are only roof drains; however there are no over-flow drains on the roof (see Figure 5.3-12). There is no system for cleaning storm water discharge control for existing building.

Figure 5.3-12 Roof Drain

Plumbing Fixtures

The existing plumbing fixtures are well maintained. However these fixtures are not the water efficient type fixtures. The fixtures inside the holding cells area are not the vandal resistant plumbing fixtures (see Figure 5.3-13). Also the floor drain is located inside cell.

Figure 5.3-13 Holding Cell plumbing fixtures

5.4 TELECOMMUNICATIONS

Introduction

Site is well served by communications carriers, manhole covers on Broadway observed include “Bell System” (assumed to be Verizon) AT&T, QWEST, Metromedia and Level 3. Manhole covers on sidewalk were unmarked and are believed to be part of the courthouse. We did not note additional carrier manholes on surrounding streets feeding the property.

MCR I is the original telecommunications room and has been updated several times over the life of the facility. The current layout is of fairly recent vintage and the space has grown “organically” to accommodate upgrades. While well-managed, relatively clean and functional it does not meet current design standards. Additionally, the room is used for storage of IT related equipment. The size of the room is adequate for a well planned main communications room if the facility is reused.

MCR II is considered the Main Point of Entry (MPOE) and should be dedicated for this purpose; IT and other equipment are stored in this room. If the facility is reused the room has adequate space for continued use as an MPOE.

Two locations on the roof were observed with communications antennas; one set of microwave antennas adjacent to the [east] roof stairs was noted to be out of service. On the roof adjacent to the [west] roof door a WiFi link comprised of two patch (flat) antennas was noted, it is assumed this is a link to city facilities across Broadway.

Code Compliance

Sprinklers were not observed in MCR I or MCR II, retrofit of these spaces will/may require sprinkler installation. Smoke detection and environmental monitoring is recommended.

MCRs should not be used for storage. Service disruptions can be caused by unauthorized access, falling boxes, etc. Depending on the final use of the building, service disruptions can have significant consequences to the operation and security of the facility.

Abandoned cabling must be removed nominally per NFPA 770.25, 800.25, 820.25 and 830.25; it is recommended all cable be removed, not simply per the requirements called for in those sections.

It is recommended that abandoned equipment also be removed.

Summary of Opportunities & Constraints

Opportunities

- Existing MCR I and II can be reused with minimal re-work
- Site is well served by several telecommunication carriers on Broadway

Constraints

- Existing building communication closets are not standards compliant (size) and may not be optimally located to support cable distance limitations.
- Ceiling space limitations and ductwork layout may impede cable distribution within the ceiling cavities.

Strategy 2B

New facility with existing façade and lobby preserved would require an entire new telecommunication infrastructure within the facility. It does present an opportunity to add a second redundant service entrance for communications resiliency.

Strategy 3

Reuse of the facility would still require a primarily new telecommunications infrastructure with partial re-use of existing spaces and risers; this new infrastructure would consist of telecommunication rooms designed as part of core rework. New cable containment would be required in conjunction with HVAC rework. Potential opportunities exist to integrate support infrastructure such as interior antennas for radio systems, cellular augmentation and WiFi.

Strategy 4

Reuse of the facility would still require a primarily new telecommunications infrastructure with partial re-use of existing spaces and risers; this new infrastructure would consist of telecommunication rooms designed as part of core rework. New cable containment would be required in conjunction with HVAC rework. Reuse of courtrooms as office space will require cable distribution methodologies to be developed to maintain the character of the spaces. Potential opportunities exist to integrate support infrastructure such as interior antennas for radio systems, cellular augmentation and WiFi.

Main Communications Room I (MCR I)

Located in the basement, room houses network equipment, telephone switch, rack mounted data patch panels and wall mounted voice termination fields. Incoming service from Broadway is via two 4-inch conduits supplying copper and fiber optic cable. Wall mounted demarcation terminations provide service within this room, incoming fiber cable continues to MCR II (immediately adjacent). Racks containing network switches, routers and patch panels are located in this space. Several PCs and servers are also located in this room. Cooling is provided by a wall mounted mini-split system.

Main Communications Room II

Located immediately adjacent to MCR I, this room houses a SONET node which is believed to be providing the bulk of telecommunications services to the facility. Several other pieces of equipment such as routers and DS3 multiplexers are collocated in this space. Power supplies and battery backup associated with the node are in the rack and an adjacent rack holds several rack mounted UPSs and a Cisco router believed to be associated with carrier services. Cooling is provided by a wall mounted mini-split system.

Building Communications & Distribution

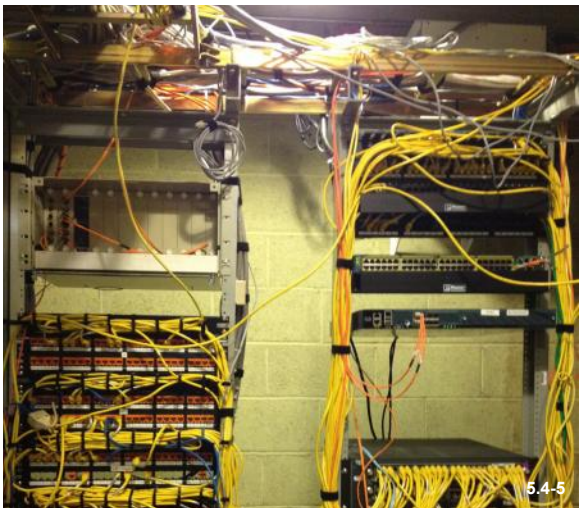
Communications closets were observed on the 2nd and 3rd floors, these are assumed to be original to the building and do not contain active telecommunications equipment. The building was constructed prior to distance limitations imposed by modern structured cabling systems. Two sets of wall mounted 110-type termination blocks were observed, one set with “V” labels (voice) the other set labeled “D” (data).

Voice blocks are fed from the basement MCR I with voice grade riser cable, in addition there are older “66” style blocks that are cross connected to the 110 type blocks feeding older station (phone) cables. Data blocks are fed from MCR I with data grade multi pair riser cable (category 5 rated). Station (drop) cables are connected directly to the blocks. The quantity of data drops from the blocks were of a low quantity (24 noted in one closet), we suspect some quantity of these drops may feed data switches located throughout the facility, which in turn may feed multiple PC/data locations in the vicinity of those switches. This configuration with or without additional network switches is limited to a maximum of 100 mbps.

Current design standards call for centrally located data communications equipment typically in communications rooms spaced so cable distances do not exceed 200 feet linearly (290 cable feet maximum).

Wireless access points were observed in the lobby area, we did not enter office areas to determine quantity, spacing or approximate coverage.

Figure 5.4-1 Building service entry



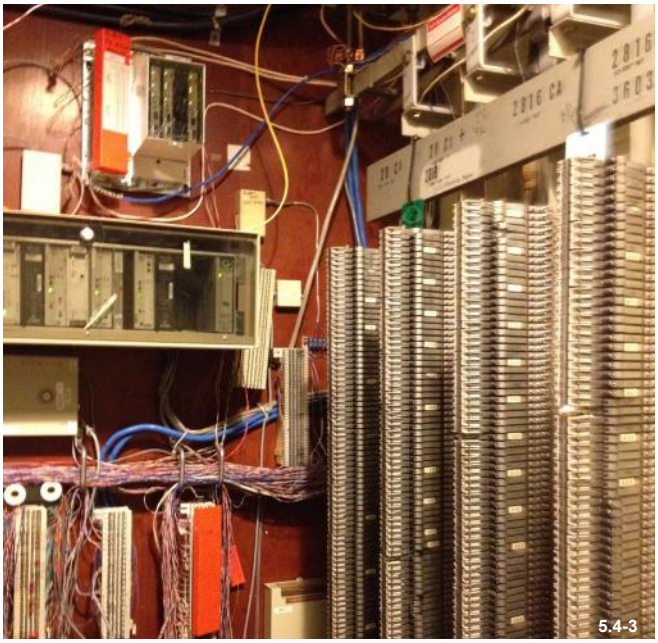


Figure 5.4- 2 Existing Phone System (PBX)

Figure 5.4-3 Unused equipment to be removed (right of photo)

Figure 5.4-4 Storage items in MCR I

Figure 5.4-5 Building-serving network equipment

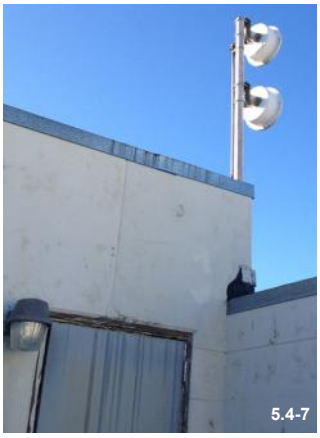


Figure 5.4-6 SONET Node in MCR II

Figure 5.4-7 Out-of-service microwave link

Figure 5.4-8 Existing WiFi link to City (left set of antennas)

Figure 5.4-9 Interior of typical telecom closet

6.0 SECURITY EVALUATION




6.1 INTRODUCTION

This report addresses the compliance of the three design options as defined in Chapter 4 of the 2011 edition of the California Trial Court Facilities Standards. This edition of the court standards replaces a 2006 version and contains a number of changes which affect this project. Notably, the explosive charge weight has been reduced significantly, and the required building setback has been increased from 20 to 25 feet.

The standards document provides generic provisions pertaining to all courthouse construction. Ultimately, the project specific security requirements will be developed based on a formal site specific risk assessment performed by the Administrative Office of the Courts which deviate from the standards document.

In addition to a qualitative assessment of the design features of the facility, a relative cost-benefit study of the renovation schemes has been performed to assess which is the most effective design option to resist explosive attack. This methodology is based on the explosive energy that the design options will need to withstand and uses probabilistic methods to model damages.

The sections below provide a description of the existing facility, the three options under consideration including the physical security issues unique to each option and, the results of our cost-benefit study. An appendix is provided with the details regarding the cost-benefit study.

6.2 FACILITY DESCRIPTION

The Glendale Courthouse is located in an area populated by a number of civic facilities. It is directly across the street from the City Hall, and within a one block radius of the Police Headquarters and the Municipal Services Building.

Originally constructed in 1956, it is a four story reinforced concrete structure with steel members embedded within girders and columns, and a thin slab. The front façade, which is considered historically significant, has a brick wavy wall and a glass curtain wall. The curtain wall has mullions which are steel with aluminum trim.

The existing building has a probation wing in the rear parking lot which is perpendicular to the main structure. It one story elevated above the ground floor level and supported on columns which permit vehicles to travel beneath the floor system. Beyond the rear parking lot is currently the Board of Realtors Site.

Overall, the existing building is relatively robust. Reinforced concrete is both a massive and ductile material which has a reasonably high inherent resistance to explosive loads. The use of exterior shear walls provides additional protection to the interior spaces. The use of steel in embedded in the columns and primary girders provides added stiffness to resist the extreme loads. The steel used in the window frames provides significant strength to resist explosive loads.

One drawback is the use of unreinforced masonry and glass curtain wall on the front façade. These materials are brittle and are likely to cause significant damage due to an explosive placed along East Broadway. Once the air-blast enters the building, the thin slabs (approx. 2” thick) are likely to fail and the stairwell adjacent to the existing lobby will likely become damaged and impede evacuation and rescue efforts.

6.3 DESIGN OPTION ASSESSMENT

Three design options are currently being considered, designated as Options 2B, 3 and 4. All three options increase the footprint of the current building by adding structure to the rear of the building. The historic front façade will be maintained in all options. Each option has a different emphasis. Option 2B is intended to provide a rigorous historic renovation of the front façade as well as the major public corridors. An addition will be attached to the current structure. Option 3 is intended to minimize interior modifications to the original structure and Option 4 is intended to comply with the current court standards. Options 3 and 4 provide a separate structure in the rear connected to the existing structure via one or more enclosed bridges.

All three options have the following similarities:

- Maintain historically significant front facade
- Removal of the Probation Wing in the rear
- New four story parking structure
- New Sally Port on Isabel Street
- New entrance on Glendale Avenue (except 4B)

The implications of these modifications in terms of explosive effects are as follows.

1) **Maintaining Historic façade**. The wavy brick wall obtains its lateral resistance to explosive effects from its wavy shape which provides stability as well as its mass. However, because it is unreinforced masonry, it will fail in a brittle manner which will block one point of egress and potentially destabilize the structure above.

2) **Removal of the Probation Wing**. This will have a favorable impact on the buildings response to explosive attack. The current design allows vehicles directly under the occupied portions of the building which increases the vulnerability of the building.

3) **New four story parking structure**. This solution is considerably better than the current parking lot design which allows vehicles access to the rear of the existing building, for it imposes a setback to the building.

   One drawback of this design is that the garage allows vehicles to park on four levels, which would place a potential weapon directly across from the upper level floors. Also, the circulation path from the garage to the main entrance will require pedestrians to walk around one or two sides of the building where there are courtrooms which increases the risk of a hand delivered weapon placed against the building structure.

4) **New Sally Port on Isabel Street**. This feature increases the operational security of the facility. It is assumed that all vehicles that are allowed access to this entrance will be authorized government vehicles, or prescheduled deliveries. This security will be essential for eliminating the possibility of a vehicle gaining access to the building.

5) **New entrance on Glendale Avenue**. This will greatly improve the queuing and support the security protocols mandated by the current standards.

Vulnerabilities associated with the individual options are provided below.

Of the three options, Option 2B offers some unique benefits compared with Options 3 and 4. Option 2B has the greatest setback in the rear of the building which will significantly reduce the explosive pressures on the new structure. It is also the only option that offers a pre-screening area exterior to the main structure which provides better protection to the building due to explosive effects compared with Options 3 and 4 which are very similar with regard to their exposure to explosive attack. Both have the courthouse split into two structures, one existing and one new. Because of this it will be highly likely that any attack targeting the front or rear of the courthouse will have major damage isolated to only one of the structures.

One notable difference between these two options is the number of bridges connecting the two structures which are vulnerable to becoming damaged and impassible due to an explosion. This may impede evacuation and rescue operations. Option 3 has three bridges, and Option 4 has only one. With regard to this feature, Option 3 is somewhat more vulnerable to an attack than Option 4.

6.4 STRUCTURAL RECOMMENDATIONS

Front Façade

- Fiber Reinforced Polymer on brick wall anchored into floor system
- 7mil anti-shatter film daylight application

New Construction

- Laminated glass, min 2-3/16” panes, 30 mil interlayer
- Balanced design of windows and wall system (i.e., walls need to have a lateral resistance at least as large as the windows)
- Ductile design of wall system using reinforced concrete CMU block or other material

Parking Structure

- Harden floor system between secured and public parking levels
- Use a solid wall on the side facing the courthouse to redirect explosive effects

6. 5 PERFORMANCE VERSUS BENEFITS STUDY

As a preliminary step to facilitate pre-schematic efforts, Hinman has conducted a study of the three site options to determine the optimal configuration to minimize the cost of building envelope blast resistant design. Site configuration, building location and shape, and weapon threat size were collectively considered to define each option’s associated blast exposure. The three options were compared based on the relative air-blast energy required to be resisted by the building envelope, which was considered to be proportional to the cost of blast resistant construction. The smallest air-blast energy exposure indicated most cost-effective site configuration. The unsecured vehicle threat located at the publicly accessible road or parking area.

It is assumed that Options 3 and 4 are geometrically identical. This is not expected to change the results given that the two building configurations are so similar.

Based on this study, the ranking of design options was as follows:

1. Option 2B, air-blast load energy = 196 kips-sec
2. Option 3 and 4, air-blast energy = 231 kips-sec

Based on these results, Option 2B, provides the best configuration for developing cost-effective blast mitigation design. A brief analysis summary is provided below.

6.6 APPENDIX: COST BENEFIT ANALYSIS SUPPORTING CALCULATIONS

Analysis Approach

Ranking of building options is based on air-blast load energy which needs to be resisted by the exterior skin of the building. Our approach is outlined below:

1. Construct computer model of all options (see Figures 1 and 4)

2. Create air-blast load fragility curves created using bomb-sizes, standoffs and site configurations (see Figures 2 and 5) These fragility curves represent an envelope of all threats. Horizontal axis is represented as Load Intensity Measure (LIM) and vertical axis is complimentary extend of this load, which can be represented as Level of Protection (LOP = 1-Damage).

3. Create LIM vs LOP plot by rearranging the axis as shown in Figures 3 and 6.

4. Air-blast load energy is green shaded area in Figures 3 and 6.

Analysis Results Summary

Evaluation Of Option 2B

Design Option 2B includes demolition of a portion of the existing Glendale Courthouse and construction of a new facility, which integrates the historic north and east façade of the existing courthouse. The blast energy to be resisted is 195k-sec (see Figure 3).

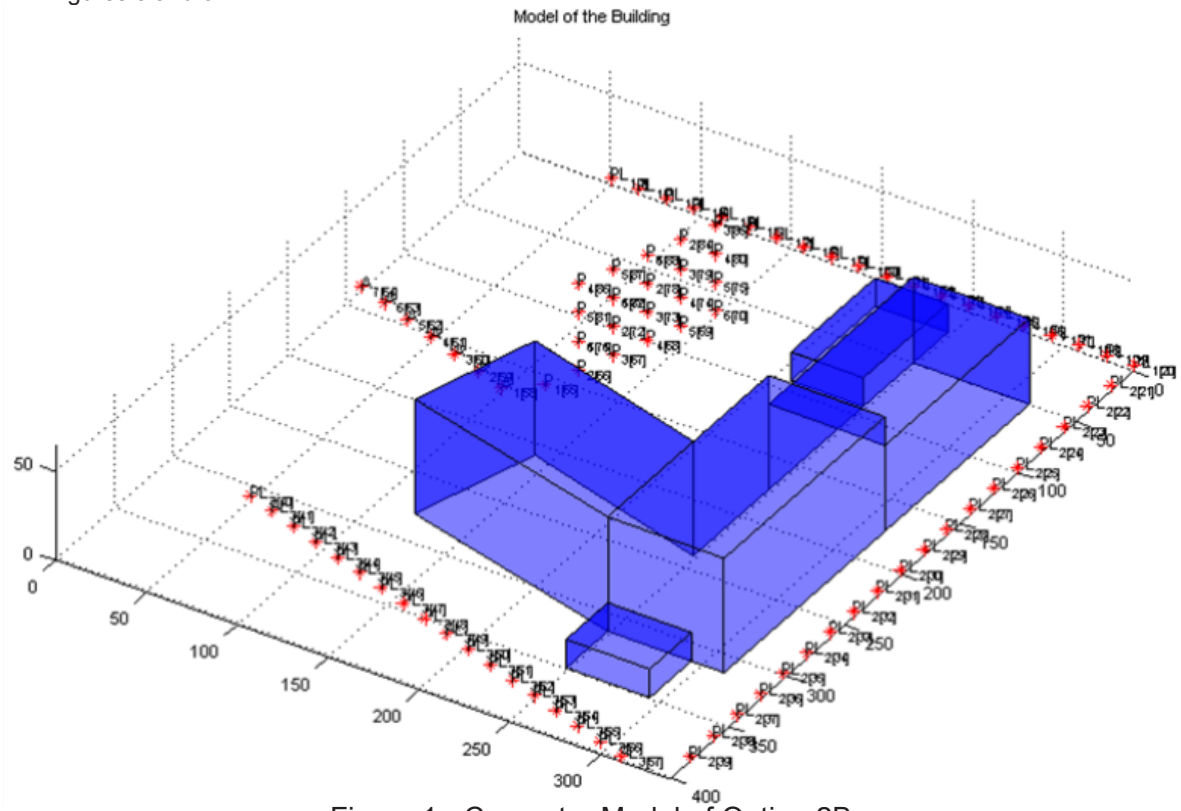


Figure 1 - Computer Model of Option 2B

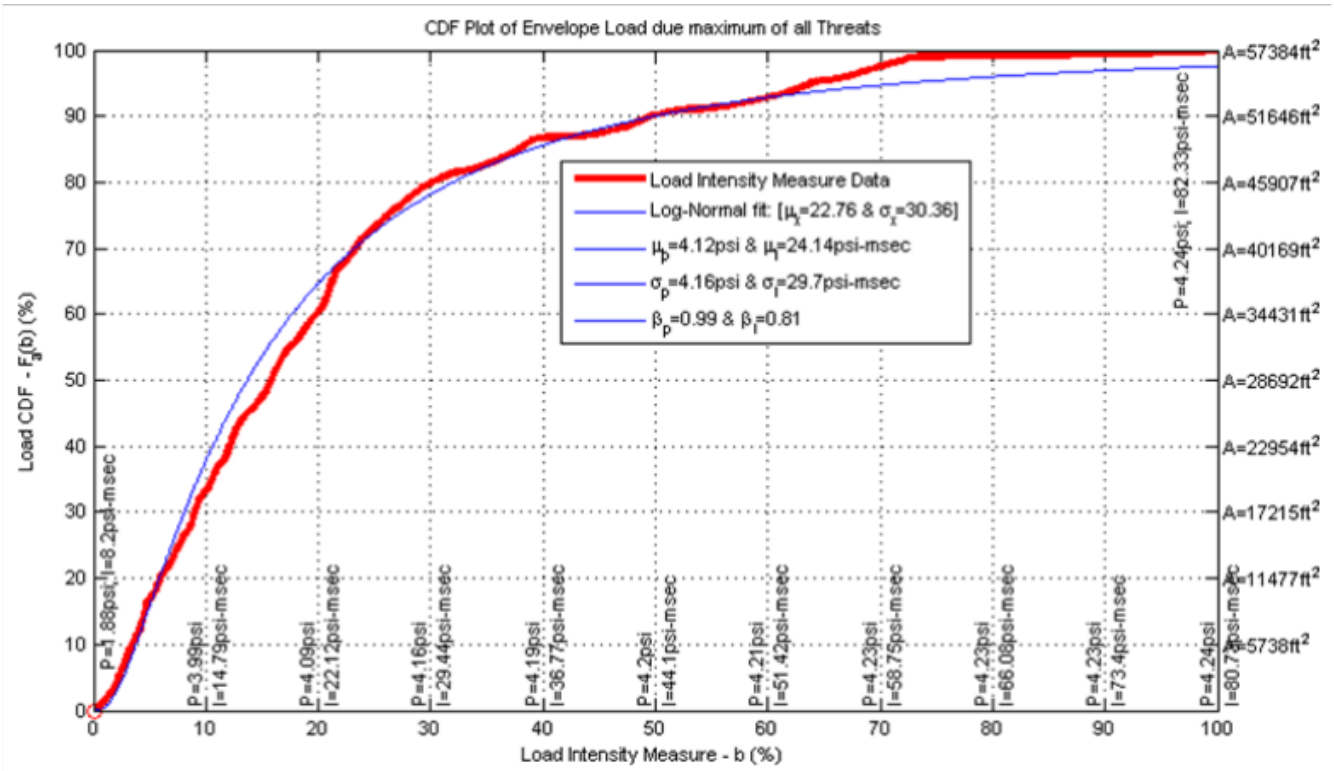


Figure 2 - Fragility Curve for Option 2B

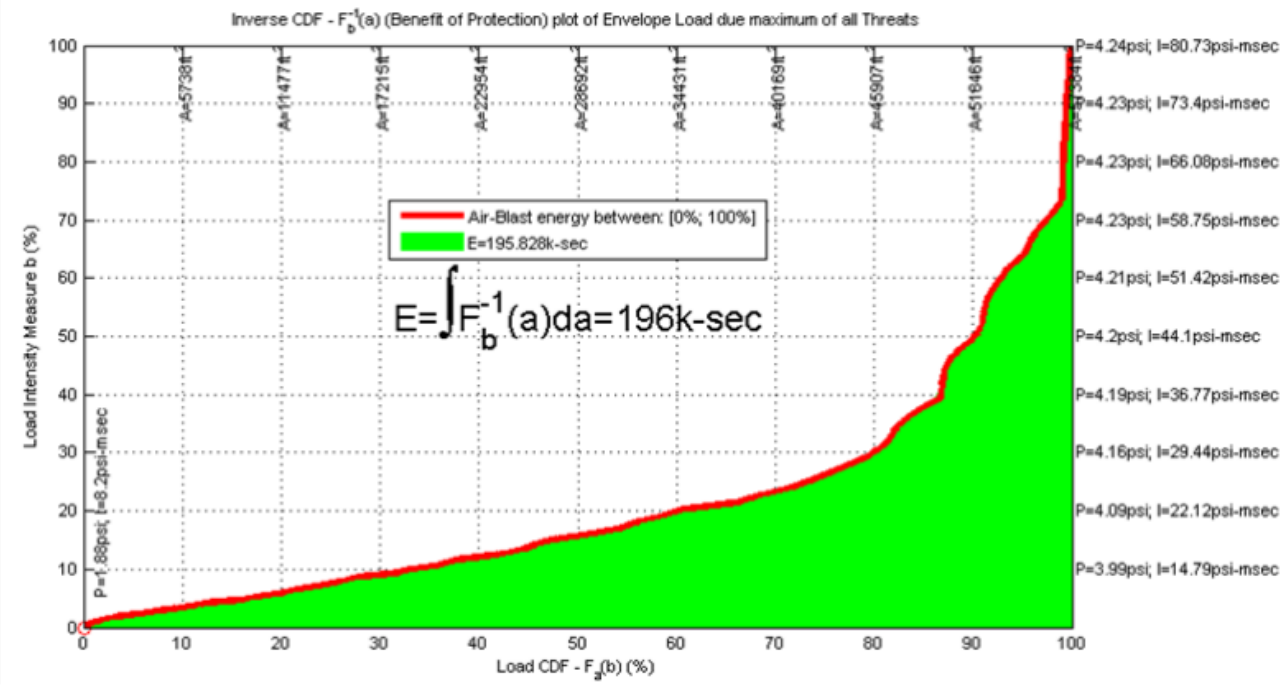


Figure 3 – Protection VS. Benefit Plot for Option 2B

EVALUATION OF OPTIONS 3 & 4

Design Options 3 & 4 include remodeling of the existing courthouse building and constructing a new multi-story addition with a 40-ft setback to the south. The slight differences in configuration between Options 3 & 4 are neglected in this study. Evaluation accounts for the presence of unsecured vehicles at the parking garage to the south of the new building. The blast energy to be resisted is 231 k-sec (see Figure 6).

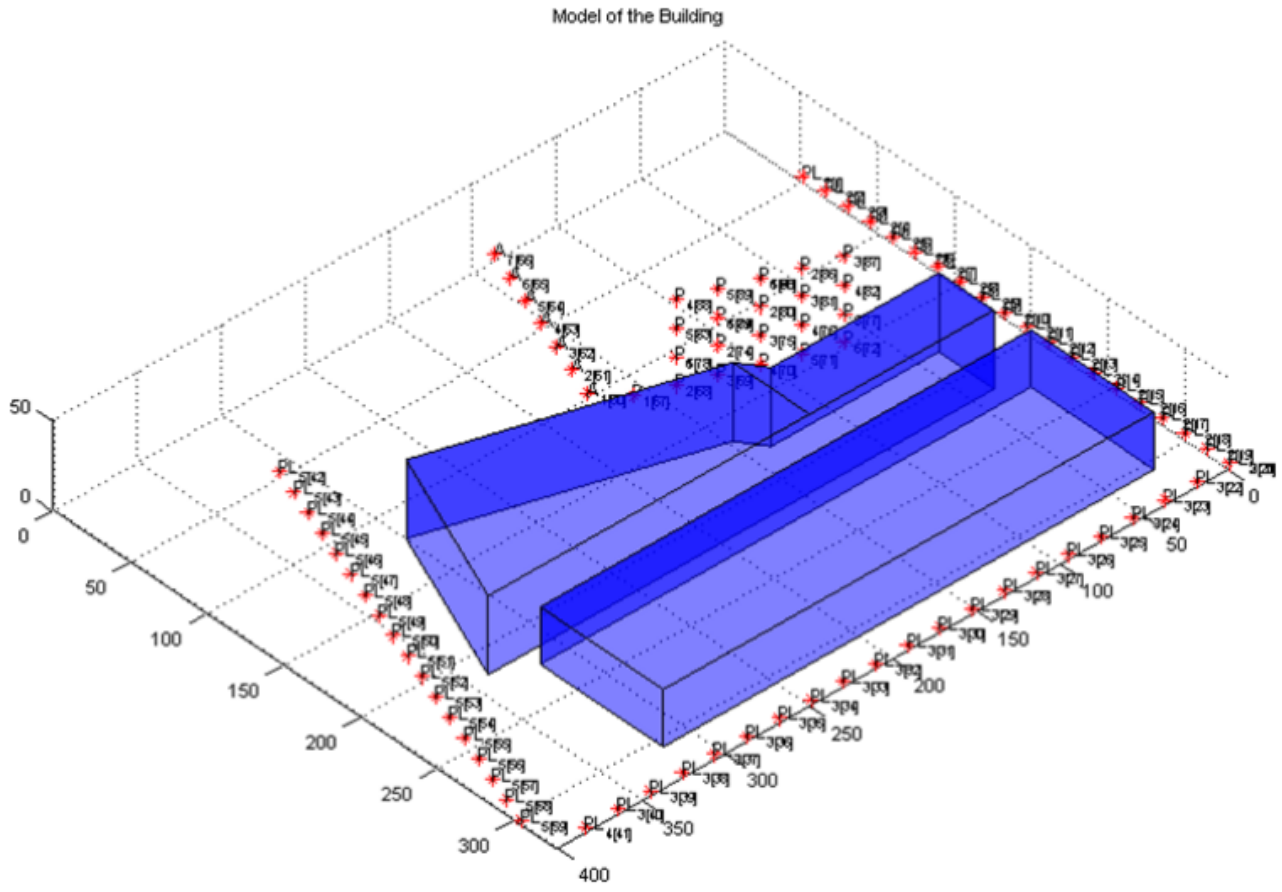


Figure 4. Computer Model of Options 3 & 4

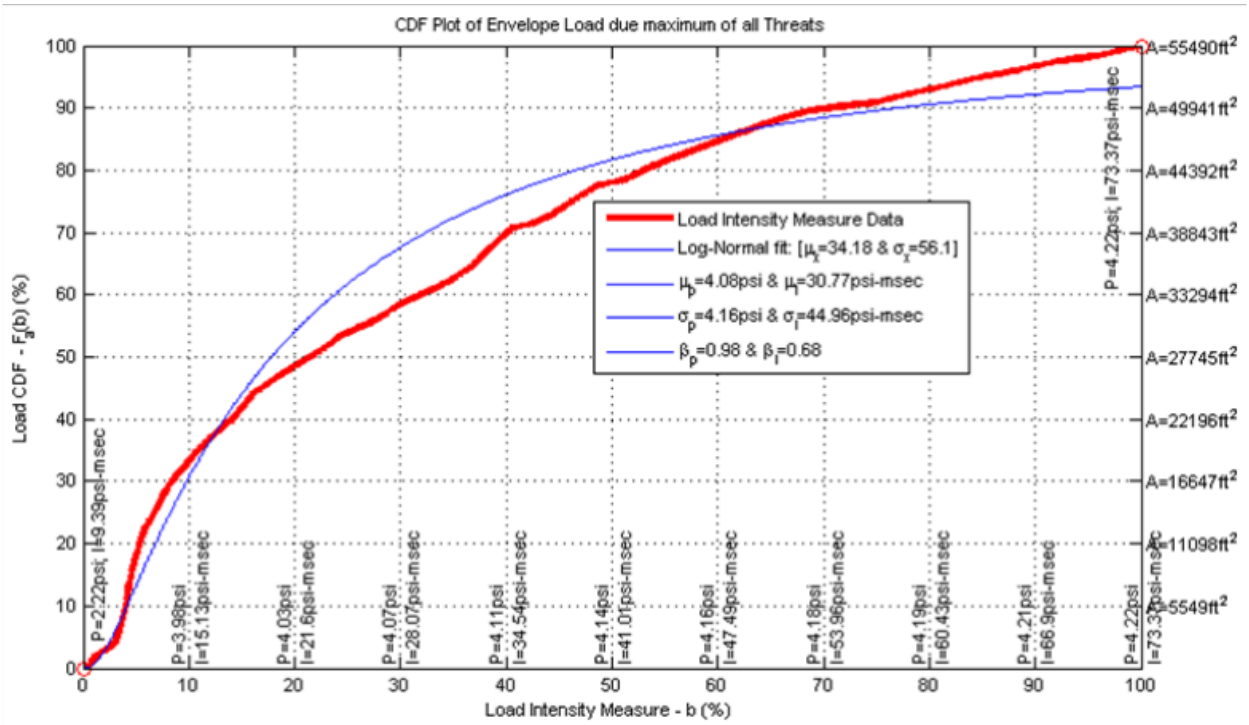


Figure 5. Fragility Curve for Option 3 and 4

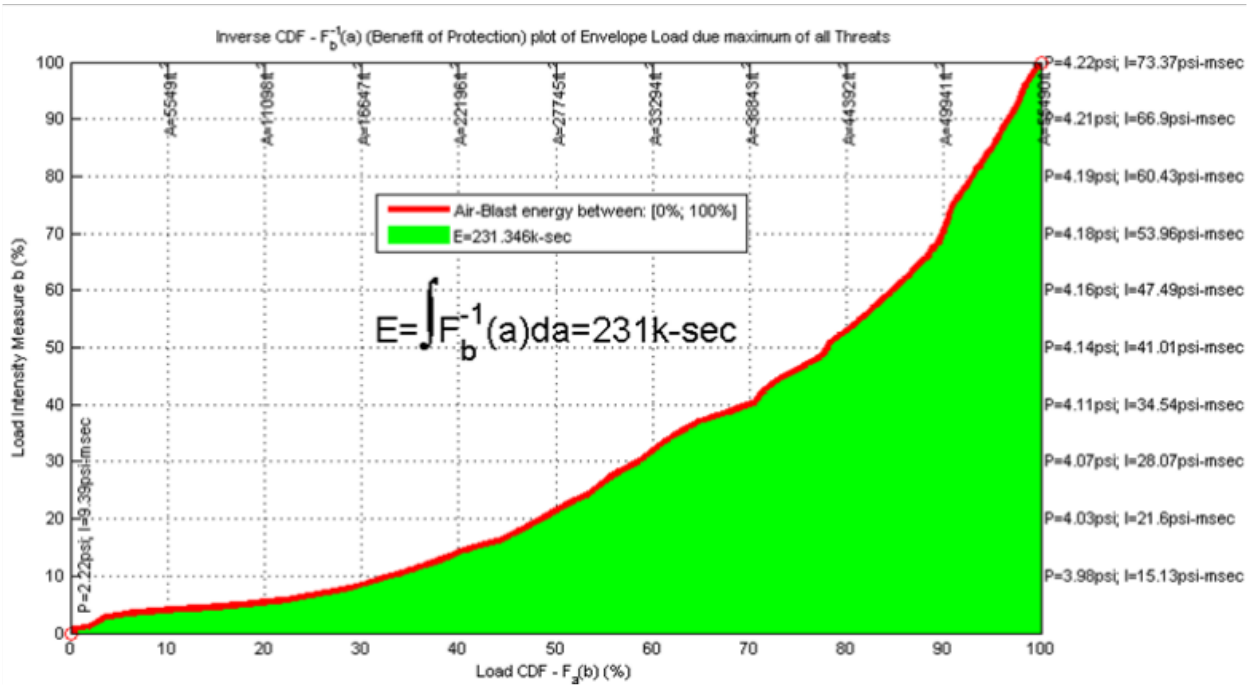


Figure 6. Protection vs. Benefit Plot for Option 3 and 4

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7.0 CONSTRUCTION FEASIBILITY EVALUATION

7.1 OVERVIEW

Construction feasibility was considered in terms of:

- Relocation of Operations During Construction
- Initial Construction Costs
- Long Term Operational and Maintenance Costs
- Impacts to Construction Schedule

7.2 RELOCATION OF OPERATIONS DURING CONSTRUCTION

All strategies will require relocation of the Courts during construction. Even Strategy 3, that attempts to preserve the original courtrooms as functioning courtrooms, would require extensive modifications to accommodate seismic upgrading of the structural system, alterations to provide universal accessibility and modifications to accept new building systems.

7.3 INITIAL CONSTRUCTION COSTS

A conceptual design cost estimate was conducted on Strategies 2B, 3 and 4B, to determine if there were any significant expected cost differences between approaches. The results indicated that there was little variance in bottom line first construction costs. Broadly speaking, additional costs associated with careful interventions of new systems and refurbishment of character defining elements are offset by savings in reusing the existing structure and components.

In all strategies, it should be noted that the gross square footages exceed the original Project Feasibility Report projections due to the inefficiencies of working within the constraints of the existing structure. For a further discussion on the topic, see Section 2.2.

7.4 LONG TERM OPERATIONAL AND MAINTENANCE COSTS

Detailed life cycle cost analyses were not included in this study. However, several generalizations can be made about differences between strategies. Strategy 2B offers the greatest degree of new structure, new exterior envelope, new systems integrated with new finishes and therefore is likely to reap the greatest degree of energy efficiency and durability of materials. 2B also offers the most efficient layout in terms of court functions, their flow and proximity to each other.

In comparison, Strategy 3 offers the greatest degree of retention of existing exterior envelope and existing finishes. Depending on integration of new HVAC systems and the degree to which existing walls and ceilings are kept to their original design, this strategy is likely to be the least energy efficient. Original components kept in place, by their nature are 60 years old and will likely require a greater degree of care and upkeep.

Strategies 4A and 4B are a hybrid approach that retain much of the original character defining elements but require a greater degree of flexibility in terms of renovating the interiors. As such, the resulting long term operational efficiencies are likely to land somewhere between Strategies 2B and 3.

7.5 IMPACTS TO SCHEDULE

Strategy 3 to the greatest extent and Strategies 4A and 4B to a lesser extent, entail a greater level of care in executing seismic upgrades and new foundations by inserting them strategically in areas being preserved and refurbished. New concrete shear walls will require modifications to footings and removal and replacement of finishes, such as millwork in courtrooms and potentially terrazzo flooring in public areas. Fiber Reinforced Polymer (FRP) wraps will likely be employed at piers and exterior openings as part of the seismic strengthening strategy.

Working within existing conditions for each of these tasks may require additional time to the construction schedule for selective demo and re-installation work that would not be otherwise be employed in new construction.

Strategy 2B offers the least potential impact to schedule as the structural system proposed would be primarily a new system behind the Broadway facade. Some selective work will still be required to tie the new system to the old, but the extent of refurbishment of interior finishes and components is much less.

8.0 COMPARATIVE ANALYSIS



8.1 OVERVIEW

The purpose of a graphic comparative analysis between the four conceptual planning approaches in this feasibility report is to quickly and broadly assess and identify the pros and cons of the many variables involved. The end goal is to determine what is the best approach to the existing structures and their place in an expanded Glendale Courthouse facility.

This report has made some general assumptions about the project, which are discussed in detail in Section 2.2. These include common planning approaches, such as the location of sallyport and the configuration of the parking garage. It also includes the demolition of the Annex, or Probation Wing, due to its significant structural non-conformities, restrictive site location, etc.

The following chart assesses each of the principle areas examined by the architectural and engineering team in terms of each strategy's ability to meet criteria important to the project's success. A subjective judgment of great, good, fair or poor has been given to each category.

MATRIX OF CRITERIA FOR STRATEGIES	2B	3	4A	4B
HISTORIC PRESERVATION				
Retains Broadway Façade				
Retains East & West Facades, Courtyards				
Retains South Façade				
Retains North Public Concourses				
Retains Original Courtrooms				
URBAN AND CIVIC RESPONSE				
Civic Presence on Broadway				
Civic Presence on Glendale				
Procession from Parking to Front Door				
Clarity in Wayfinding				
Provides Park-like Setting				
Opportunity for 10 Surface Parking Spots				
ARCHITECTURE / FUNCTIONALITY				
Meets CA Trial Court Facility Standards				
Parity Between Courtrooms & Chambers				
Ease of Modifications to Existing Structure				
Public Circulation				
Private / Restricted Circulation				
Secure Circulation (In-Custodies)				
Future Flexibility				
ACCESSIBILITY				
Accessible Routes to Primary Entrance				
Accessible Routes to Other Entrances & Exits				
Accessible Route within Facility				
Accessibility in Courtrooms				
STRUCTURE				
Ease of Modifications to Existing Structure				
Cost of Structural System				
Ability to Stay Operational On-Site During Construction				
Straightforwardedness of Design and Plancheck				

MATRIX OF CRITERIA FOR STRATEGIES	2B	3	4A	4B
MECH. / ELEC. / PLUMBING / DATA				
Ease of Modifications to Existing Structure	GOOD	POOR	FAIR	FAIR
Ease of Service Distribution While Maintaining Ceiling Height	FAIR	POOR	GOOD	GOOD
Possible Reuse of Some Existing HVAC Equipment	POOR	FAIR	POOR	POOR
FIRE PROTECTION				
Ease of Modifications to Existing Structure	GOOD	POOR	FAIR	FAIR
Requires New Standpipe and Fire Pump Due to Height	POOR	GREAT	POOR	GREAT
THREAT & PHYSICAL SECURITY				
Amount of Stand-Off	GOOD	POOR	FAIR	FAIR
Total Exterior Wall & Roof Area	GREAT	POOR	FAIR	FAIR
Percentage of New Floor Construction	GREAT	POOR	POOR	POOR
In-Custody Holding Accommodations	GREAT	POOR	GREAT	GOOD
Evacuation and Rescue Access	GREAT	POOR	FAIR	FAIR
CONSTRUCTION FEASIBILITY				
Estimate of Construction Costs	FAIR	GOOD	FAIR	FAIR
Impact to Construction Schedule	GOOD	POOR	FAIR	FAIR
MAINTENANCE AND OPERATIONS				
Estimate of Operational Costs - Building	GOOD	FAIR	FAIR	FAIR
Estimate of Operational Costs - Energy	GREAT	FAIR	GOOD	GOOD
SUSTAINABILITY				
Reuse of Existing Structure	FAIR	GREAT	GOOD	GOOD
Ease of Upgrading Existing Envelope	GOOD	FAIR	GOOD	GOOD
Site Permeability / Amount of Landscape	GOOD	FAIR	FAIR	FAIR
Flexibility to Achieve Energy Efficiency	GOOD	FAIR	FAIR	FAIR
Access to Daylight & Views for Staff	GOOD	GOOD	POOR	POOR

GREAT
GOOD
FAIR
POOR

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9.0 APPENDIX

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APPENDIX-A
BUILDING PERFORMANCE LEVEL OBJECTIVES

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 Structural Seismic Performance**: Normal structural seismic performance objectives will be met by thorough conformance with the principles and provisions of the applicable code using either mapped seismic acceleration parameters required by ASCE 7-05 Chapter 11 or site-specific seismic ground motions. This is categorized as “Life Safety (3-C)” according to ASCE 31-03 and ASCE-41 documents.

• **Enhanced Structural Seismic Performance**: The AOC will review and approve the seismic design criteria and may appoint an independent peer reviewer to review the criteria. This is categorized as “Immediate Occupancy (1B)” according to ASCE 31-03 and ASCE-41 documents.

The structural performance of a building during a seismic event can generally be categorized into four performance levels: (i) Operational (1-A), (ii) Immediate Occupancy (1B), (iii) Life Safety (3-C), and (iv) Collapse Prevention (5-E). ASCE 31-03 and 41-06 documents provide descriptions for these performance levels of structural and non-structural elements. For reference, structural and non-structural performance levels are shown in Figures A-1 and A-2. Current US building codes imply a “Life Safety” performance level for “typical” buildings under code level seismic hazard (BSE-1 “rare” event with a 10% probability of being exceeded in 50 years, a 475 year event). However, for the evaluation of existing structures, other performance levels can also be considered based on the type and associated (operational and/or safety) risks. For example, essential structures such as Hospitals, Fire Stations and Power Plants are generally designed to stay “operational” (1-A) after a BSE-1 level seismic hazard. Similarly, “Immediate Occupancy” (1-B) performance objective could be selected for structures where extended disruption to the occupancy of the structure has substantial financial consequences to the client. For non-essential structures, it is usual to aim to achieve “Life Safety” structural performance level when the building is subjected to a building code level earthquake. For the purposes of this evaluation, we understand that the objective that is to be considered is a ‘Life Safety’ performance level. However, other levels could be considered, if operational interruption after a seismic event is a concern.

• **Life Safety Performance Level**: The definition of Life Safety performance level per ASCE documents contains two performance criteria that require judgment to be exercised. The following guidance may be used to incorporate the two criteria in the design evaluation: (1) at least some margin against either partial or total structural collapse remains, or (2) injuries may occur, but the overall risk of life-threatening injury as a result of structural damage is expected to be low.

• **Immediate Occupancy Performance Level** is defined as the post-earthquake damage state in which a structure remains safe to occupy (per ASCE 41-06). The definition of Immediate Occupancy Performance Level contains two performance criteria that require judgment to be exercised. The following guidance may be used to incorporate the two criteria in the design evaluation: (1) after a design earthquake, the basic vertical- and lateral-force-resisting systems retain nearly all of their pre-earthquake strength, and (2) very limited damage to both structural and nonstructural components is anticipated during the design earthquake that will require some minor repairs, but the critical parts of the building are habitable.

• **Collapse prevention** is not a performance level defined in ASCE 31-03, however, ASCE 41-06 states “Structural Performance Level S-5, Collapse Prevention, means the post-earthquake damage state in which the building is on the verge of partial or total collapse. Substantial damage to the structure has occurred, potentially including significant degradation in the stiffness and strength of the lateral-force-resisting system, large permanent lateral deformation of the structure, and degradation in the vertical-load-carrying capacity. However, all significant components of the gravity-load-resisting system must continue to carry their gravity load demands. Significant risk of injury due to falling hazards from structural debris may exist. The structure may not be technically practical to repair and is not safe for re-occupancy, as aftershock activity could induce collapse.”

	Target Building Performance Levels			
	Collapse Prevention Level (5-E)	**Life Safety Level (3-C)**	**Immediate Occupancy Level (1-B)**	**Operational Level (1-A)**
Overall Damage	Severe	Moderate	Light	Very Light
General	Little residual stiffness and strength, but load-bearing columns and walls function. Large permanent drifts. Some exits blocked. Infills and unbraced parapets failed or at incipient failure. Building is near collapse.	Some residual strength and stiffness left in all stories. Gravity-load-bearing elements function. No out-of-plane failure of walls or tipping of parapets. Some permanent drift. Damage to partitions. Building may be beyond economical repair.	No permanent drift. Structure substantially retains original strength and stiffness. Minor cracking of facades, partitions, and ceilings as well as structural elements. Elevators can be restarted. Fire protection operable.	No permanent drift. Structure substantially retains original strength and stiffness. Minor cracking of facades, partitions, and ceilings as well as structural elements. All systems important to normal operation are functional.
Nonstructural components	Extensive damage.	Falling hazards mitigated but many architectural, mechanical, and electrical systems are damaged.	Equipment and contents are generally secure, but may not operate due to mechanical failure or lack of utilities.	Negligible damage occurs. Power and other utilities are available, possibly from standby sources.
Comparison with performance intended for buildings designed under the *NEHRP Provisions*, for the Design Earthquake	Significantly more damage and greater risk.	Somewhat more damage and slightly higher risk.	Less damage and lower risk.	Much less damage and lower risk.

Figure A-1 Damage Control and Building Performance Levels (ASCE 41-06/FEMA 356)

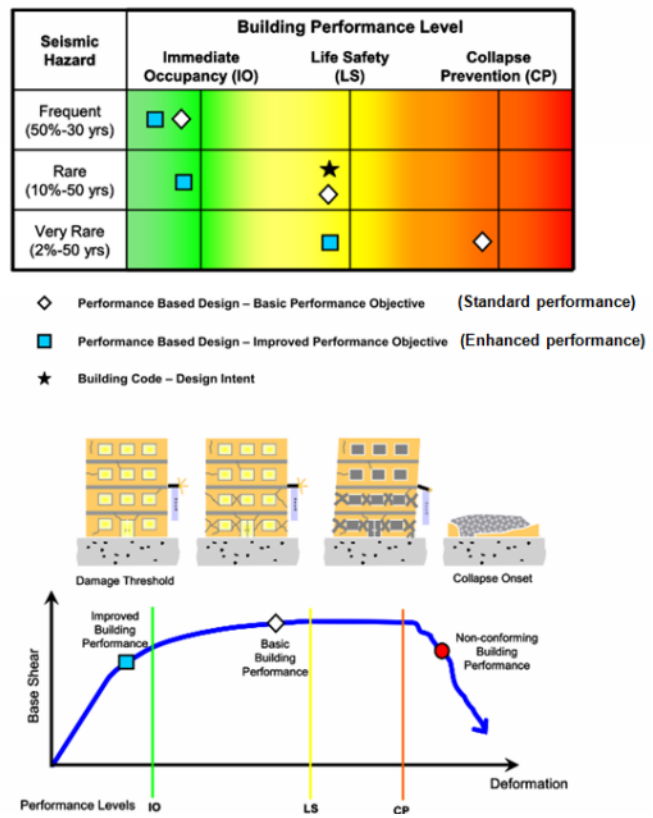


Figure A-2 Building Performance Levels

APPENDIX-B: SITE DESCRIPTIONS AND SEISMICITY

Glendale in Los Angeles County is classified as a high seismic zone by the current building code. The City of Glendale is surrounded by four fault systems where Epicentral distances are closer than 10 miles: Verdugo, Raymond Hill, Eagle Rock, and Hollywood/Santa Monica (Figure 4). According to a USGS (2002) seismic hazard deaggregation, the highest contributors to seismic hazard at the Glendale Courthouse site are large events (M6.5-M7) on a fault system less than 10 miles distance from the site (Figure B-2). These near faults are in seismic silence and are assumed as high risk by the seismologists. In addition to that, there are some significant historic earthquakes on nearby faults in Southern California (Figure B-1) including the 1994 Northridge Earthquake (Magnitude 6.7, 14 miles away), 1971 San Fernando Earthquake (Magnitude 6.7, 22 Miles away), and 1952 Kern County Earthquake (Magnitude 7.5, 42 miles away).

The ground shaking at the site due to previous large magnitude earthquakes was not severe due to seismic gap at near faults (<10miles), long distances over which ground shaking attenuated by the nearby active faults and also due to good soil condition at the site. The Glendale Courthouse does not appear to have experienced any significant damage due to earthquakes and no damage was documented or reported since 1956. Both the Main building and Probation wing were designed per the 1955 Edition of Uniform Building Code (UBC).

Parameters that are used to define the seismic hazard at the building site have been obtained from USGS U.S. Seismic Hazard Data. Short period and 1-second spectral acceleration values (S_S and S_1) have been given as 2.787g and 0.935g respectively. The site class has been found as “Type C” (Very Dense Soil and Soft Rock) per ASCE 7-05 classifications and USGS V_s^{30} Maps (Figure B-4).

Site coefficients (F_a and F_v) have also been found as 1.0 and 1.3 respectively. Based on site class C, short period and 1-second design spectral accelerations (S_{DS} and S_{D1}) have been calculated as 1.858g and 0.810g, respectively. Short period and 1-second spectral acceleration maps and the design basis earthquake (DBE) response spectrum (5% damping) are shown in Figure B-3 and Figure B-5. The Glendale Courthouse building matches the Seismic Design Category (SDC) “D” per ASCE 7-05.

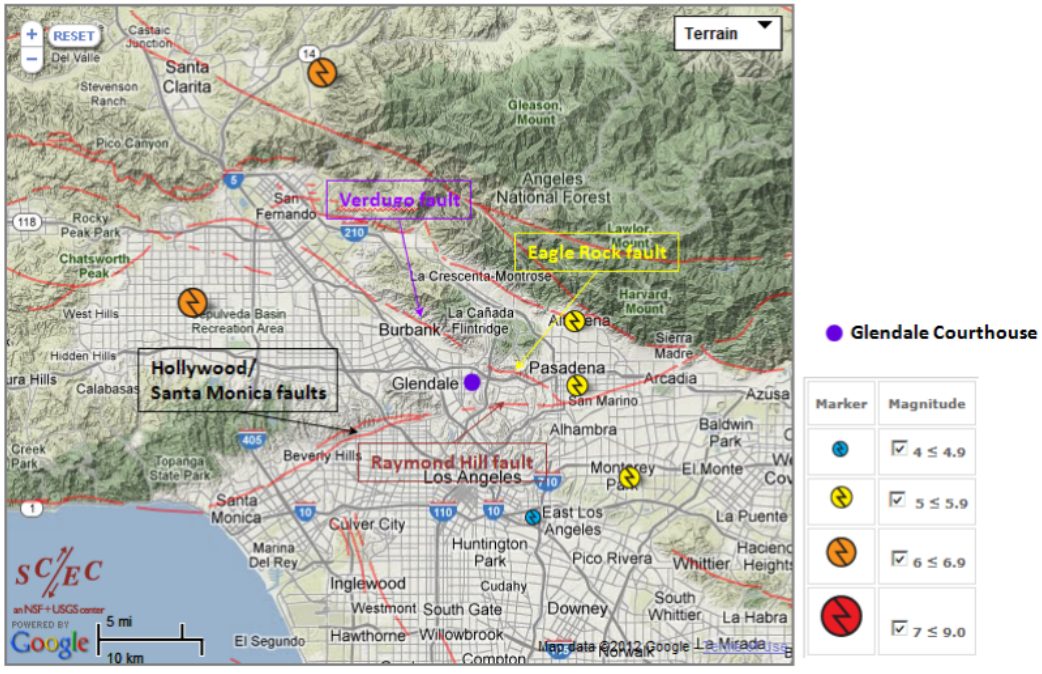


Figure B-1 Significant earthquakes and faults around Glendale Courthouse (SCEC, 2011)

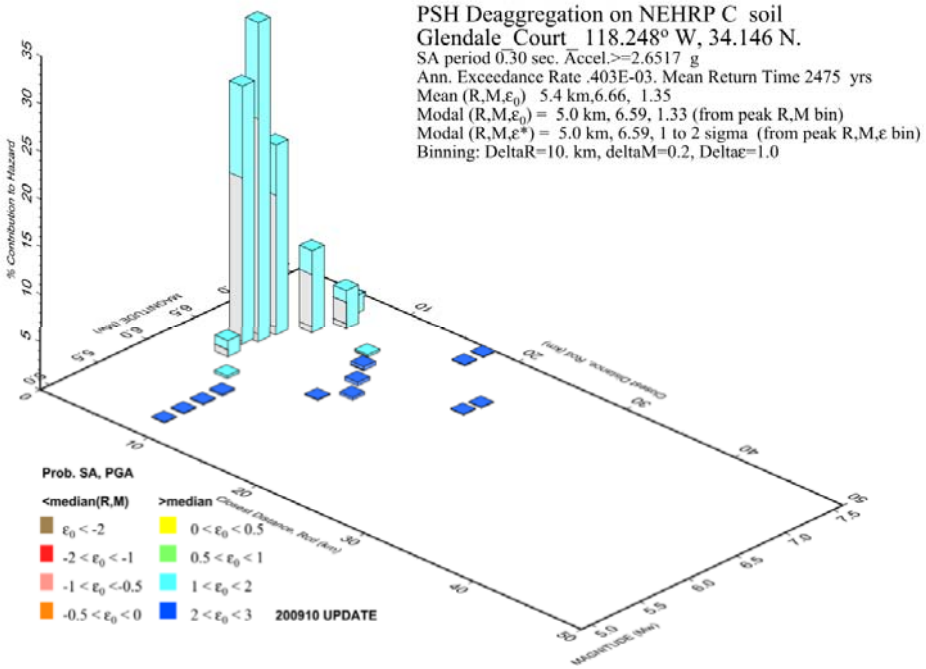
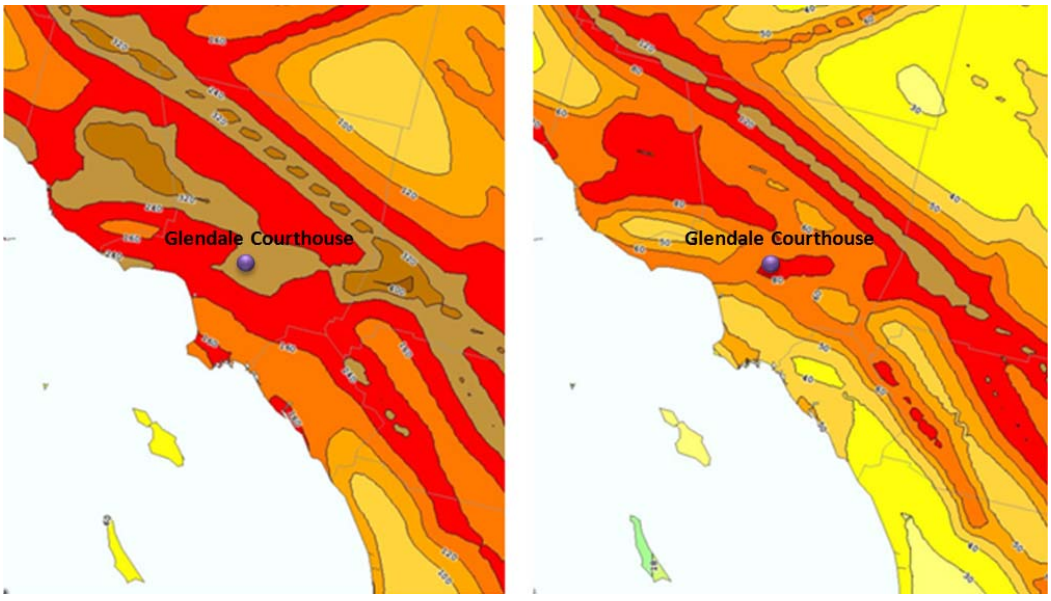


Figure B-2 Seismic Hazard Deaggregation at Glendale Courthouse site (USGS)



(a) S_S (b) S_1

Figure B-3 Short period (S_S) and 1 sec period (S_1) spectral acceleration for seismic hazard with 2% probability of exceedance in 50 years (USGS)

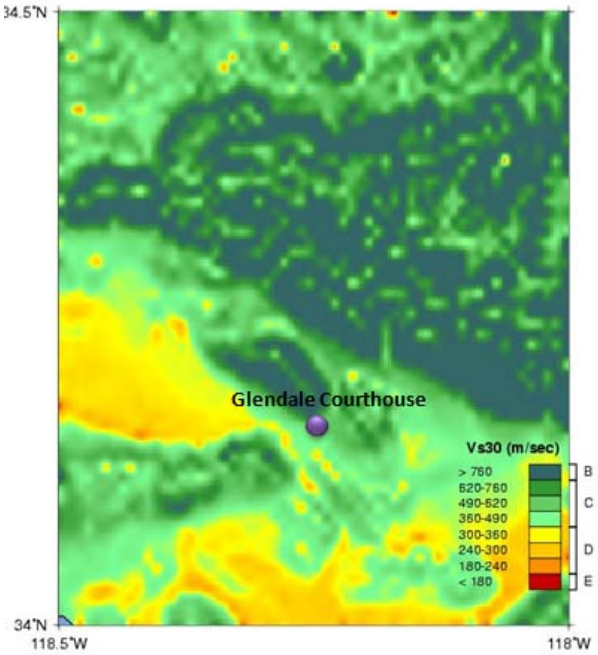


Figure B-4 Glendale Courthouse Site Class based on V_s^{30} Map Server (USGS)

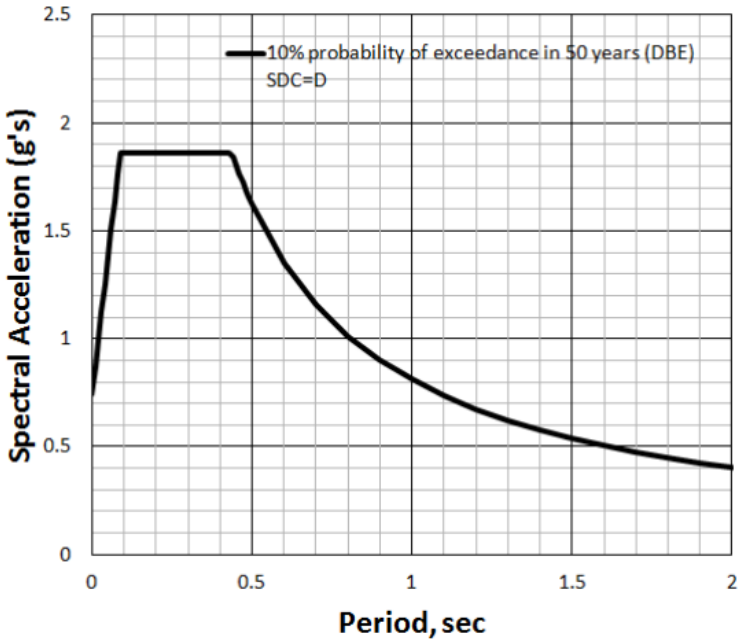


Figure B-5 Elastic Design Base Earthquake (DBE) Response Spectra Function (5% damping)

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APPENDIX-C: TIER-1 FINDINGS
Main Building

3.7.6 Basic Structural Checklist for Building Type S4: Steel Frames with Concrete Shear Walls

This Basic Structural Checklist shall be completed where required by Table 3-2.

Each of the evaluation statements on this checklist shall be marked Compliant (C), Non-compliant (NC), or Not Applicable (N/A) for a Tier 1 Evaluation. Compliant statements identify issues that are acceptable according to the criteria of this standard, while non-compliant statements identify issues that require further investigation. Certain statements may not apply to the buildings being evaluated. For non-compliant evaluation statements, the design professional may choose to conduct further investigation using the corresponding Tier 2 Evaluation procedure; corresponding section numbers are in parentheses following each evaluation statement.

C3.7.6 Basic Structural Checklist for Building Type S4

These buildings consist of a frame assembly of steel beams and steel columns. The floor and roof diaphragms consist of cast-in-place concrete slabs or metal deck with or without concrete fill. Framing consists of steel beams, open web joists, or steel trusses. Lateral forces are resisted by cast-in-place concrete shear walls. These walls are bearing walls where the steel frame does not provide a complete vertical support system. In older construction the steel frame is designed for vertical loads only. In modern dual systems, the steel moment frames are designed to work together with the concrete shear walls in proportion to their relative rigidity. In the case of a dual system, the walls shall be evaluated under this building type and the frames shall be evaluated under S1 or S1A, Steel Moment Frames. The steel frame may provide a secondary lateral-force-resisting system depending on the stiffness of the frame and the moment capacity of the beam-column connections.

Building System

C (NC) N/A — LOAD PATH: The structure shall contain a minimum of one complete load path for Life Safety and Immediate Occupancy for seismic force effects from any horizontal direction that serves to transfer the inertial forces from the mass to the foundation. (Tier 2: Sec. 4.3.1.1)

C NC (N/A) — MEZZANINES: Interior mezzanine levels shall be braced independently from the main structure, or shall be anchored to the lateral-force-resisting elements of the main structure. (Tier 2: Sec. 4.3.1.3)

C (NC) N/A — WEAK STORY: The strength of the lateral-force-resisting system in any story shall not be less than 80 percent of the strength in an adjacent story, above or below, for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.3.2.1)

Penthouse level has a lateral strength less than 80% of the strength at the roof level.

C NC N/A — SOFT STORY: The stiffness of the lateral-force-resisting system in any story shall not be less than 70 percent of the lateral-force-resisting system stiffness in an adjacent story above or below, or less than 80 percent of the average lateral-force-resisting system stiffness of the three stories above or below for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.3.2.2)

C NC N/A — GEOMETRY: There shall be no changes in horizontal dimension of the lateral-force-resisting system of more than 30 percent in a story relative to adjacent stories for Life Safety and Immediate Occupancy, excluding one-story penthouses and mezzanines. (Tier 2: Sec. 4.3.2.3)

C (NC) N/A — VERTICAL DISCONTINUITIES: All vertical elements in the lateral-force-resisting system shall be continuous to the foundation. (Tier 2: Sec. 4.3.2.4)

Penthouse level walls are not continuous to the foundation.

Screening Phase (Tier 1)

(C)	NC	N/A	MASS: There shall be no change in effective mass more than 50 percent from one story to the next for Life Safety and Immediate Occupancy. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 4.3.2.5)
(C)	NC	N/A	TORSION: The estimated distance between the story center of mass and the story center of rigidity shall be less than 20 percent of the building width in either plan dimension for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.3.2.6)
(C)	NC	N/A	DETERIORATION OF STEEL: There shall be no visible rusting, corrosion, cracking, or other deterioration in any of the steel elements or connections in the vertical- or lateral-force-resisting systems. (Tier 2: Sec. 4.3.3.3)
(C)	NC	N/A	DETERIORATION OF CONCRETE: There shall be no visible deterioration of concrete or reinforcing steel in any of the vertical- or lateral-force-resisting elements. (Tier 2: Sec. 4.3.3.4)
(C)	NC	N/A	CONCRETE WALL CRACKS: All existing diagonal cracks in wall elements shall be less than 1/8 inch for Life Safety and 1/16 inch for Immediate Occupancy, shall not be concentrated in one location, and shall not form an X pattern. (Tier 2: Sec. 4.3.3.9)

Lateral-Force-Resisting System

(C)	NC	N/A	COMPLETE FRAMES: Steel or concrete frames classified as secondary components shall form a complete vertical-load-carrying system. (Tier 2: Sec. 4.4.1.6.1)
(C)	NC	N/A	REDUNDANCY: The number of lines of shear walls in each principal direction shall be greater than or equal to 2 for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.2.1.1)
C	(NC)	N/A	SHEAR STRESS CHECK: The shear stress in the concrete shear walls, calculated using the Quick Check procedure of Section 3.5.3.3, shall be less than the greater of 100 psi or $2\sqrt{f'c}$ for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.2.2.1)
(C)	NC	N/A	REINFORCING STEEL: The ratio of reinforcing steel area to gross concrete area shall be not less than 0.0015 in the vertical direction and 0.0025 in the horizontal direction for Life Safety and Immediate Occupancy. The spacing of reinforcing steel shall be equal to or less than 18 inches for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.2.2.2)
C	NC	(N/A)	COLUMN SPLICES: Steel columns encased in shear-wall-boundary elements shall have splices that develop the tensile strength of the column. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.4.2.2.9)

Connections

(C)	NC	N/A	TRANSFER TO SHEAR WALLS: Diaphragms shall be connected for transfer of loads to the shear walls for Life Safety and the connections shall be able to develop the lesser of the shear strength of the walls or diaphragms for Immediate Occupancy. (Tier 2 Sec. 4.6.2.1)
C	(NC)	N/A	FOUNDATION DOWELS: Wall reinforcement shall be doweled into the foundation for Life Safety, and the dowels shall be able to develop the lesser of the strength of the walls or the uplift capacity of the foundation for Immediate Occupancy. (Tier 2: Sec. 4.6.3.5)
C	(NC)	N/A	SHEAR-WALL-BOUNDARY COLUMNS: The shear-wall-boundary columns shall be anchored to the building foundation for Life Safety, and the anchorage shall be able to develop the tensile capacity of the column for Immediate Occupancy. (Tier 2: Sec.4.6.3.6)

3.7.6S Supplemental Structural Checklist for Building Type S4: Steel Frames with Concrete Shear Walls

This Supplemental Structural Checklist shall be completed where required by Table 3-2. The Basic Structural Checklist shall be completed prior to completing this Supplemental Structural Checklist.

Lateral-Force-Resisting System

C NC (N/A) COUPLING BEAMS: The stirrups in coupling beams over means of egress shall be spaced at or less than $d/2$ and shall be anchored into the confined core of the beam with hooks of 135° or more for Life Safety. All coupling beams shall comply with the requirements above and shall have the capacity in shear to develop the uplift capacity of the adjacent wall for Immediate Occupancy. (Tier 2: Sec. 4.4.2.2.3)

(C) NC N/A OVERTURNING: All shear walls shall have aspect ratios less than 4-to-1. Wall piers need not be considered. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.4.2.2.4)

C NC (N/A) CONFINEMENT REINFORCING: For shear walls with aspect ratios greater than 2-to-1, the boundary elements shall be confined with spirals or ties with spacing less than $8d_b$. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.4.2.2.5)

(C) NC N/A REINFORCING AT OPENINGS: There shall be added trim reinforcement around all wall openings with a dimension greater than three times the thickness of the wall. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.4.2.2.6)

(C) NC N/A WALL THICKNESS: Thickness of bearing walls shall not be less than 1/25 the unsupported height or length, whichever is shorter, nor less than 4 inches. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.4.2.2.7)

(C) NC N/A WALL CONNECTIONS: There shall be a positive connection between the shear walls and the steel beams and columns for Life Safety and the connection shall be able to develop the strength of the walls for Immediate Occupancy. (Tier 2: Sec. 4.4.2.2.8)

Diaphragms

C (NC) N/A OPENINGS AT SHEAR WALLS: Diaphragm openings immediately adjacent to the shear walls shall be less than 25 percent of the wall length for Life Safety and 15 percent of the wall length for Immediate Occupancy. (Tier 2: Sec. 4.5.1.4)

(C) NC N/A PLAN IRREGULARITIES: There shall be tensile capacity to develop the strength of the diaphragm at re-entrant corners or other locations of plan irregularities. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.5.1.7)

C NC (N/A) DIAPHRAGM REINFORCEMENT AT OPENINGS: There shall be reinforcing around all diaphragm openings larger than 50 percent of the building width in either major plan dimension. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.5.1.8)

Connections

C NC (N/A) UPLIFT AT PILE CAPS: Pile caps shall have top reinforcement and piles shall be anchored to the pile caps for Life Safety, and the pile cap reinforcement and pile anchorage shall be able to develop the tensile capacity of the piles for Immediate Occupancy. (Tier 2: Sec. 4.6.3.10)

Screening Phase (Tier 1)

3.7.8 Basic Structural Checklist for Building Type C1: Concrete Moment Frames

This Basic Structural Checklist shall be completed where required by Table 3-2.

Each of the evaluation statements on this checklist shall be marked Compliant (C), Non-compliant (NC), or Not Applicable (N/A) for a Tier 1 Evaluation. Compliant statements identify issues that are acceptable according to the criteria of this standard, while non-compliant statements identify issues that require further investigation. Certain statements may not apply to the buildings being evaluated. For non-compliant evaluation statements, the design professional may choose to conduct further investigation using the corresponding Tier 2 Evaluation procedure; corresponding section numbers are in parentheses following each evaluation statement.

C3.7.8 Basic Structural Checklist for Building Type C1

These buildings consist of a frame assembly of cast-in-place concrete beams and columns. Floor and roof framing consists of cast-in-place concrete slabs, concrete beams, one-way joists, two-way waffle joists, or flat slabs. Lateral forces are resisted by concrete moment frames that develop their stiffness through monolithic beam-column connections. In older construction, or in levels of low seismicity, the moment frames may consist of the column strips of two-way flat slab systems. Modern frames in levels of high seismicity have joint reinforcing, closely spaced ties, and special detailing to provide ductile performance. This detailing is not present in older construction. Foundations consist of concrete spread footings, mat foundations, or deep foundations.

Building System

(C)	NC	N/A	LOAD PATH: The structure shall contain a minimum of one complete load path for Life Safety and Immediate Occupancy for seismic force effects from any horizontal direction that serves to transfer the inertial forces from the mass to the foundation. (Tier 2: Sec. 4.3.1.1)
C	(NC)	N/A	ADJACENT BUILDINGS: The clear distance between the building being evaluated and any adjacent building shall be greater than 4 percent of the height of the shorter building for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.3.1.2)
C	NC	(N/A)	MEZZANINES: Interior mezzanine levels shall be braced independently from the main structure, or shall be anchored to the lateral-force-resisting elements of the main structure. (Tier 2: Sec. 4.3.1.3)
C	(NC)	N/A	WEAK STORY: The strength of the lateral-force-resisting system in any story shall not be less than 80 percent of the strength in an adjacent story, above or below, for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.3.2.1)
C	(NC)	N/A	SOFT STORY: The stiffness of the lateral-force-resisting system in any story shall not be less than 70 percent of the lateral-force-resisting system stiffness in an adjacent story above or below, or less than 80 percent of the average lateral-force-resisting system stiffness of the three stories above or below for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.3.2.2)
C	(NC)	N/A	GEOMETRY: There shall be no changes in horizontal dimension of the lateral-force-resisting system of more than 30 percent in a story relative to adjacent stories for Life Safety and Immediate Occupancy, excluding one-story penthouses and mezzanines. (Tier 2: Sec. 4.3.2.3)
C	(NC)	N/A	VERTICAL DISCONTINUITIES: All vertical elements in the lateral-force-resisting system shall be continuous to the foundation. (Tier 2: Sec. 4.3.2.4)

Screening Phase (Tier 1)

C (NC) N/A MASS: There shall be no change in effective mass more than 50 percent from one story to the next for Life Safety and Immediate Occupancy. Light roofs, penthouses, and mezzanines need not be considered. (Tier 2: Sec. 4.3.2.5)

Torsion exists in the short direction of the Probation Wing

C (NC) N/A TORSION: The estimated distance between the story center of mass and the story center of rigidity shall be less than 20 percent of the building width in either plan dimension for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.3.2.6)

(C) NC N/A DETERIORATION OF CONCRETE: There shall be no visible deterioration of concrete or reinforcing steel in any of the vertical- or lateral-force-resisting elements. (Tier 2: Sec. 4.3.3.4)

C NC (N/A) POST-TENSIONING ANCHORS: There shall be no evidence of corrosion or spalling in the vicinity of post-tensioning or end fittings. Coil anchors shall not have been used. (Tier 2: Sec. 4.3.3.5)

Lateral-Force-Resisting System

C (NC) N/A REDUNDANCY: The number of lines of moment frames in each principal direction shall be greater than or equal to 2 for Life Safety and Immediate Occupancy. The number of bays of moment frames in each line shall be greater than or equal to 2 for Life Safety and 3 for Immediate Occupancy. (Tier 2: Sec. 4.4.1.1.1)

C NC (N/A) INTERFERING WALLS: All concrete and masonry infill walls placed in moment frames shall be isolated from structural elements. (Tier 2: Sec. 4.4.1.2.1)

C (NC) N/A SHEAR STRESS CHECK: The shear stress in the concrete columns, calculated using the Quick Check procedure of Section 3.5.3.2, shall be less than the greater of 100 psi or $2\sqrt{f'c}$ for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.1.4.1)

C (NC) N/A AXIAL STRESS CHECK: The axial stress due to gravity loads in columns subjected to overturning forces shall be less than $0.10f'_c$ for Life Safety and Immediate Occupancy. Alternatively, the axial stresses due to overturning forces alone, calculated using the Quick Check procedure of Section 3.5.3.6, shall be less than $0.30f'_c$ for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.1.4.2)

Connections

(C) NC N/A CONCRETE COLUMNS: All concrete columns shall be doweled into the foundation for Life Safety, and the dowels shall be able to develop the tensile capacity of reinforcement in columns of lateral-force-resisting system for Immediate Occupancy. (Tier 2: Sec. 4.6.3.2)

3.7.8S Supplemental Structural Checklist for Building Type C1: Concrete Moment Frames

This Supplemental Structural Checklist shall be completed where required by Table 3-2. The Basic Structural Checklist shall be completed prior to completing this Supplemental Structural Checklist.

Lateral-Force-Resisting System

C NC (N/A) FLAT SLAB FRAMES: The lateral-force-resisting system shall not be a frame consisting of columns and a flat slab/plate without beams. (Tier 2: Sec. 4.4.1.4.3)

C NC (N/A) PRESTRESSED FRAME ELEMENTS: The lateral-force-resisting frames shall not include any prestressed or post-tensioned elements where the average prestress exceeds the lesser of 700 psi or $f'_c/6$ at potential hinge locations. The average prestress shall be calculated in accordance with the Quick Check procedure of Section 3.5.3.8. (Tier 2: Sec. 4.4.1.4.4)

C (NC) N/A CAPTIVE COLUMNS: There shall be no columns at a level with height/depth ratios less than 50 percent of the nominal height/depth ratio of the typical columns at that level for Life Safety and 75 percent for Immediate Occupancy. (Tier 2: Sec. 4.4.1.4.5)

C (NC) N/A NO SHEAR FAILURES: The shear capacity of frame members shall be able to develop the moment capacity at the ends of the members. (Tier 2: Sec. 4.4.1.4.6)

C (NC) N/A STRONG COLUMN/WEAK BEAM: The sum of the moment capacity of the columns shall be 20 percent greater than that of the beams at frame joints. (Tier 2: Sec. 4.4.1.4.7)

C (NC) N/A BEAM BARS: At least two longitudinal top and two longitudinal bottom bars shall extend continuously throughout the length of each frame beam. At least 25 percent of the longitudinal bars provided at the joints for either positive or negative moment shall be continuous throughout the length of the members for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.1.4.8)

C (NC) N/A COLUMN-BAR SPLICES: All column bar lap splice lengths shall be greater than $35d_b$ for Life Safety and $50d_b$ for Immediate Occupancy, and shall be enclosed by ties spaced at or less than $8d_b$ for Life Safety and Immediate Occupancy. Alternatively, column bars shall be spliced with mechanical couplers with a capacity of at least 1.25 times the nominal yield strength of the spliced bar. (Tier 2: Sec. 4.4.1.4.9)

C (NC) N/A BEAM-BAR SPLICES: The lap splices or mechanical couplers for longitudinal beam reinforcing shall not be located within $l_b/4$ of the joints and shall not be located in the vicinity of potential plastic hinge locations. (Tier 2: Sec. 4.4.1.4.10)

C (NC) N/A COLUMN-TIE SPACING: Frame columns shall have ties spaced at or less than $d/4$ for Life Safety and Immediate Occupancy throughout their length and at or less than $8d_b$ for Life Safety and Immediate Occupancy at all potential plastic hinge locations. (Tier 2: Sec. 4.4.1.4.11)

(C) NC N/A STIRRUP SPACING: All beams shall have stirrups spaced at or less than $d/2$ for Life Safety and Immediate Occupancy throughout their length. At potential plastic hinge locations, stirrups shall be spaced at or less than the minimum of $8d_b$ or $d/4$ for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.1.4.12)

C (NC) N/A JOINT REINFORCING: Beam-column joints shall have ties spaced at or less than $8d_b$ for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.1.4.13)

(C) NC N/A JOINT ECCENTRICITY: There shall be no eccentricities larger than 20 percent of the smallest column plan dimension between girder and column centerlines. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.4.1.4.14)

C (NC) N/A STIRRUP AND TIE HOOKS: The beam stirrups and column ties shall be anchored into the member cores with hooks of 135° or more. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.4.1.4.15)

C (NC) N/A DEFLECTION COMPATIBILITY: Secondary components shall have the shear capacity to develop the flexural strength of the components for Life Safety and shall meet the requirements of Sections 4.4.1.4.9, 4.4.1.4.10, 4.4.1.4.11, 4.4.1.4.12 and 4.4.1.4.15 for Immediate Occupancy. (Tier 2: Sec. 4.4.1.6.2)

C NC (N/A) FLAT SLABS: Flat slabs/plates not part of lateral-force-resisting system shall have continuous bottom steel through the column joints for Life Safety and Immediate Occupancy. (Tier 2: Sec. 4.4.1.6.3)

Diaphragms

(C) NC N/A DIAPHRAGM CONTINUITY: The diaphragms shall not be composed of split-level floors and shall not have expansion joints. (Tier 2: Sec. 4.5.1.1)

(C) NC N/A PLAN IRREGULARITIES: There shall be tensile capacity to develop the strength of the diaphragm at re-entrant corners or other locations of plan irregularities. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.5.1.7)

C NC (N/A) DIAPHRAGM REINFORCEMENT AT OPENINGS: There shall be reinforcing around all diaphragm openings larger than 50 percent of the building width in either major plan dimension. This statement shall apply to the Immediate Occupancy Performance Level only. (Tier 2: Sec. 4.5.1.8)

Connections

C NC (N/A) UPLIFT AT PILE CAPS: Pile caps shall have top reinforcement and piles shall be anchored to the pile caps for Life Safety, and the pile cap reinforcement and pile anchorage shall be able to develop the tensile capacity of the piles for Immediate Occupancy. (Tier 2: Sec. 4.6.3.10)

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APPENDIX-D: TIER-2 FINDINGS

3-D models of the buildings were created using ETABS v9.7.2 structural analysis software (Figures D-1 through D-6). The analysis models include all members of the lateral load resisting system and primary gravity load carrying members. The geometry of the models are based on the architectural and structural floor plans dated October, 1956 (by Arthur Wolfe A.I.A. Architect.) that were made available to Arup. Linear Dynamic Procedure (Response Spectrum) was employed and scaled up to the base shears obtained from Equivalent Static Procedure,

The 3D building models are analyzed under combinations of horizontal seismic and vertical gravity loads laid out by ASCE 31-03.The capacities of the lateral load resisting members are derived and checked against ASCE 31-03 acceptance criteria under an earthquake hazard level with 10% probability of being exceeded in 50 years (475 year event).

Material strengths are based on the information available on the structural drawings and ASCE 31-03 default values.

The following strengths were used in seismic evaluation:

- Concrete strength, f'c=2,000 psi (Main building) and f'c=3,000 psi (Probation wing)
- Yielding strength of reinforcing steel, fy=40 ksi (ASTM A305)
- Yielding strength of structural steel, Fy=33 ksi (ASTM A7)

Load demand due to gravity loads (Q_G) is a combination of dead (Q_D) and live (Q_L) loads on the structure as follows:

$Q_G=1.1(Q_D+Q_L+Q_S)$ (Eq. D-1)
$Q_G=0.9Q_D$ (Eq. D-2)

Seismic loads (Q_E) acting on the components were based on the linear static procedure outlined in Section 4.2.2.1.3 of ASCE 31-03. Gravity and seismic forces were then combined using equation 4-8 of ASCE 31-03.

$Q_{UD}=Q_G \pm Q_E$ (Eq. D-3)

Per ASCE 31-03 linear analysis procedure, components are grouped as deformation or force controlled.

Analysis results indicate that structural components on the lateral load resisting system of the Main building members fall into the both force and deformation controlled component categories. Equation (D-3) shown above is used for the assessment of deformation controlled components. Q_{UD} represents the load demand on these members. As shown in Equation (D-4) below, force demand on the elements is reduced by factor m, which accounts for the inelastic response of the components. Per Table 4.6 of ASCE 31-03, S4 type building types, the value of m factor for deformation control actions (flexure) is taken as 3.0 for "Life safety" and 2.0 for "Immediate Occupancy" performance levels. As for the values of m factor for force control actions (shear) is taken as 2.5 for "Life safety" and 2.0 for "Immediate Occupancy" performance levels.

Expected strength of the structural elements, Q_{CE}, is then compared against the force acting on the element, Q_{UD} using Equation (D-4). The expected strength is assumed to be equal to the nominal strength multiplied by 1.25 per Section 4.2.4.4 of ASCE 31-03.

$Q_{CE} \geq Q_{UD}/m$ (Eq. D-4)

Figure D-7 and D-8 present the members with non-conforming shear and flexural strengths respectively under "Life Safety" performance criteria. Similarly, Figures D-9 and D-10 present the members with non-conforming shear and flexural strengths respectively under "Immediate Occupancy" performance criteria.

Analysis results indicate that structural components of the lateral load resisting system of the Probation wing members fall into both force and deformation controlled component categories. Per Table 4.6 of ASCE 31-03, C1 type building types, the values of m factor for deformation control actions (flexure) are taken as 2.5 for "Life safety" and 1.5 for "Immediate Occupancy" performance levels (for non-ductile reinforced concrete column). The values of m factor for force control actions (shear) are taken as 2.0 for "Life safety" and 1.5 for "Immediate Occupancy" performance levels.

Analysis of the Probation wing revealed that the reinforced concrete bent columns do not conform to the life safety and immediate occupancy criteria outlined in ASCE 31-03 Tier-2 requirements. Figure D-11 and D-12 present the members with non-conforming shear and flexural strengths respectively under "Life Safety" performance criteria. Similarly, Figures D-13 and D-14 present the members with non-conforming shear and flexural strengths respectively under "Immediate Occupancy" performance criteria.

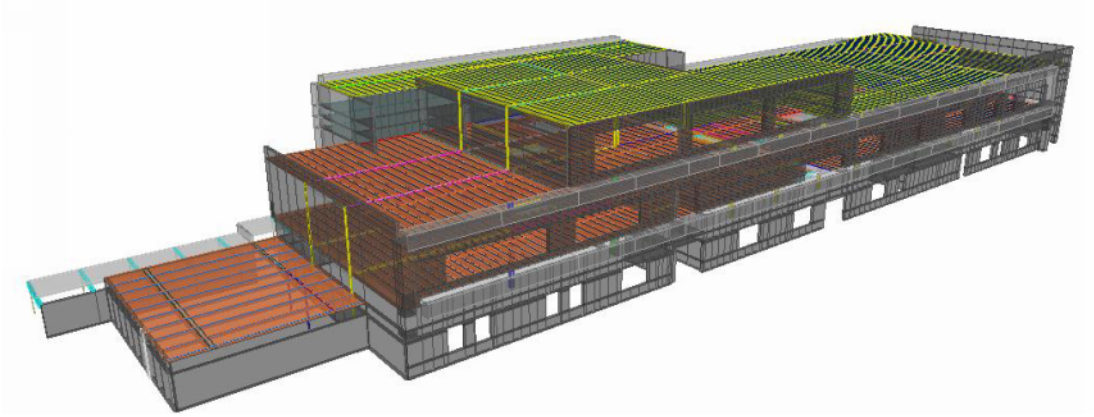

Figure D-1 3D isometric view of the Main Building structural analysis model – South face

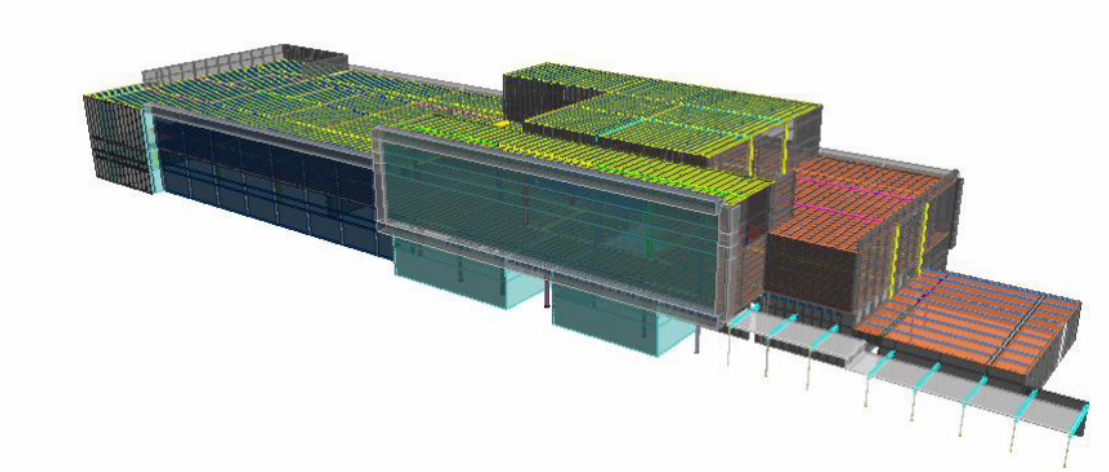

Figure D-2 3D isometric view of the Main Building structural analysis model – North face

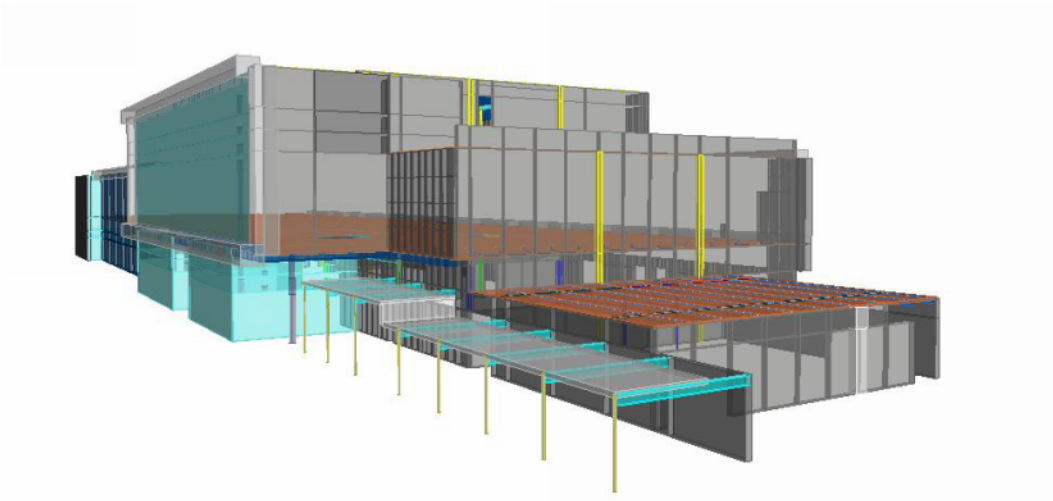

Figure D-3 3D isometric view of the Main Building structural analysis model – West face

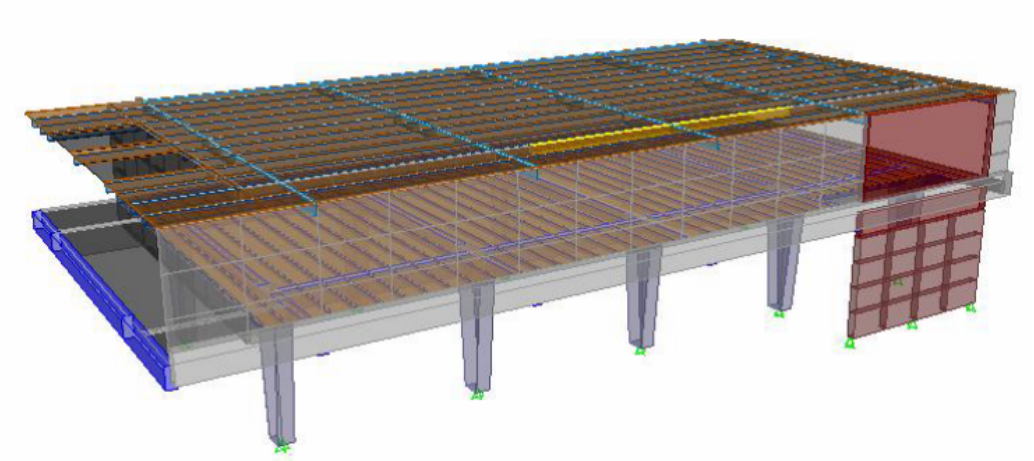

Figure D-4 3D isometric view of the Probation wing structural analysis model - East face

Figure D-5 3D isometric view of the Probation wing structural analysis model – West face

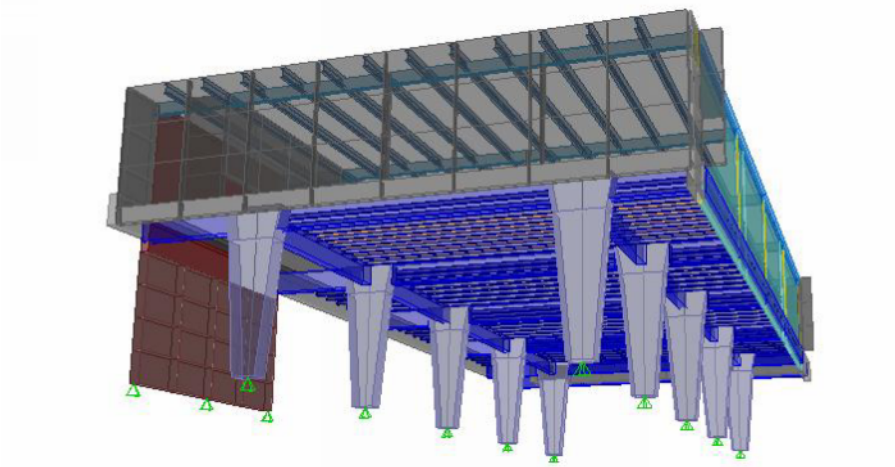

Figure D-6 3D isometric view of the Probation wing structural analysis model – South face

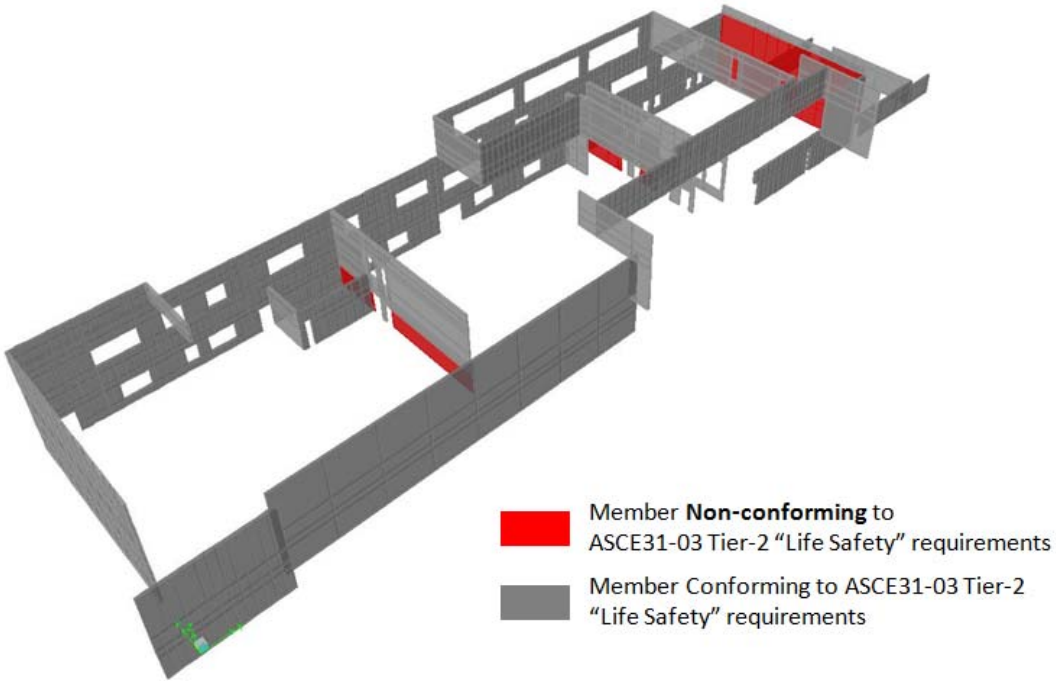

Figure D-7 Main Building "Life Safety-Standard performance" conformance check for SHEAR behavior of RC shear walls

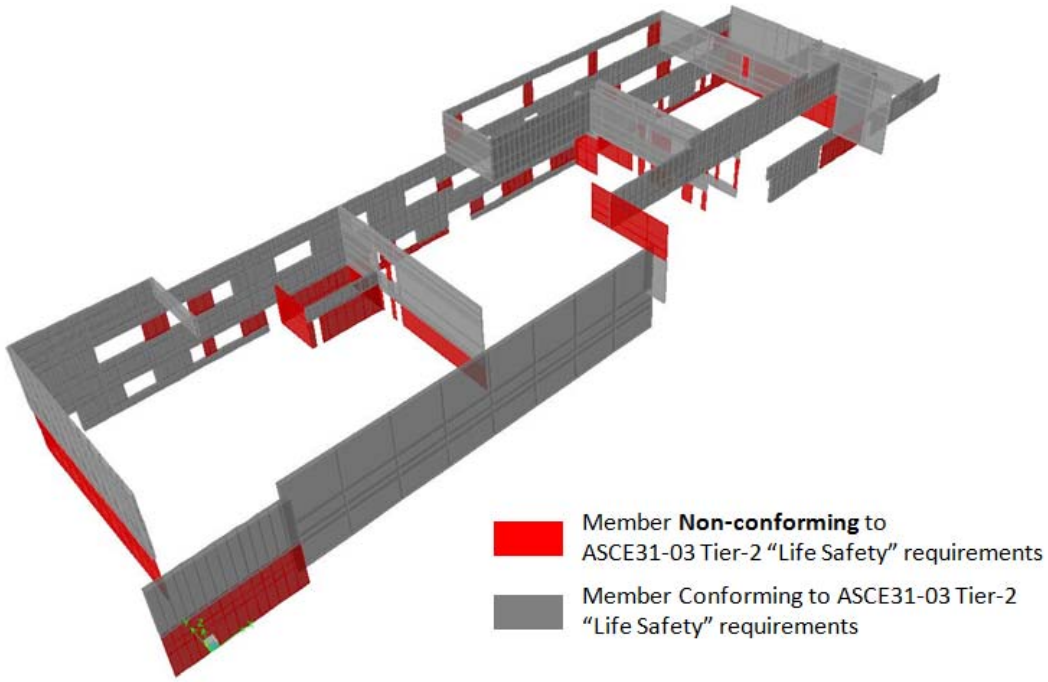

Figure D-8 Main Building "Life Safety-Standard performance" conformance check for FLEXURAL behavior of RC shear walls

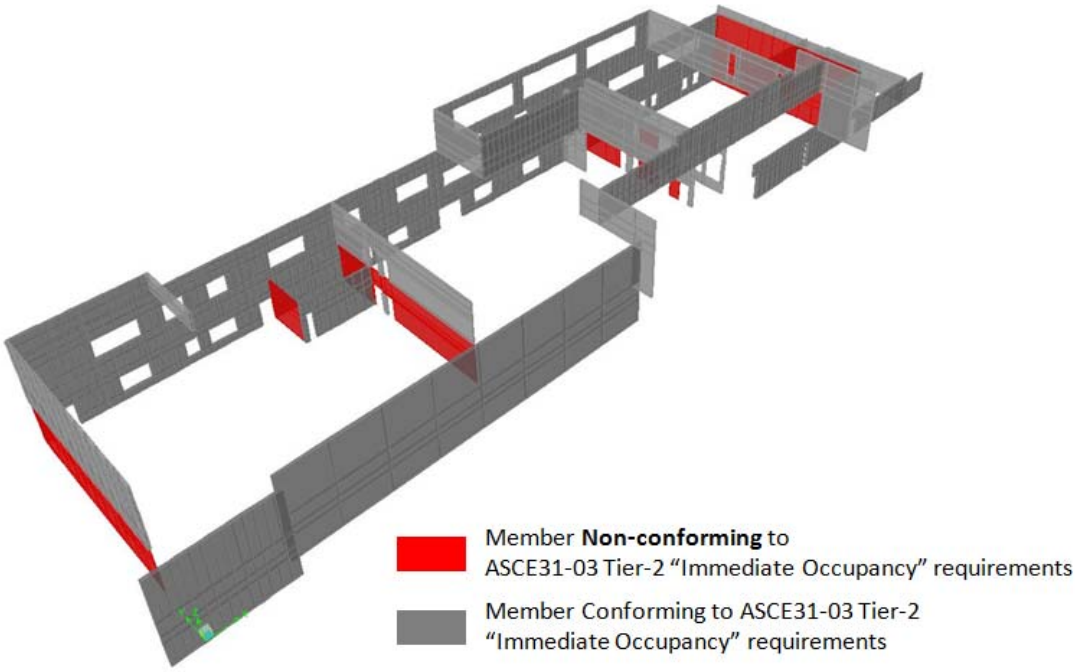

Figure D-9 Main Building "Immediate Occupancy-Enhanced performance" conformance check for SHEAR behavior of RC shear walls

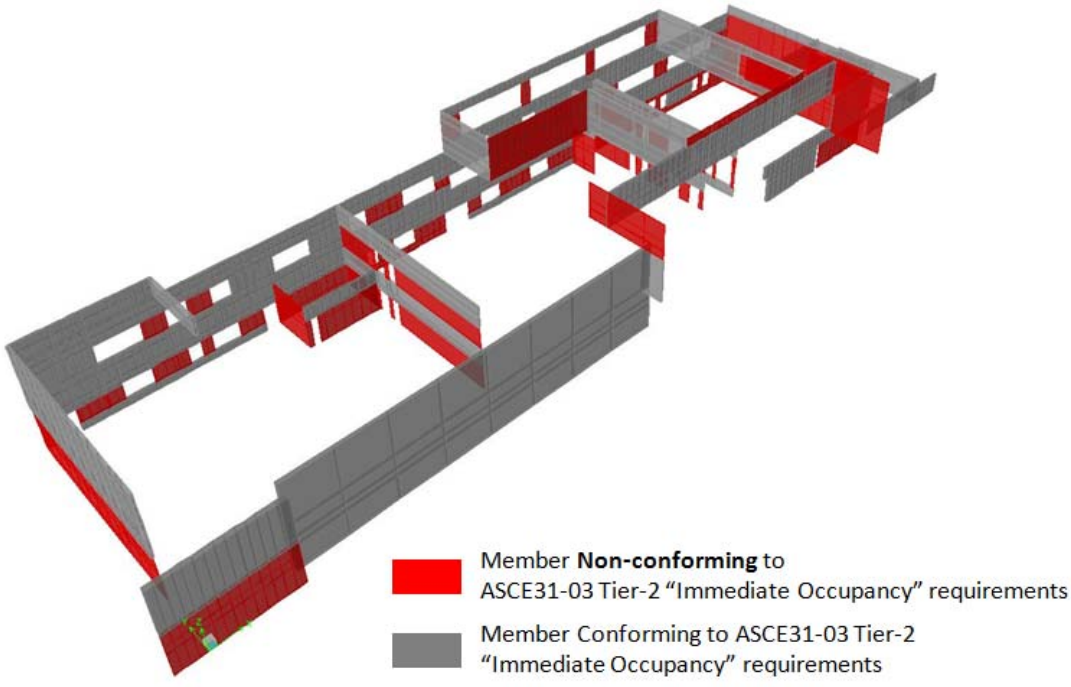

Figure D-10 Main Building "Immediate Occupancy-Enhanced performance" conformance check for FLEXURAL behavior of RC shear walls

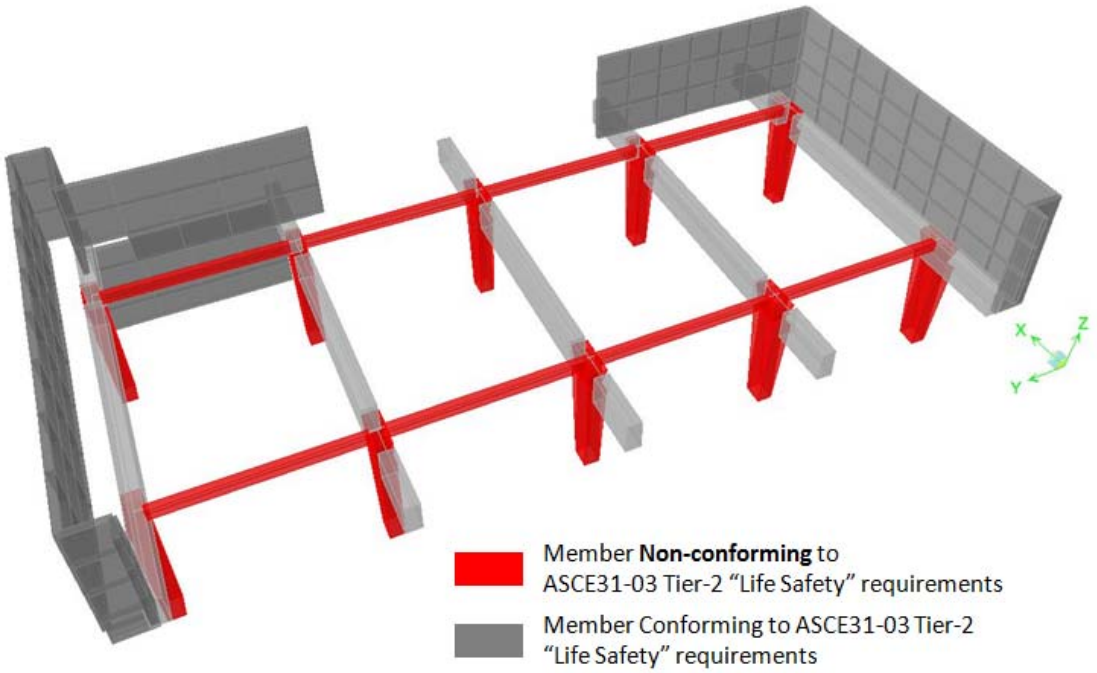

Figure D-11 Probation wing "Life Safety-Standard performance" conformance check for SHEAR behavior of reinforced concrete bent columns and floor beams

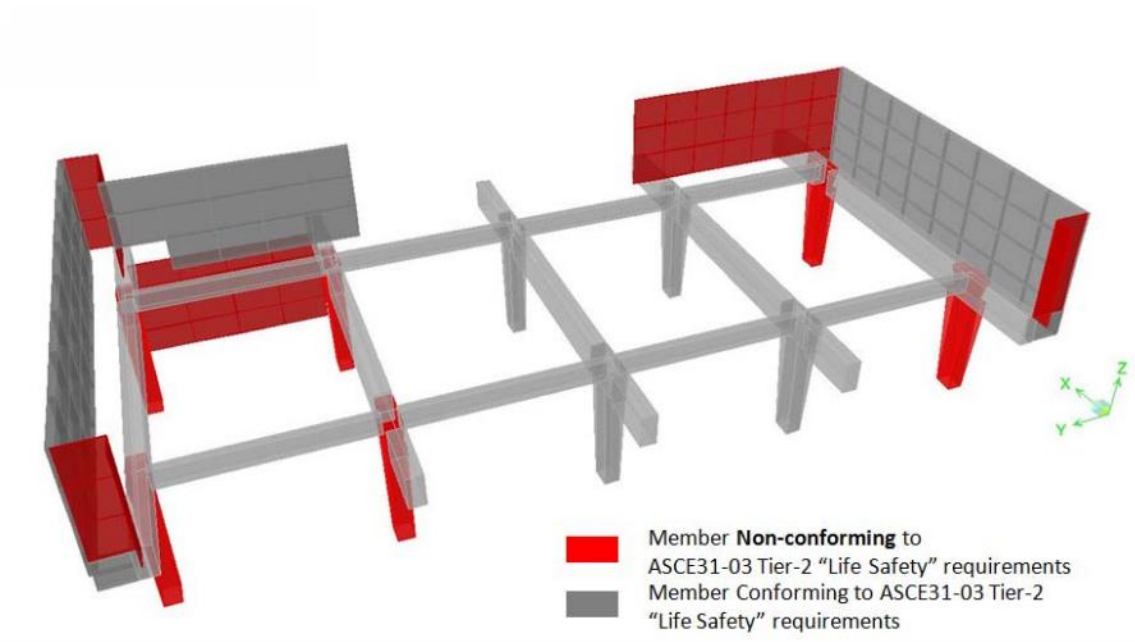

Figure D-12 Probation wing "Life Safety-Standard performance" conformance check for FLEXURAL behavior of reinforced concrete bent columns and floor beams

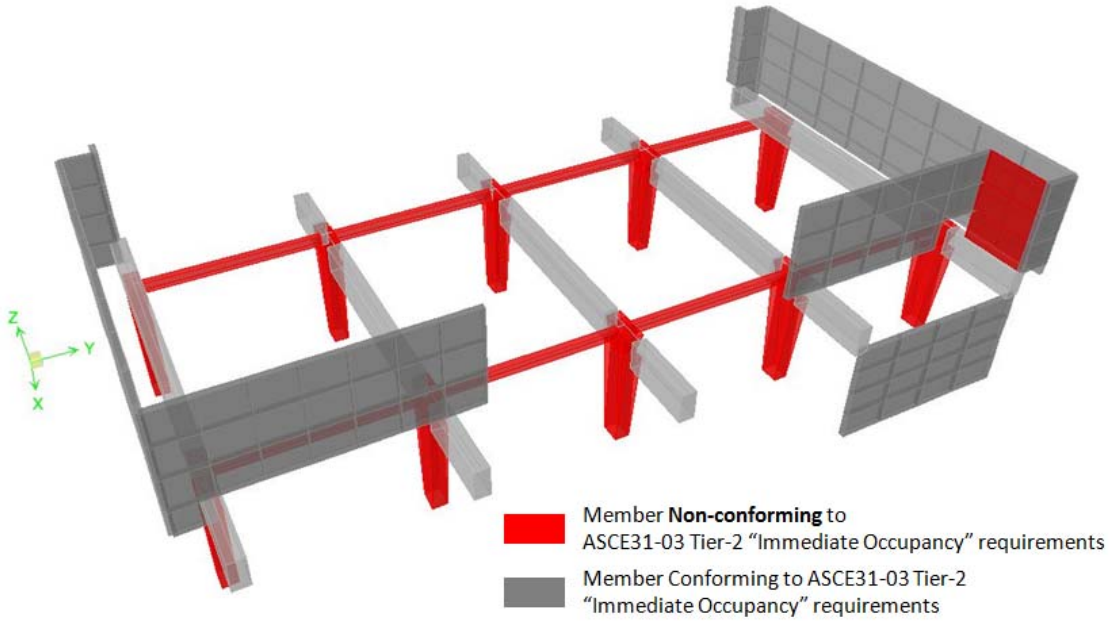

Figure D-13 Probation Wing "Immediate Occupancy-Enhanced performance" conformance check for SHEAR behavior of reinforced concrete bent columns and floor beams

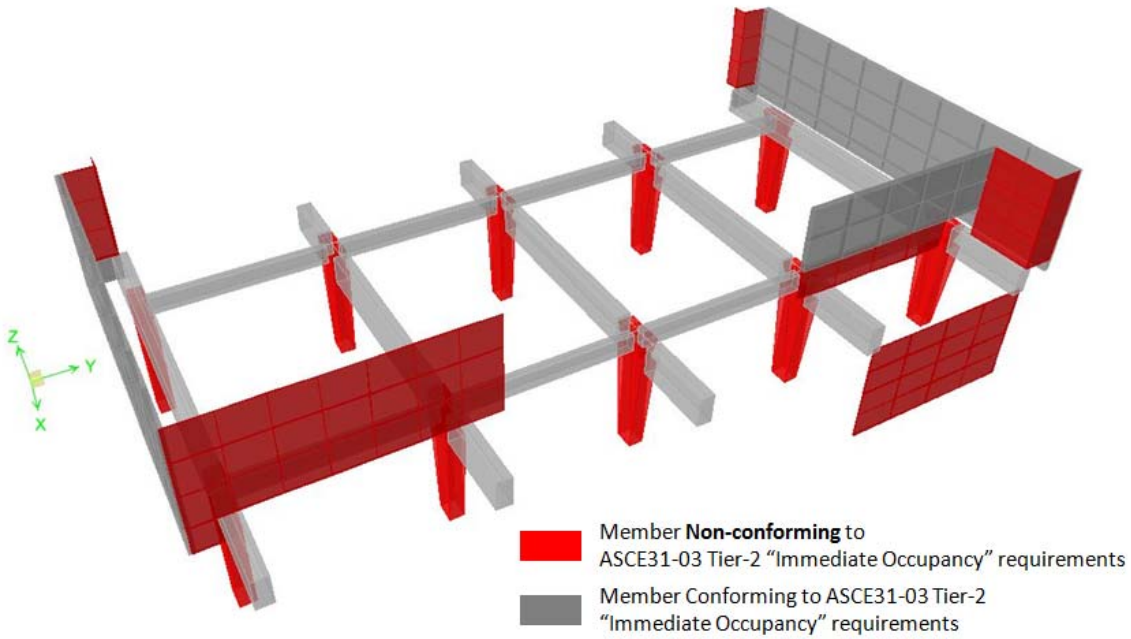

Figure D-14 Probation Wing "Immediate Occupancy-Enhanced performance" conformance check for FLEXURAL behavior of reinforced concrete bent columns and floor beams

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APPENDIX-E: REINFORCED CONCRETE DETAIL DEFICIENCIES

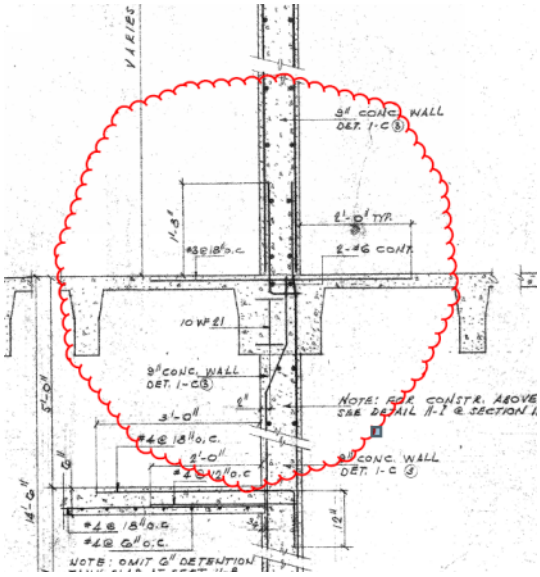

Figure E-1 Discontinuous longitudinal wall reinforcement detail

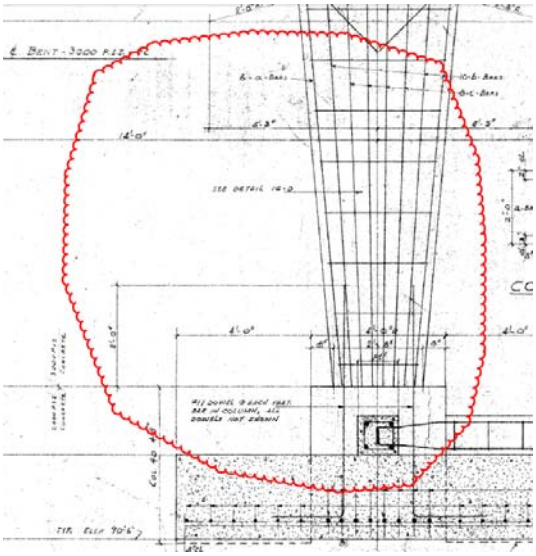

Figure E-3 Inadequate lap splice length and inadequate confinement for bent column

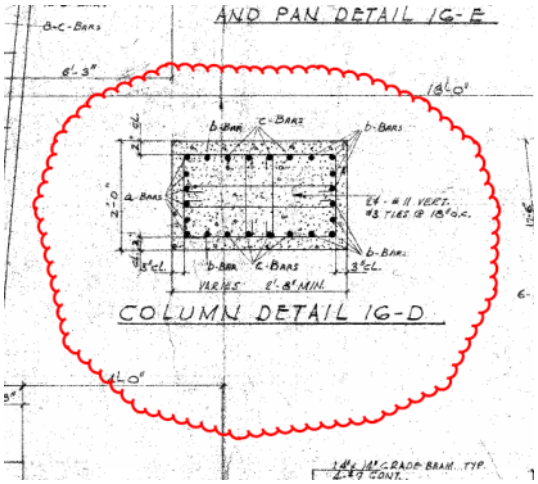

Figure E-2 Stirrups and Hook deficiencies. Non-ductile (brittle) column detail.

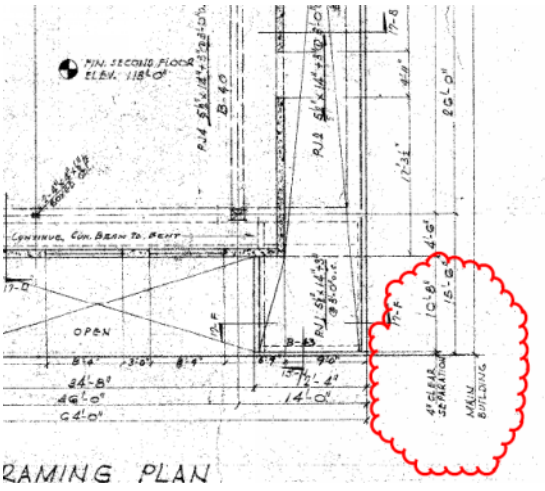

Figure E-4 Insufficient building separation distance

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APPENDIX-F: SITE OBSERVATION

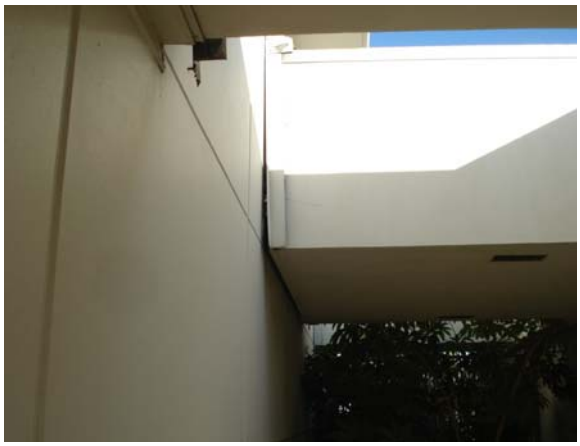

Photo 1: Non-conforming building separation joint and residual deflections from past earthquakes

Photo 4: Minor crack development due to water leakage

Photo 2: Concrete deterioration observed only at one of the entrance canopy beams

Photo 5: Non conforming separation joint

Photo 3: Non-conforming steel anchorage to wall

Photo 6: Unrestrained chandelier as a nonstructural non-conformance per ASCE 31-03

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APPENDIX-G: REFERENCES

[1] California Trial Court Facilities Standards, 2011 Edition, Judicial Council of California, Administrative Office of the Courts

[2] ASCE/SEI 41-06 Seismic Rehabilitation of Existing Building, 2006, American Society of Civil Engineers, Reston, Virginia.

[3] ASCE/SEI 31-03 Seismic Evaluation of Existing Buildings, 2003, American Society of Civil Engineers, Reston, Virginia.

[4] Building Code Requirements for Reinforced Concrete (ACI 318-08), American Concrete Institute, 2008.

[5] ASCE 7-05, Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers, Reston, Virginia, 2005.

[6] USGS Website, http://earthquake.usgs.gov/hazards/apps.

[7] Summary Report of Preliminary Findings" prepared by Rutherford & Chekene Consulting Engineers for Superior Courts of California, Seismic Assessment Program (January, 2004).

[8] New Glendale Courthouse-Site Feasibility Report, prepared by ZGF for Superior Court of California, County of Los Angles (2010)

[9] "Focused Environmental Impact Report SCH No.2011061027-New Glendale Courthouse Project" prepared by RBF Consulting for Judical Council of California-Administrative Office of the Courts (August, 2011)

[10] California Trial Court Facilities Standards, 2011 Edition, Judicial Council of California, Administrative Office of the Courts (2011).

[11] P100-Facilities Standards for the Public Building Service, U.S. General Services and Administration (November, 2010)