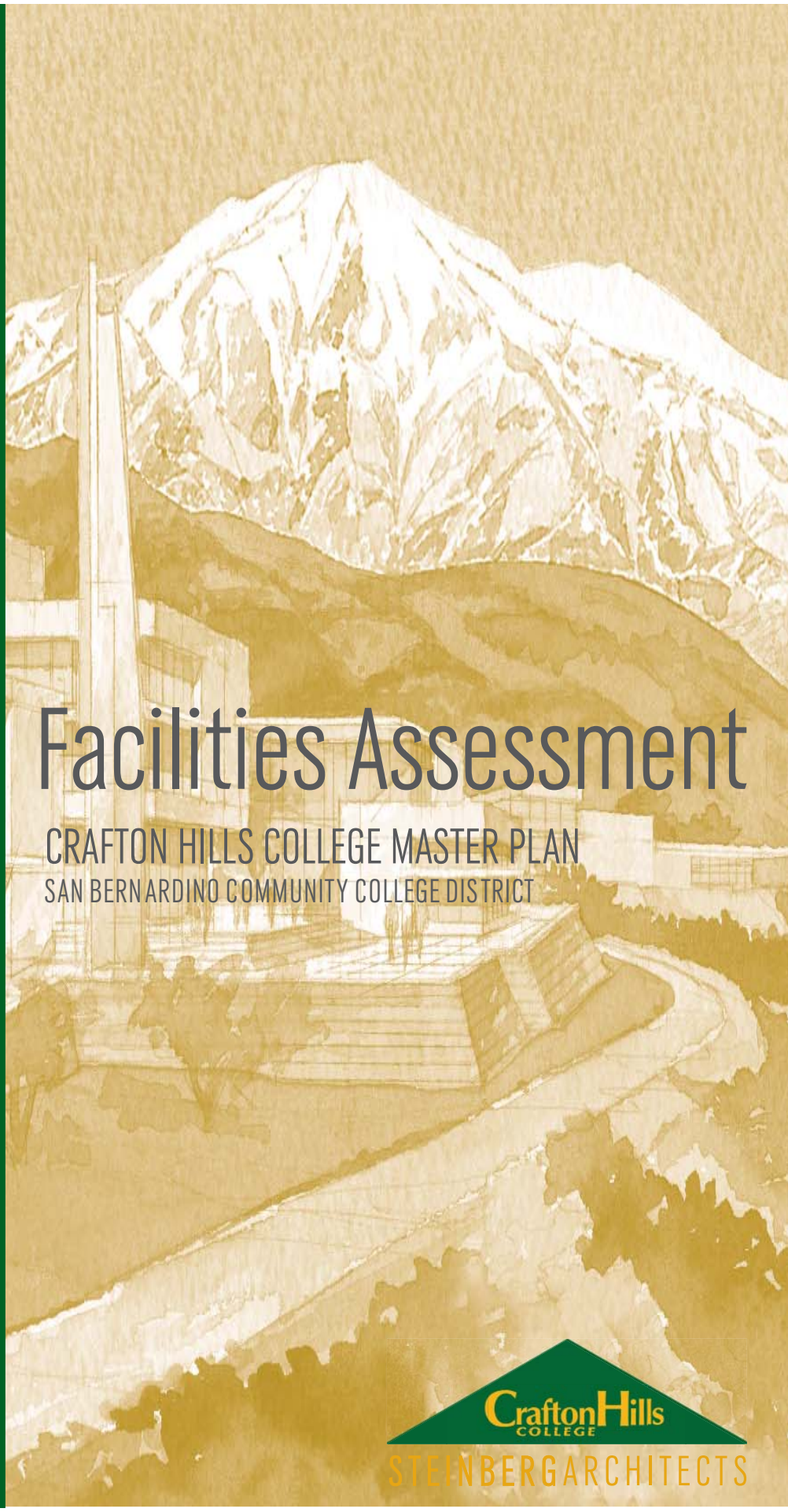
Volume 3 Facilities Assessment

CRAFTON HILLS COLLEGE MASTER PLAN

SAN BERNARDINO COMMUNITY COLLEGE DISTRICT



Crafton Hills College

STEINBERG ARCHITECTS

Volume 1 Master Plan

Volume 2 Master Program

Volume 3 Existing Facilities Assessment

Volume 4 Phasing, Guidelines, & Infrastructure

A | SUMMARY

OVERVIEW

An assessment of the existing facilities has been completed as part of the Crafton Hills College Master Plan. The findings identified in the assessment report help to ensure that various campus deficiencies are addressed in the 2025 master plan.

The assessment is divided into two basic components. The first component is site or campus wide systems. Included in this are civil, site utilities, landscape, technology infrastructure, site and building lighting, parking and vehicular circulation, security, and signage. The findings and recommendations that have been made regarding these elements are a critical part of the master plan, and the designs shown in volume four.

The second assessment component is building-specific assessments. The building assessments deal with general code issues as well as building systems. Exiting requirements, accessibility, and sprinklering have been addressed, along with those items pertaining to fire life safety, ADA (Accessibility) and maintenance. Structural, mechanical, plumbing, and electrical systems have all been examined, and recommendations have been made for the improvements of each of these systems. As with the campus wide systems, these findings and recommendations are an integral part of the master plan and volume four.

B | CIVIL

SITE DRAINAGE

Figure 1 - Typical site catch basin that collects surface drainage.

Figure 2 – Typical curb inlet located along Campus Drive.

Figure 3 – Concrete headwall discharging site storm drain to open channel located along the northerly side of Campus Drive.

System

- Site storm drainage consists of a system of surface flow to catch basins and inlets, conveyance through small diameter pipes, connecting to larger diameter storm drains and discharging to an open channel located along the northerly side of Campus Drive. The open channel discharges to a retention pond located in the vicinity of Campus Drive and Sand Canyon Road. Drainage flows from the pond, offsite in a natural swale running northwesterly along Sand Canyon Road.

Condition

- Isolated areas adjacent to buildings that lack sufficient gradients to allow surface drainage to area drains or catch basins.
- Areas on concrete flatwork that lack sufficient gradient to direct surface drainage to catch basins.
- Catch basins and inlets appear to be in good condition and function adequately.
- Small diameter drains appear to function adequately.
- Large diameter storm drains appear to be well maintained and function properly.
- Channel located along the northerly side of Campus Drive has developed into a natural creek. The channel appears to have adequate capacity to convey site drainage. The channel requires annual maintenance to restrict growth of vegetation.
- Retention basin located in the vicinity of Campus Drive and Sand Canyon has filled with silt and is overgrown with vegetation.

SITE DRAINAGE

Figure 4 – Retention basin spillway looking easterly into the basin.

Figure 5 – Retention basin spillway looking westerly downstream to Sand Canyon Road.

Figure 6 – Outlet structure within the retention basin.

Maintenance

- Continue maintenance of catch basins and inlets.
- Continue maintenance of both small and large diameter storm drains.
- Continue maintenance of open channel along the northerly side of Campus to limit the vegetation growth
- Remove vegetation and silt from retention basin to allow the basin to function correctly.

Repair

- Add area drains and catch basin in landscape areas where surface drainage is poor and ponding occurs.
- Replace hardscape areas where ponding occurs.
- Remove vegetation and silt from the retention basin to allow the basin to function properly.

SANITARY SEWER

Figure 7 – Typical sanitary sewer manhole located in pavement area.

Figure 8 – Typical sanitary sewer cleanout.

Figure 9 – Typical sanitary sewer manhole located in landscape area.

System

- The site sanitary sewer system consists of building waste lines connecting to site sewers at cleanouts located adjacent to the buildings. Site sewers consisting of gravity flow 6" and 8" pipes, cleanouts, and manholes convey the sewage to the campus trunk line located in Campus Drive. The trunk line flows westerly in Campus Drive, connecting to the City of Redlands sanitary sewer located in Sand Canyon Road.

Condition

- The sanitary sewer system appears to be well maintained and functions properly.

Maintenance

- Continue maintenance of cleanouts, manholes, and sanitary sewer lines.

Repair

- No repairs proposed.

WATER DISTRIBUTION

Figure 10 – Regulating reservoir located in the northeasterly portion of campus. Reservoir provides potable water to campus.

Figure 11 – Eight inch meter for campus water distribution system. Meter located at the northerly side of the tennis facility.

Figure 12 – Eight inch backflow device for the campus water service.

System

- The site water distribution system consists of potable water supplied by the City of Redlands Water Department. The City supplies water to the campus through a system of transmission mains, regulating reservoirs, and a pumping station. The City water main located in Sand Canyon Road extends onto campus easterly in Campus Drive and northerly to a regulating reservoir locate adjacent to the campus Maintenance and Receiving facility. Water from the reservoir is pumped through a transmission main located in Campus Drive, easterly and northerly to a second regulating reservoir located at a higher elevation in the northeasterly portion of campus. Water and fire protection water are provided to campus facilities from the transmission main. Fire hydrants located along Campus Drive and several hydrants located near the campus buildings are serviced from the transmission main.

- Potable water, irrigation water, and additional fire protection water are supplied to campus from an eight inch service and meter located at the north side of the tennis facility. From this service point, water is distributed to campus from a six inch main extending westerly in Campus Drive, looping southerly and easterly through the campus courtyard, and returning northerly to connect back in Campus Drive. Domestic service and fire protection for each building are provided from the six inch main. Several fire hydrants are also serviced from the main.

Fire Protection

- Fire protection for the Crafton Hills campus is provided by the City of Yucapia Fire Department.

WATER DISTRIBUTION

Figure 13 – Typical fire hydrant serviced from the City of Redlands transmission main located in Campus Drive.

Figure 14 – Fire department connection for the fire sprinkler system for the gymnasium.

Figure 15 – Site fire hydrant serviced from the metered site water main loop.

Fire Protection

- The current fire flow requirements of the Yucapia Fire Department are to provide 3000 gallons per minute at each fire hydrant.. A reduction of 25% of flow requirement is allowed for all buildings provided with fire sprinklers.
- The current water distribution system is incapable of providing flows sufficient to meet the current fire flow requirements.

Condition

- The water distribution system appears to be well maintained and functions properly.
- Preliminary calculations indicate that the current water distribution system is undersized and can not provide current required fire flow.

Repair

- The water distribution system must be upgraded to accommodate current requirements for fire flow.
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- A detailed study of the current water distribution system will be prepared to determine the extent to which the system is deficient.
- Water main improvements will be required.

CIVIL 11x17 DIAGRAM - SITE DRAINAGE

CIVIL 11x17 DIAGRAM - SANITARY SEWER

CIVIL 11x17 DIAGRAM - WATER DISTRIBUTION

CIVIL 11x17 DIAGRAM - FIRE ACCESS

C | SITE UTILITIES

CAMPUS HIGH-VOLTAGE DISTRIBUTION SYSTEM

Figure 1 – Electrical manhole.

Figure 2 – Electrical cables.

Figure 3 – Available knock-outs. Manhole half-filled with water.

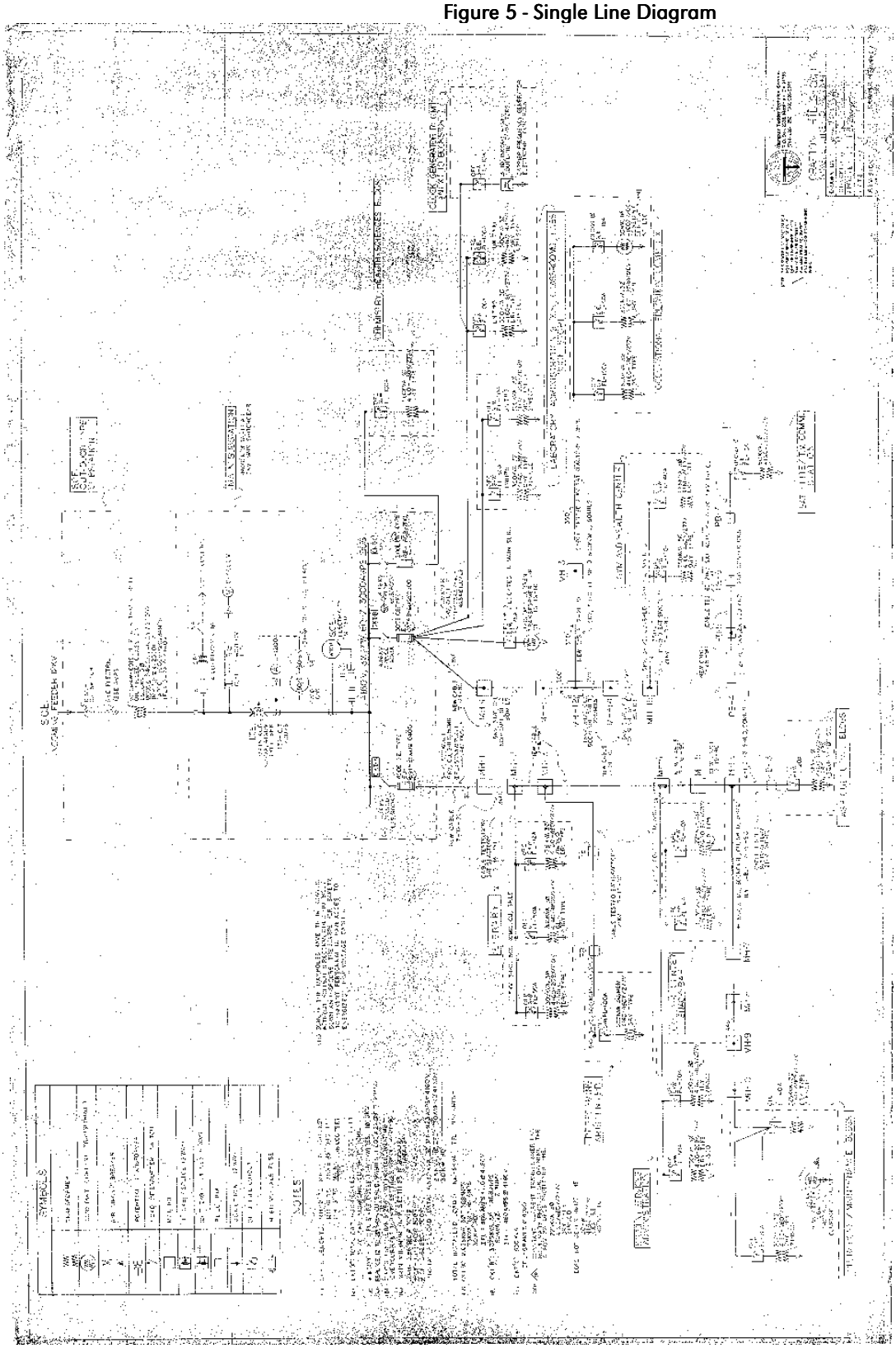
Figure 4 – Main service equipment.

Existing Site Power System Description

Southern California Edison (SCE) is the power utility provider. From the SCE supply point at Sand Canyon Road, west side of campus, the incoming SCE 12,000V service is ran underground and terminates in an outdoor 2500KVA substation at the Old Bookstore Building. It is then stepped down to 4,160V and metered at 5,000V main service metal-clad switchgear located inside an electrical room at the Old Bookstore Building.

From the main service switchgear, power is distributed radially at 4,160V throughout the campus via underground cables in underground ducts, pull boxes and manhole structures. At each of the power manholes, power is tapped from the 4,160V cables through 5,000V oil-filled fuse cut-outs and stepped-down to 480/277V and/or 208/120V by step-down transformers at or in the individual buildings. The main service switchgear consists of three (3) circuits, "A", "B" and "C". Circuit "A" serves the Library, Performing Arts Center, Student Services A & B, Student Center/Cafeteria, Maintenance and the Agricultural building including (1) street lighting circuit. Circuit "B" serves the Laboratory/Administration, Classroom, Bookstore, Occupational Education 1 & 2, Gymnasium, Satellite/T.V. Communication station, Clock Generator Station and two (2) street lighting circuits. Circuit "C" serves the Chemistry & Health Science building. The load status of each circuit is yet to be evaluated.

Figure 5 - Single Line Diagram



CAMPUS HIGH-VOLTAGE DISTRIBUTION SYSTEM

Figure 6 – Typical oil-filled fuse cut-outs.

Figure 7 – Main service metal-clad switchgear.

Figure 8 – Constant current transformer with oil-filled fuse cut-outs for street lighting power.

Figure 9 – Outdoor sub-station.

Recommendations

- Campus High-Voltage Distribution System
  - Main issue with the majority of the manhole is the water running into it. Almost every manhole is half-filled with water. It is recommended that all manholes be looked at to determine how water accumulation can be prevented.
  - The existing high-voltage distribution equipment are discontinued models from Zinsco and G&W with no replacement parts available. However, these existing equipment are still in good working condition and require regular inspection and maintenance.
  - The existing 5KV oil-filled fuse cut-outs are discontinued models from G&W and no replacement parts are available. These equipment are in excess of their life expectancy. At this time, these equipment are still in good working condition and there is no immediate need of replacement. However, if any of the building will require renovations, replacement of all existing electrical equipment is strongly recommended.
  - The majority of the existing high-voltage distribution transformers are in excess of their life expectancy and it is recommended that whenever an opportunity comes that they be replaced.
  - Prior to any future expansion, visual inspection and integrity testing of the underground high-voltage cables are recommended.
  - Periodic inspection of and, if necessary, torque adjustments of wire terminations at switchboards and distribution boards are recommended.
  - For purposes of adequacy, a campus-wide power system study is recommended prior to implementing any future major expansion of the existing facilities. The study will include the maximum demand of the campus as a whole and the maximum demand of each building to verify adequacy of the existing power service and infrastructure. The study will also include the calculation of the available short-circuit current and voltage profile at the main service of each building.

CAMPUS HIGH-VOLTAGE DISTRIBUTION SYSTEM

Figure 10 – Oil-filled fuse cut-outs.

Figure 11 – Indoor service equipment.

Figure 12 – HVAC pipes above electrical panel.

- Building Electrical Facilities
    - With the exception of the relatively new electrical equipment in the Child Development Complex and the Bookstore Complex, electrical equipment such as panelboards and switchboards, in the older buildings are discontinued models from Zinsco with no replacement parts available. These existing equipment are in excess of their life expectancy but are still in good working condition. It is strongly recommended that should opportunity arise, such as a major building renovation, that these existing equipment be replaced. At this time, periodic inspection, and if necessary, torque adjustment of wire connections in distribution boards and switchboards are recommended.
- Fire Alarm System
    - All the older buildings in the campus will require an upgrade or complete replacement of non-ADA compliant fire alarm system except in the newer buildings that are equipped with equipment and devices compliant with ADA requirements.

Campus Master Gas Meter

General Description

- The master gas meter is located on west of the campus.
- High pressure gas is supplied to the meter by Gas Company. Gas Company's gas pressure regulators reducing the pressure to 3 to 5 PSI (to be verified).

Piping

- A 6" painted gas line appears to be black steel enters underground and delivers gas to the campus.
- Above ground piping appears to be in fair condition.

Campus Natural Gas Demand

Building	Cubic feet per hour
01 Laboratory/Administration	9,990
03, 04 & 05 Student Center	5,855
06 Occupational Edu. I	700
07 Occupational Edu. II	900
09 Maintenance	1,159
10 Gymnasium	1,980
12 Chemistry & Hlt. Science	250
13 Child Development I	409
14 Child Development II	274
17 Bookstore	600
Bookstore Complex	600
Total	22,717 CFH at 850 feet developed length to building EO-2

Campus Master Gas Meter

Future Development and gas Load discussion

- Assuming future gas load increases through next 15 years by 7,000 CFH, then the total gas consumption will be approximately 30,000 cubic feet per hour.
- Assuming the future furthest building from the gas meter to be 150 feet east of building OE-2, then the total developed length from gas meter to furthest building gas pressure regulator will be 1,000 feet.
- For the above ultimate gas load the existing gas meter 6" discharge at 3 PSI is adequate.
- Underground pipe sizes can not be determined to evaluate the existing branches capacity vs. pipe size.
- In according to the maintenance personnel, the newly installed boiler in central plant building #1 are starving for gas. It seems that ample gas capacity can not be delivered in the existing underground piping to building #1.

Recommendations

- Inform gas company to up date the existing meter to have the ability to deliver 30,000 CFH gas, 3 PSI at 1500 developed length.
- Investigate underground piping for proper sized to deliver gas to all gas pressure regulators.
- Provide a gas loop to overcome the friction in the underground gas piping.

D | LANDSCAPE

Existing Campus Landscape Assessment

Figure 1.1 – Campus's connection to the surrounding landscape.

Figure 1.2: The campus architecture is designed to extend views outwardly.

Figure 1.3: Inside-outside nature of the campus' built spaces

An assessment of the Crafton Hills College landscape is presented in the following pages. Discussions of the various campus outdoor spaces and materials are organized into the following sections:

1. General Landscape Character
2. Vehicular Circulation
3. Pedestrian Circulation
4. Green Outdoor Spaces
5. Paved Outdoor Rooms
6. Site Furnishings
7. Irrigation Assessment

The Diagrams, referred to in several sections, are located at the end of this assessment report.

1. GENERAL LANDSCAPE CHARACTER

- The original design layout and architecture of the campus creates a symbiotic relationship between the built environment and the Crafton Hills College landscape.
- The built environment is integrated well with the surrounding landscape, creating a non-invasive built community.
- The inside-outside nature of the campus should be highly valued as a unique asset and reinforced wherever possible.
- The landscape of the campus should correspond to, support and extend into the naturalized areas adjacent to the campus.

2. VEHICULAR CIRCULATION

Figure 2.1: College Marquee at Southern Entrance along Sand Canyon Road

Figure 2.2: Campus Drive

Figure 2.3: Central Entry at Parking Lot D

Character and Function

Diagram 1 provides Vehicular Circulation Zones, as discussed below.

- Campus Drive is the main vehicular spine running through campus (Diagram 1). This two-lane connector forms a loop through campus, links the College's southern and western entrances along Sand Canyon Road, and provides the only access into the campus parking lots.
- Mass plantings of native and non-native trees and shrubs border either side of Campus Drive at the College entries (Figure 2.2). As an entry drive, the landscape lacks definition or visual cues.
- A secondary system of roads provides service access to the existing buildings (Diagram 1).
- College marquees identify the Sand Canyon Road entries and the College's central entry at parking lot D (Figure 2.1 and Diagram 1). The marquees are clearly visible from the road and serve well as campus identification signs. However, the plantings surrounding the signs do not reinforce a strong gateway concept.
- The Central Entry at parking lot D includes limited parking, a bus stop and visitor drop-off area (Figure 2.3). The marquee sign identifies this arrival point, but the space lacks visual impact. Although visitors enter the heart of the campus, (i.e., the Central Quad) from this point, they will not be aware of this until they stand in the middle of the Central Quad.

Figure 2.4: The landscape edge at parking lots E through I is visually open into the campus.

- The group of parking lots serves as the front door to the main campus and, as such, creates visitors' first impression of the College. Along the roadside edge, the landscape provides a wide, green buffer between Campus Drive and the parking lot. The use of lawn and trees, instead of large shrubs, also provides visual access into the lots.
- Mixed plantings of primarily Sycamore trees (Platanus racemosa) and evergreen shrubs effectively buffer and separate each lot. Although the landscape buffers take up potential parking spaces, the additional green edge breaks up the expanse of asphalt visitors see when they first arrive.
- At the southern perimeter of parking lots A, B and C, a landscaped slope separates the lots from the campus. People who park in these lots must climb stairs to get to their destinations. Thickly planted with mature Eucalyptus trees, this landscape edge provides an evergreen screen between the western campus and the parking lots.
- The southern perimeters of parking lots E, F, G, H, and I are less steep than lots A through C. The edge planting in these lots is primarily lawn, tall fescue grass, Sycamore trees and pine trees. The perimeter is visually open to the campus and the pedestrian paths leading to buildings (Figure 2.4).
- In contrast to its perimeter landscape, the parking lots' interior landscapes can be described as "Planted" and "Exposed," as described below:

Figure 2.5 – "Planted Parking Lot"

Figure 2.6: "Exposed Parking Lot"

Figure 2.7: Gravel lot as extreme example of "Exposed Parking Lot"

- The interior islands of the "Planted Lots" are planted primarily with Evergreen Pear trees (Pyrus kawakamii), groundcover and lawn. The trees provide much needed shade and the planters reduce the visual and heat effect of asphalt (Figure 2.5).
- "Exposed lots" have little to no planting and accommodate a greater volume of cars (Figure 2.6). In some Exposed Lots, plant material is absent in a few, but not all, planters, suggesting the plants were removed and not replaced. The tree species in these lots tend to vary. A gravel lot located at the western end of Campus Drive is an extreme example of the Exposed Lot (Figure 2.7).

Issues and Opportunities

- Enhancement of the landscape along Campus Drive and at the marquee gateways can make the campus entry more welcoming and memorable for visitors. The three marquee gateways can share a more distinct and related design that visually connects them to each other and better defines each one as a destination marker.
- Secondary/service roads do not extend to all buildings. Even if the road connects to a building, it is not always the most direct route, as seen with the Performing Arts Center loading dock. College personnel and delivery drivers will use pedestrian walkways as alternative routes to gain closer access to buildings, resulting in damage to paving, plants and equipment (see Figure 2.8).
- Parking lot entrances/exits get congested when traffic volume is high.

Figure 2.8: View of damage to paving, planting and irrigation.

Figure 2.9: Lack of visual cues or focal points at Central Entry into the Quad"

- During peak times, overflow parking occurs along the street on Campus Drive. The overflow worsens during class registration when student parking continues down to Sand Canyon Road, forcing students to walk a great distance uphill.
- The Central Entry at Lot D lacks visual cues and a focal point. Upon entering this area, the initial view of the Central Quad is a rectangular area of lawn, leading the eye to the sky instead of a terminus or focal point (Figure 2.9). This arrival area can be greatly enhanced by the creation of a transitional area from the drop-off into the Central Quad, or a north-south axis leading to the PAC building.
- Although not observed during our site visits, the grounds staff indicated that some of the Evergreen Pear trees (Pyrus kawakamii) in the Planted Lots and elsewhere on campus are suffering from a bacterial disease known as "fire blight". Unless proper horticultural management practices are implemented, fire blight will eventually cause the infected trees to die.
- The addition of plants within the Exposed Lots can reduce the "sea of parking" effect, provide shade and further enhance the campus frontage. Selection of trees and other plant material should accommodate the grounds staff's desire for low maintenance planting.
- Litter is a problem in most of the parking lots. Trash receptacles within the parking lots can alleviate some of this problem.

3. PEDESTRIAN CIRCULATION

Figure 3.1: A pedestrian spine serves as a campus outdoor hallway.

Figure 3.2: Secondary path near Student Service B.

Figure 3.3: Students cut across lawn near Library to avoid less direct routes.

Character and Function

Diagram 2 provides Pedestrian Circulation Zones, as discussed below.

- Pedestrian routes into the campus core begin at the parking lots.
- Pedestrian walkways are viewed as extensions of nearby buildings and act as outdoor hallways, connecting both interior and exterior places.
- A primary pedestrian spine connects the major campus buildings (Figure 3.1). Concrete pergolas, located at opposite ends of the campus, architecturally reinforce the idea of the outdoor hallway along this spine.
- An indoor-outdoor connection is expressed whenever walkway and building joints align and their color/finish match.
- Pedestrian walkways provide multiple accesses to buildings without creating paths that feel like alleys or backs of buildings. Their design provides directional clarity and a sense of safety, while offering outward views of the surrounding landscape or internal views of the campus.
- A secondary pedestrian circulation system wraps around the buildings and provides access into classrooms and facilities, as well as views of the surrounding hillsides (Figure 3.2).
- Informal walking paths exist within the outer naturalized areas of the campus, golf course and campus recreational zones.

Figure 3.4: "Cow path" between Parking Lot G and the Bookstore.

Figure 3.5: Ramp near LADM is not compliant with ADA standards.

Figure 3.6: Inconsistent hardscape treatments between newer and older paving.

Issues and Opportunities

- A hierarchy between primary and secondary walkways is unclear. Paths can be better delineated in a variety of ways, including the repetitive use of specific landscape and paving material, varying walkway widths, placement of site furnishings, and/or wayfinding methods that provide visual cues and references.

- Pedestrian walkways do not always transcend the most direct routes, encouraging students to create "cow paths" through the landscape (Figure 3.3). The cow paths are most obvious near the parking lot areas (Figure 3.4). New walkways can be installed where landscape areas are most damaged.

- Pedestrian routes to parking lots and buildings are not always compliant with A.D.A. standards (Figure 3.5) and should be corrected in future work.

- Paving damage is evident where pedestrian walkways are used as alternative vehicular routes to buildings (Figure 2.8). Vehicular access to existing walkways can be blocked or restricted with the addition of bollards. Alternative routes for service and delivery should be identified in future work.

- The finish and color of new paving is not consistent with older paving. In areas, such as the Library, the paving stain is faded and attempts to match the stain are unsuccessful. (Figures 3.6)

4. GREEN OUTDOOR SPACES

Figure 4.1: The Upper Green near the LADM Building

Figure 4.2: "Informal Green Room" located outside of the Laboratory Administration Building.

Figure 4.3: Mature Sycamore trees shade the lawn area near the Student Center loading area.

Character and Function

Diagram 3 presents the Green Outdoor Rooms discussed below. These outdoor spaces are described as "Green Rooms", "Green Walls", and "Green Zones".

- Crafton Hills College enjoys a series of Green Rooms that can be characterized as formal and informal spaces.
    - The Formal Green Rooms are large open lawn areas enclosed by buildings, walls and walkways (Figure 4.1). They have simple landscapes of trees and turf. Formal Green Rooms include the "Upper Green" between the LADM and Chemistry & Health Science buildings, the "Library Green" between the Library and the Student Services A (SSA) building, and the "SSA Green" below the Clock Tower (Diagram 3). Sycamore trees (Platanus racemosa) create the canopies for the Library Green and the Upper Green. Gingko biloba trees are used in the SSA Green.
    - "Informal Green Rooms" are located along the outer edge of campus. Like the Formal Green Rooms, they are landscapes of open lawn with trees. However, they provide outwardly views of the surrounding hillside because they are adjacent to the Naturalized Zones (Diagram 3) and are not surrounded by buildings and walls. These spaces are intended for activities such as students sitting on the lawn or throwing frisbees (see Figures 4.2 and 4.3).

Figure 4.4: "Green Walls" define edges.

Figure 4.5: Ornamental grass and low shrubs near Library provide transition edge between campus and surrounding hills.

Figure 4.6: Slope planting creates a Green Wall between the Performing Arts Center Plaza and the Central Quad.

- "Green Walls" are the landscaped spaces that are not intended to be occupied by people. They act as edges to the spaces they surround and as transition areas between the campus and the Naturalized Zone. They also screen and separate areas, such as the parking lot perimeters (Figure 4.4). In some cases, they are low shrub areas (Figure 4.5) and in others they are more like perimeter walls (Figure 4.6).

- Two large Green Zones surround the College:

    - The "Naturalized Green Zone" is located on the College's southern perimeter (Diagram 3 and Figure 4.7). The Naturalized Zone is primarily grassland (consisting of a coastal sage scrub plant community) with some non-native and ornamental plants. For more information on the plant communities in this area, refer to the Biological Constraints Analysis Report, prepared by Ecorp Consulting, dated March 3, 2,005.

    - On the College's northern perimeter, the golf courses and soccer/recreational fields provide a large greenbelt, consisting mostly of turf lawn areas (Diagram 3). This zone extends the College's verdant landscape into the surrounding hills (Figures 4.8).

Issues and Opportunities

- Formal Green Rooms are not distinct from each other. The spaces can be better defined by careful selection of plant material and placement of site furnishings. For example, each space could have a specific accent tree or accent planting to help define an edge or locate building entries.

Figure 4.7: View of "Naturalized Green Zone"

Figure 4.8: The SSA Green with its lawn area and Gingko trees

- Green Rooms generally lack vibrancy. Students and others seem to pass through the spaces without lingering. The insufficient quantity of seating, particularly within the Formal Green areas, provides a partial explanation. The addition of benches would encourage students to stop, enjoy the landscape views and shade, and possibly turn the areas into more active social spaces. The overall program for these spaces should be revisited as the campus is developed.

- The existing campus plant palette provides a verdant landscape, but plant diversity is limited. Sycamore, Evergreen Pear, Eucalyptus and Pine trees are used repeatedly and turf grass is found extensively as groundcover on campus. Flowering or accent planting could supplement existing plant selections and provide more distinction between spaces, particularly those places that are considered campus icons. Turf can be replaced with drought-tolerant or low maintenance groundcover in selected areas, providing diversity while reducing maintenance and water resources.

- The lawn in the SSA Green is a maintenance issue since mowers must be carried up and down the steps (Figure 4.8). Replacing the lawn with groundcover or hardscape material can alleviate this problem.

- Wildlife (e.g., snakes, bobcats) are occasionally sighted on campus and require additional maintenance attention. For example, the grounds staff cuts "no-mow" ornamental grasses near walkways because snakes hide in them. As the campus landscape is developed, such issues need to be considered.

Figure 4.9: Mistletoe growing on Sycamore tree

Figure 4.10: View of soccer field within the "Recreational Green Zone"

- Green walls predominantly consist of non-native plant communities, diminishing native habitat potential and requiring significant maintenance and irrigation.

- Naturalized zones consist of conflicting native and non-native species, lowering their ecological integrity.

- Non-native species are not providing adequate habitat, and risk jeopardizing the existing surrounding native plant communities.

- Campus trees suffer from horticultural pests and diseases. Mistletoe (a parasitic plant observed on Sycamore trees), psyllid (a pest attacking Eucalyptus trees) and fire blight (a bacterial disease affecting the Evergreen Pear trees) are current problems (Figure 4.9). If the diseases/pests are not horticulturally managed, trees can be weakened and sometimes killed, especially if they are stressed by other problems such as drought. We recommend the College hire a certified arborist to assess tree conditions. An arborist can determine the extent of damage to infected trees and make recommendations regarding their disposition.

- The Recreational Green Zone requires significant maintenance and irrigation which is disproportional to the volume of use it incurs. The golf courses and soccer field are minimally maintained. A jogging/track path exists around the soccer field, but it appears to be makeshift and in need of improvements. Tennis courts require updating and the outdoor basketball courts are used for fire rescue exercises instead of basketball. Pathway access to the soccer field and courts require improvements.

5. PAVED OUTDOOR ROOMS

Figure 5.1: View of Plaza at Cafeteria/College Center Building

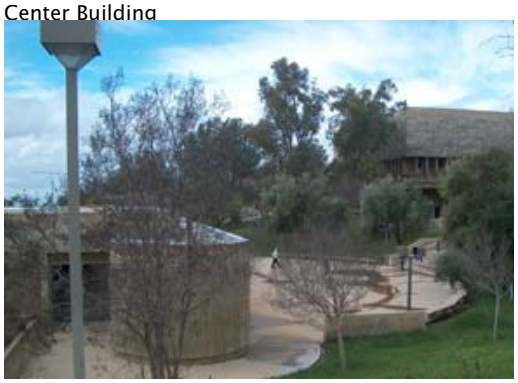


Figure 5.2: Performing Arts Center Plaza

Character and Function

Diagram 4 presents the paved outdoor rooms discussed below. Paved outdoor rooms can be categorized as the Plaza, the Court and the Foyer.

A. Plazas

Plazas are large outdoor paved areas with planting at their perimeters or in contained areas. Plazas are intended to facilitate outdoor events (Diagram 4). Three significant Plazas exist on campus.

- The Cafeteria Plaza is adjacent to the Student Center Building (Figure 5.1). The concrete paving has a repeated hexagonal pattern in colors of terracotta red and natural concrete. These same concrete paving colors are used throughout the campus and unify the campus spaces. The canopies of mature Sycamore trees located in raised planters provide shade and act as overhead planes in the space, containing it and giving it a pedestrian scale against the surrounding buildings' mass. The planters are placed in an informal arrangement, with their shape matching the paving pattern and adding design definition. A dense planting of shrubs separates the plaza from an adjacent walkway/service road and completes its enclosure. Additional planters throughout the space help to soften this primarily paved space. Students have an adequate amount of outdoor furniture for eating, sitting and socialization.

Figure 5.3: Close-up view of Plaza at Performing Arts Center

- The Performing Arts Center (PAC) Plaza is the roof for a portion of the PAC building (Figures 5.2 and 5.3). Its perimeter is defined by a sloping landscape of evergreen and flowering plants (e.g., Olive Tree, Crepe Myrtle), a wide staircase, and a line of benches. Because visitors step down into the PAC Plaza, it is characteristic of an amphitheatre, but it is not used as such. The plaza is used primarily for outdoor events associated with the Performing Arts Center, e.g., pre-performance gathering, an outdoor art gallery. The space has the feel of an urban entry plaza—i.e., a wide expanse of patterned, colored concrete paving (in red and natural) that is open to the elements.

Figure 5.4: View of Central Quad

- The primary plaza space is called "Central Quad" and is a major campus nexus (Figure 5.4). This space is used for large campus events, such as graduation, and student organization/club activities. Its edges are defined by the Laboratory Administration Building's main staircase to its east, the central entrance (at parking lot D) to its north, the Library on the west and the Performing Arts Center stairs to the south.

  Four large planters arranged in rows and the plaza's enhanced concrete paving (a red grid pattern with bands of natural colored concrete) reinforce the formality of the space. People make use of the planters' high edges for sitting and resting away from the sun. Evergreen pear trees and juniper shrubs fill the planters.

Figure 5.5: View of Library Court.

Figure 5.6 View of Foyer space at a SSA classroom entry.

A significant staircase gives this plaza a grand scale and lead visitors down from the LADM building into the Central Quad. Anyone standing at the stairs will enjoy great views of the internal and external landscapes.

B. Courts

Courts are primarily hardscape spaces associated with a specific campus building (Diagram 4). Some courts are accessible from the building, while others are only accessible from within the building. The Library Court (Figure 5.5), the Upper Court of the LADM building, and the Bookstore Court are the primary courts on campus.

The Library Court is located along the primary campus pedestrian spine and has views of the internal campus landscape and outward views to the hills. The LADM Upper Court sits at the top of the Central Quad stairs and serves as a building forecourt, with views over the Central Quad and the Upper Green. In comparison, the Bookstore Court is smaller, more internally focused and enclosed. Planters and seating are placed against its perimeter, putting the visual focus on its plain concrete paving. An alcove area within the OE1 building is nothing more than a vending machine area, but it is a space with a great view of the adjacent hills.

C. Foyers

Foyers are small spaces adjacent to classroom entrances (Figure 5.6 and Diagram 4). Although they are smaller in scale to plazas and courts, the existing foyers are not intimate spaces. For the most part, they are open and very public spaces, with few amenities and little to no landscape character.

Figure 5.7: Bookstore Court feels void of people, seating and shade.

Issues/Opportunities

- The College has a variety of outdoor spaces, but most seem underutilized. Activating these spaces will require the development of more scheduled events for the spaces and the addition of amenities that maximize user comfort (shade trees, seating, shade structures). The Bookstore Court, for example, is so void of amenities that it feels empty and overly exposed to the elements (Figure 5.7).

- The planting within the Central Quad does not reinforce it as the heart of the campus. Specimen trees, accent or flowering planting, and accent features could give the space the visual impact appropriate for a campus icon.

- The Cafeteria Plaza is purposefully designed to maximize user comfort and provides a social gathering space. Its design elements should be considered when creating other social spaces on campus.

- Although the Library Court is located in the middle of the primary pedestrian spine—a high traffic area—the shade trees, tables and benches are amenities that draw students to it. It is a very public space, a place to be seen and for chance meetings.

Figure 5.8: Stairs and landings become "Found Spaces".

Figure 5.9: Students use guard walls for seating between classes.

Figure 5.10: Low fencing surrounding the Child Development playground.

- Due to the lack of site furnishings in many of the outdoor spaces, students take advantage of "found spaces," such as stairs and landings, for informal gatherings (Figure 5.8). They also sit on the guard walls located outside of their classrooms (Figure 5.9). Since these guard walls protect people from the sometimes steep adjacent slope, its use as seating should be a safety concern.

- The campus does not have sufficient "private spaces." Private spaces are informal and small in scale. They are designed for personal study space or small group interactions. The Foyers come closest to the idea of private spaces, but they lack the amenities and landscape buffers that make them feel intimate.

- Students congregating in foyer spaces can be disruptive to nearby classes in session, and some teachers don't want to encourage their use as social spaces.

- The Child Development buildings include a large children's playground area. This playground is a unique space within the campus. The playground is partially bordered by a fence that seems too low for security purposes (Figure 5.10). A landscape hedge would enclose and provide a green buffer.

- There are drainage problems in some plaza areas. For example, the Performing Arts Center Plaza has general drainage problems, including some caused by the existing irrigation system.

6. SITE FURNISHINGS

Figure 6.1: Backless concrete benches line the perimeter of the Performing Arts Center Plaza.

Figure 6.2: Backless concrete bench with painted wood seat located at stair landing. Bench is similar to PAC Plaza benches.

Figure 6.3: Metal and wood benches with backs located outside the LADM Building.

Crafton Hills College's existing site furniture is a mixture of styles that don't always relate to each other or the surrounding elements. The most prevalent furnishings are cast concrete products and they correspond well with the campus architecture. But the furnishings are not consistent throughout the campus. The collection should be reduced to one coordinated set that is in keeping with the architecture and the indoor-outdoor relationship prevalent to the campus design. Overall, the campus has an insufficient quantity of site furniture, given its size, its number of outdoor spaces, and its views.

Benches/Seating

- The most commonly found benches on campus are two backless, concrete bench styles that share similar profiles. Although their concrete frames and legs match, the seat material is either concrete (Figure 6.1) or wood (Figure 6.2).

- The turquoise colored wood seat on the concrete-and-wood bench is repeated in a metal-and-wood bench style found near the LADM building (Figure 6.3). The repeated use of color is an effective way of combining different styles.

- The paint and finish for most of the wood-seated benches show signs of weathering (Figure 6.4).

Figure 6.4: Paint and wood wear on many of the existing benches.

Figure 6.5: Raised planters serve double-duty as seating in the Cafeteria Plaza.

Figure 6.6: Concrete tables are donated by College Alumni.

- Concrete handrails, once part of the original campus architecture, were removed and recycled as benches. These "benches" were observed in the Upper Green area between the LADM and CHS buildings and in a snack alcove in the OE1 building. Although they look similar to the other concrete campus benches, they are massive pieces and rather high-seated. Students, however, use them, reinforcing the need for more campus seating.

- Raised planters, such as the ones located in the Central Quad and the Cafeteria Plaza, provide seating for passersby (Figures 6.5).

- Students take advantage of the many campus stairs for seating and socializing, particularly when they are located just outside of classrooms.

Tables

- One concrete table style is found throughout campus (Figure 6.6).

- Plaques placed on the table tops indicate that the tables were donated to the College by alumni and other individuals.

- Although the table is probably available with an umbrella option, no umbrellas were observed on campus. In areas with lots of sun exposure, tables were placed in the shade of buildings. Such placement sometimes pushes the furniture to the perimeter of an outdoor room and leaves the space looking and feeling vacant (e.g., at the Bookstore Court). The possibility for social activity within those spaces is then not realized.

Figure 6.7: Primary concrete trash receptacle.

Figure 6.8: Trash receptacle at CDC building.

Figure 6.9: Metal trash receptacle.

Trash Receptacles

- The College uses one particular concrete receptacle for most of the campus (Figure 6.7). This receptacle is consistent in style with the concrete tables.

- However, several other trash receptacles were observed throughout the site (Figures 6.8 nd 6.9) The styles are not consistent with each other or with the primary concrete trash receptacle.

- Trash receptacles within the parking lots are recommended since litter is a problem in these areas.

Other Site Furniture

- Drinking fountains are generally wall-mounted styles that are part of the campus buildings. Except for an unusual fountain-trash receptacle combination located on the golf course, no standalone drinking fountains (e.g., pedestal styles) were observed.

- No bollards were observed on campus. Bollards could be helpful in controlling the number of people who drive their vehicles onto pedestrian paths and plazas/courts. For example, faculty, staff and delivery vehicles are driven from Parking Lot E to the LADM and CHS buildings. This practice causes damage to the paths, the landscape and irrigation, and results in additional maintenance issues.

LANDSCAPE

LANDSCAPE

LANDSCAPE

LANDSCAPE

7. IRRIGATION ASSESSMENT

An irrigation system walkthrough was conducted at the Crafton Hills College site on March 10, 2005 with the intent of determining current system deficiencies and possible remedies. Daryl Covino, the College's Grounds Supervisor, led this walkthrough. This section provides a recap of the site visit observations, and the issues and remedies for irrigation.

Observations

A. Campus Grounds Department requires a 10 p.m. to 6 a.m., 6 day-a-week water window.

- Problem: The water flow requirement, in gallons-per-minute, may be a limiting factor. This watering window has been determined by the Grounds Department to cause the least amount of impact to students—i.e., very few students are on campus during these hours. The golf course, however, may make use of an extended 12 hour operating watering window.
- Remedy: Determine water flow availability from the water purveyor and design main lines and pumping station to accommodate all irrigation within the watering window. The figures below indicate the water demand requirement for the month of July. The month of July is considered the "worst case scenario" for irrigation water demands. All other months would require less demand.

  By means of an 8-hour watering window, the estimated water flow requirement for the campus is 1,275 GPM.
  By means of a 12-hour watering window, the estimated water flow requirement for the golf course/soccer fields is 480 GPM.

B. Irrigation is currently on domestic water supplied by the City of Redlands (City Contact: Mike Taylor, telephone: 909.557.6447).

- Problem: Staying with domestic (potable) water will incur increasingly higher costs. Domestic (potable) water supply is a non-renewable resource. Available resources are dependent on demand and yearly weather patterns. Domestic water use has seen a steady increase in demand and tremendous variations in availability occur from one year to the next. These factors have led to increasingly higher delivery fees. The industry does not see a reversal of this trend. From an environmental perspective, if alternate water sources are available, the use of domestic water for landscape can be seen as "wasting precious water".

- Remedy: Review the possibility of other water resources such as reclaimed water or non-potable water delivered to the campus.

C. Campus Grounds Dept. (telephone: 909.389.3381) is very interested in tying into the new 16" non-potable water main on Sand Canyon.

- Problem: Infrastructure costs. The tie-in may alleviate the issue of the availability of an alternate water source. It has not been determined whether the water purveyor can supply the amount of water required by the campus. Tying into the non-potable line will require a tap and water meter installed by the water purveyor.
- Remedy: Determine the quantity of water and the gallons-per-minute flow rates the water purveyor can supply for the campus.

D. Non-potable water (raw lake water) is supplied by Yucaipa Valley Water District (City Contact: Brett Anton, telephone: 909.797.5118, extension 5).

- Problem: None. Non-potable water delivered by the YVWA is actually slightly filtered lake water from Silverwood Lake. The filtration for non-potable water is not quite as stringent as it would be if it were labeled "drinking water". This non-potable water is not considered "reclaimed water" because RW is water that would typically be directed to the sewer system but instead is "reclaimed' through processing at a reclaimed water facility.
- Remedy: None

E. Yucaipa Valley Water District (YVWD) will work with the College (flow/pressure) due to the large volume of water required to irrigate the campus.

- Problem: None. Brent Anton with the YVWD has put a positive step forward in his willingness to work with the College. Due to the fact that the college will be a major non-potable user, he indicated he might be able to manipulate the system to be more in line with the campus' actual needs.
- Remedy: None

F. Current irrigation configuration cannot complete all required irrigation within the water window.

- Problem: With the existing irrigation mainline sizes, it is not possible to run the amount of water through them in order to irrigate the campus within the prescribed 8-hour water window.
- Remedy: Increase the size of the irrigation main lines to accommodate the necessary water flow to irrigate the campus within the prescribed water window.

G. The current pump station is not adequate to provide enough pressure to the systems to irrigate all zones within the water window.

- Problem: According to the Campus Grounds Supervisor, the existing pump is currently restricted in its ability to provide the pressure required to irrigate all parts of the campus. A new pump station will be required; its specification will depend on the static pressure of the water source, irrigation design perimeters, existing landscaped areas, and new landscaped areas to be added to the campus.
- Remedy: Specify a pump system to handle the current and future needs of the entire campus.

H. The current water purveyor turns off the domestic water for multiple days in the summer months, causing major plant stress to all landscaped areas.

- Problem: The landscape is stressed at the worst possible (hottest) time of the year. When plant material draws water out of the soil profile, the amount of available stored water is reduced. When this percentage of water is reduced to a critical point called the Permanent Wilting Point, the plant suffers permanent damage and in some cases will not recover. This process occurs much quicker during the hottest times of the year.
- Remedy: Find a water source that can supply the campus as required during these critical times.

I. Various sizes of irrigation mains (4", 6") loop through the campus.

- Problem: Closed piping systems incur pressure losses within those systems as liquid flows through them. The larger the flows (demand), the higher the pressure losses will be per length of pipe. For irrigation sprinklers to operate within their manufacturer's specified performances, they require a specified pressure. If the pressure reaching the sprinklers is less because of high flows through the piping, then the landscape suffers due to inefficient operation and coverage.
- Remedy: Determine the extent of reduced sized main lines on campus according to the demand (flow) and replace them with larger sized pipes. Main lines must be sized according to the demand required to run through them to keep pressure losses at a predetermined level. This should include current demand and all future demand so as to keep the systems working within the manufacturer's specified performances.

J. Existing irrigation controllers are Rain Master DX radio controlled, with master computer in Grounds Maintenance office. The Grounds staff is currently very happy with this system.

- Problem: None. The Rain Master Central Control system is a top-of-the-line central system on the market. With its radio option setup, this system will allow additional controllers at most any location on the campus.
- Remedy: None.

K. No flow sensing devices are currently installed on any systems.

- Problem: Without flow sensing capabilities, the irrigation system operator does not have information at hand to determine how efficiently the irrigation systems are functioning or to make informed operating decisions as required. Flow sensing capabilities are an important water management tool. Flow sensing equipment works in conjunction with a master valve and has the following benefits.
  - Allows central control to read actual water delivered to the various zones. This information allows the operator to adjust the run times on the controllers to maximize water efficiency and plant health.
  - Monitors system operation, identifies pipe breaks and shuts down those systems automatically.
  - Monitors system operation, identifies a sprinkler(s) head break and shuts down those systems automatically.
  - Monitors unscheduled use of irrigation water and shuts down those systems automatically.
  - Monitors system operation and alarms the system operator when scheduled irrigation does not take place.

- Remedy: Install flow sensing equipment on irrigation sub-main lines at locations where the sub-main lines tie into the master main line. Currently, this would occur at the irrigation backflow locations. Sensing cables will also be required to run to the irrigation controllers. It is recommended that this cable be run in an electrical conduit.

L. No master valves are currently installed on any irrigation systems.

- Problem: An irrigation system without master valve shut off capabilities cannot take advantage of the flow sensing equipment's ability to monitor high flow events and shut down systems as required. A master valve is an important water management tool. Master valves work in conjunction with flow sensors.

- Master valves isolate pressurized water from the sub-mains they are attached to thus allowing no water flow during hours on non-operation.
- Master valves close down on command from the controller to keep pressurized water from flowing when the flow sensor has identified a break or broken sprinkler(s) in the system.

- Remedy: Install master valves on irrigation sub-mainlines at locations where the sub-mainlines tie into the master mainline. Currently, this would occur at the irrigation backflow locations. Two 24-volt wires will also be required to run to the irrigation controllers.

M. The close proximity of young children to any future non-potable water may be an issue. The current irrigation system surrounding the Child Care facility may remain as is.

- Problem: Non-potable water irrigating landscapes near kids may raise issues with YVWD or state rules and regulations. It also may raise issues with concerned parents.
- Remedy: The College will need to research any potential issues regarding the use of non-portable water. Another possibility will be to leave the existing irrigation systems near the Child Care facility on domestic water.

N. Many irrigation wires are broken throughout campus and the College is currently using Doublers to rectify the problems.

- Problem: Irrigation control wires get broken for a number of reasons—e.g., excavations within wire locations, tree root damage, new construction within wire locations, varmints, failure due to stretch stresses. The Grounds Department has used devices called 'Doublers' to help rectify the situation. Doublers allow the use of only one control wire to operate 2-4 irrigation valves. This is not an ideal fix, but it is an inexpensive one in light of the costs to run new wire through existing landscape and paving.
- Remedy: Run new control wire in new main line trenches where it makes sense to do so. Also run extra wires to alleviate future issues with broken wires.

O. On some parts of the campus the irrigation heads do not adequately water their intended target, due to low dynamic system pressures.

- Problem: For irrigation sprinklers to operate within their manufacturer's specified performances they require a specific dynamic pressure. If the dynamic pressure reaching the sprinklers is less than required then the landscape suffers due to inefficient

operation and coverage. Lower dynamic pressures can be a result of pressure losses through the system or low delivery pressures.

- Remedy: Increase dynamic pressure at the sprinkler by increasing main line pipe size where possible and/or increase delivery pressure.

P. Existing irrigation main lines are overtaxed. As the school adds new landscaped areas, the subsequent new irrigation is tied into the old existing main lines.

- Problem: Closed piping systems incur pressure losses within those systems as liquid flows through them. When landscape areas are added to the campus the increased water flow through the pipes for those new areas decreases the overall pressure within the system. The larger the demand becomes, the higher the pressure losses will be per length of pipe. For irrigation sprinklers to operate within their manufacturer's specified performances they require a specified pressure. If the pressure reaching the sprinklers is less because of high flows through the piping then the landscape suffers due to inefficient operation and coverage.
- Remedy: Determine the extent of reduced sized main lines on campus according to the demand (flow) and replace with larger sized pipes. Main lines must be sized according to the demand required to run through them to keep pressure losses at a predetermined level. This should include current demand and all future demands so as to keep the systems working within the manufacturer's specified performances.

Q. There are currently 9 reduced pressure (RP) backflow devices within the campus dedicated to irrigation systems.

- Problem: None. RP backflow devices are required by law on all domestic water irrigation installations with irrigation systems higher the installed backflow device. Irrigation backflow devices have an annual testing requirement by law. If non-potable water is delivered to the campus and YWSD allows it, the backflows may be removed, as the water is not domestic.
- Remedy: None. Removing backflow devices removes testing and maintenance costs.

R. There is not an approved backflow device separating the domestic water line from the irrigation water at the shipping and receiving area.

- Problem: RP backflow devices are required by law on all domestic water irrigation installations with irrigation systems higher the installed backflow device. If non-potable water is delivered to the irrigation zone and YWSD allows it, the backflow will not be required, as the water is not domestic.

- Remedy: Install a RP type backflow device if the irrigation system stays on domestic water.

S. The backflow devices are tied into various domestic water mains throughout campus.

- Problem: RP backflow devices are required by law on all domestic water irrigation installations with irrigation systems higher the installed backflow device. If non-potable water is delivered to the irrigation system and YWSD allows it, the backflows will not be required, as the water is not domestic.
- Remedy: None

T. Many of the current irrigation main lines are Asbestos Cement lined piping.

- Problem: Causes some issue with Grounds staff when they must do repairs on the piping. The irrigation main lines are of older vintage, not of the newer PVC style. The Grounds staff has indicated that these lines are in constant need of repair and they would prefer to work with non-asbestos cement pipe.
- Remedy: Abandon-in-place and replace all asbestos cement pipe as feasible. With use of non-potable water, required new main lines may solve this issue.

U. Approximate areas requiring irrigation:

- Problem: The current and future needs of the campus directly impact the water delivery requirements to the campus. See Table 1 for the Preliminary Water Use Estimate Chart. The chart is based on rough estimates of irrigation efficiencies and plant water requirements. To get more specific numbers at this time would require a full irrigation audit. The chart does not take into account any rain, which may fall on the site in a given year. Approximate areas requiring Irrigation are:
  - Golf and soccer fields: 30 acres
  - Campus landscaped areas (non-turf): 44 acres
  - Campus landscaped areas (turf): 9 acres
  - Roadside and miscellaneous landscape: 4 acres
  - Future construction: 5 acres

- Remedy: Negotiate water availability with the water purveyor.

Table 1

Preliminary Water Use Estimate Chart

Crafton Hills College, Yucaipa, CA

Assumptions: Total Estimated Irrigation Landscape Area = 92 acres (4,007,520 sq. ft.)

	ETo	PF	IE	Area (sq. ft.)	Rain	AR	Water Req. (inches)	Applied Irrigation Water Req. (inches)	Irrigation Water Req. (gallon)
JAN	2.80	0.65	0.60	4,007,520	0.00	0.00	1.82	3.03	7,577,330
FEB	2.80	0.65	0.60	4,007,520	0.00	0.00	1.82	3.03	7,577,330
MAR	5.00	0.65	0.60	4,007,520	0.00	0.00	3.25	5.42	13,530,946
APR	5.40	0.65	0.60	4,007,520	0.00	0.00	3.51	5.85	14,613,422
MAY	7.15	0.65	0.60	4,007,520	0.00	0.00	4.65	7.75	19,349,253
JUN	7.00	0.65	0.60	4,007,520	0.00	0.00	4.55	7.58	18,943,324
JUL	8.10	0.65	0.60	4,007,520	0.00	0.00	5.27	8.78	21,920,133
AUG	7.35	0.65	0.60	4,007,520	0.00	0.00	4.78	7.96	19,890,491
SEP	6.35	0.65	0.60	4,007,520	0.00	0.00	4.13	6.88	17,184,301
OCT	3.60	0.65	0.60	4,007,520	0.00	0.00	2.34	3.90	9,742,281
NOV	2.30	0.65	0.60	4,007,520	0.00	0.00	1.50	2.49	6,224,235
DEC	2.30	0.65	0.60	4,007,520	0.00	0.00	1.50	2.49	6,224,235
TOTAL	**60.15**				**0.00**	**0.00**	**39.10**	**65.16**	**162,777,280**

Reference:

ETo = Evapotranspiration Rate, water required by plants, in inches

PF = Plant Factor, as a percentage

IE = Irrigation Efficiency, as a percentage

Area = Irrigated Area, in square feet

Rain = Historical Average Rainfall, in inches

AR = Applied Rainfall, percent of rain that is affective

Water Required: Total water required by landscape = ETo * PF

Applied Irrigation Water Required: Water that must be added by irrigation system = (Water Required ÷ IE) – AR

E | DATA & COMMUNICATIONS

Crafton Hills - Technology Infrastructure Assessment

Introduction

In this report, the voice and data infrastructure serving the College is discussed as an integral part of the Architectural Master Plan. An overview of the existing campus technology infrastructure is presented with an evaluation of the existing as-built drawings and campus standards. The report identifies the critical areas of campus and building infrastructure that will have an impact on future installations of technology equipment and use. The goal of this report is to develop a structured, long-term view of the space and planning required for a comprehensive and flexible IT infrastructure. Though this process the College will ensure sufficient IT capacity to serve the technology build out of the campus while also effectively serving the needs of the master plan development.

The specific focus on supporting technology across the campus is not for the sake of using technology. The effort is made to ensure that the College's technology infrastructure is adequate to allow new technologies to be used that will help the College address its ultimate needs and goals required to provide a quality education to its students.

The IT infrastructure incorporated into the master plan should address long and short term needs in a cost-effective manner and should address the following:

- Technology Changes – The infrastructure must support ongoing changes such as increased network speeds and capacities, expanded use of monitoring and control systems and personal communication services.
- Distribution – The infrastructure should enable access to every Campus building and every area of the Campus, providing redundant routing wherever practicable.
- Adaptability – The infrastructure should be designed to allow a high degree of flexibility and adaptability.
- Standards Based – The infrastructure should adopt a standards based approach to provide the capability to utilize a wide range of alternative system designs without the need to reinvent the basic infrastructure.
- Fault Tolerance – The infrastructure should be designed to allow for the installation of a fault tolerant network configuration.

Data Network

The campus data network operates on a Gigabit campus backbone running over 62.5 optical fiber cabling and Gigabit over copper cabling in the internal riser with 100Mbit/s Fast Ethernet horizontal distribution over copper cabling within each building. There are two outlying campus locations that exceed the distance limitations for Gigabit backbone distribution over multimode fiber. These are the Maintenance Building and the communications tower. The College recognizes that the installation of single mode optical fiber will be required to each of these locations for the backbone to be increased from 100Mbit/s Fast Ethernet to Gigabit.

There is currently no physical redundancy in the network, i.e. there is only a single network path between the network center in the LRC and any individual building. The network is connected in a star configuration.

The network provides wide area connectivity to the San Bernardino Valley campus and to the District via a 100MB wireless Microwave connection. Internet connection is made via a DS-3 connection to the CalREN network.

There are currently two locations with wireless network deployed on campus using an 802.11b/g solution. Concerns exist over the cost/benefit equation for wireless connections, and widespread concern over security of the wireless network. The staff mainly uses desktop workstations and very few students or faculty use mobile laptop computing so the usual benefits of a wireless network cannot be realized. A district wide plan for the installation of wireless networking should be established.

Telephone System

The campus upgraded the telephone system and transitioned from a traditional TDM Meridian telephone system to the use of a Cisco AVVID Voice over IP (VoIP) system in 2004. The Cisco AVVID system is the current standard telephone system service type deployed at San Bernardino Valley College and the District offices.

The campus VoIP system currently supports all telephone users providing such services as audio conferencing and voicemail. Limited direct outside telephone lines are used for connections traditional telephone system connections and fax modem use.

The migration to VoIP has been successfully completed and the system is considered reliable by campus faculty and staff. Supporting continued telephone connections during the event of an extended power failure is a concern with the VoIP system. The data network equipment which supports the telephone system function must be powered for continued telephone service. Currently modular UPS devices are used in the campus data center and in individual telecom equipment rooms to provide back up system power. The UPS equipment provides back up power for a maximum of 1 hour.

CATV / Video Distribution

The College does not currently have CATV distribution at this campus. The District's Valley campus has television studios and a cable channel, KVCR. However, no links between the two campuses provide distribution of cable channel programming. Adding a CATV distribution feed to the campus should be considered. Other college's use CATV programming to maintain world events and for entertainment. Because no campus backbone coaxial cabling exists currently the distribution of CATV over optical fiber should be considered. The CATV signal may be distributed over optical fiber using the data network or by broadband distribution over fiber.

The use of live and recorded video streaming over the data network should also be considered. Further discussion of the future use of distance learning between the two San Bernardino Community College District campuses is required. (Use and requirements of such functions will be discussed as part of Master Plan programming.

Technology Infrastructure, As-Built Drawings and Campus Standards

The College has a collection of building and campus project as-built drawings that have recently been compiled as part of the campus master planning project. The majority of these historic drawings do not indicate locations of technology equipment rooms, communications pathways or communications cabling outlets in buildings. The majority of the technology equipment and communications cabling installations were completed after the buildings were constructed and have no formal record documentation. Drawings do exist for the campus communications infrastructure ductbank routing and the information is clearly detailed on the Utility drawings. However, campus as-built drawings for the campus backbone optical fiber air-blown cable system or the campus copper cabling do not exist. The campus Technology Services department has created a drawing that details cable types and quantities for these installations. (This report includes drawings of the campus backbone cabling installations and campus technology infrastructure.)

The campus does not have a list of formal defined technology standards. However, the District has installed similar Cisco active networking and VoIP equipment and communications cabling types at each campus. The renovation projects to be completed at Crafton Hills College and other District locations will benefit from the completion of technology infrastructure, equipment and cabling standards documents. It is recommended that such standards be completed as part of the master planning effort.

Campus Data Center

Figure 1 – Data Center Server Racks. Rack expansion space or three racks exists adjacent to these shown.

Figure 2 –Equipment consolidation will provide additional equipment rack space in existing data center racks.

Figure 3 –UPS in data center provide back up power for the campus data network and VoIP telephone system.

Figure 4 –UPS in data center provide back up power for the campus data network and VoIP telephone system.

Main Equipment Rooms

Campus MPOE

The campus currently has a hardwired incoming services connections provide by Verizon. The incoming services connection is made with 24 strands of optical fiber extended from Verizon's Mentone Central Office location. The incoming service route runs from the west entrance at Sand Canyon Road to the Library/LRC building for fiber connections and to the LADM building for copper connections. The incoming service lines are used to distribute internet and telephone system connections.

Campus Data Center

The campus data center is currently housed in the basement of the Library/LRC building. The room is approximately 600 square feet in size. The room currently has expansion space of approximately two equipment racks in each of its two rows in its current configuration. A portion of the existing servers consist of traditional cabinet style chassis and are installed on shelves in racks. This equipment will be replaced with servers that are significantly smaller in size which will allow for equipment consolidation. Further expansion space could be provide by consolidated existing equipment and removing the existing work bench and stored equipment space.
As technology continues to evolve and develop, the necessity for sophisticated equipment in the data center will continue to increase. Space in data center will continue to be at a premium for years to come, and the requirements for closely controlled environmental conditions will become more and more important.

An additional HVAC unit was recently added to provide continued room cooling. The data center now has two independent cooling units providing a total of 9 tons of air conditioning. Back-up power in the data center is supported by individual rack mounted Uninterruptible Power Supply (UPS) associated with specific equipment. No generator exists to provide emergency power. It is recommended that an emergency generator be added.

The data center does not have significant fire protection currently with the minimal installation of sprinklers required for the square footage. The majority of data center equipment would be damaged in the event of a basement located fire that allowed the sprinklers to discharge in the data center. The installation of a gas fire suppression system should be considered if this space will remain as the centralized location of data network equipment.

The build-out of a new campus data center is recommended as part of the campus improvements. A new data center would allow for a proper built room with future expansions space and all required support services. The existing data center should remain as a redundant core equipment location providing network redundancy.

Technology Equipment Rooms

Figure 1 – View of communications equipment located in an exposed area beneath a credenza area of a classroom.

Figure 2 – Example of a worst case scenario communications equipment location - mechanical room install.

Figure 3 – Wall mounted equipment racks serve as cable distribution points and house communications equipment.

Figure 4 – Wall mounted communications equipment and cable distribution in an electrical equipment room.

Building Dedicated Technology Equipment Rooms

Each main campus building has at least one dedicated telecom equipment space allowing for equipment installation for the provision of campus telephone and data services to outlet locations throughout the building.

Typical BDF/IDF Telecom Equipment Rooms

BDF (Building Distribution Facility) and IDF (Intermediate Distribution Facility) equipment rooms are used to house telecommunications equipment and for cabling distribution. BDF rooms are special-purpose rooms that provide space and maintain a suitable operating environment for the termination of backbone and campus cabling and house centralized communications and/ or computer equipment. The BDF is a buildings main communications equipment room where incoming campus services are connected.
Backbone cabling extends from the BDF location to IDF equipment rooms for distribution of services throughout the building. IDF rooms provide an environmentally suitable and secure area for installing cables, cross-connects, rack- and wall- mounted hardware and technology equipment. These rooms are connection point between the backbone and horizontal pathways.
With few exception the BDF and IDF rooms across the campus are not purpose built rooms dedicated solely to telecommunication installations. Instead communications equipment is collocated in mechanical or electric rooms or located in cabinets or shelves in classroom locations. The existing campus buildings were not constructed with dedicated telecommunications rooms and do not provide equipment spaces that meet current industry standards. These types of installations do not allow for technology equipment expansion or significant upgrades and should be replaced with purpose built equipment rooms.

Communications Equipment Room – Support Systems

Per industry standards communications rooms should have either dedicated HVAC equipment, or access to the main HVAC delivery system. Telecommunications equipment requires the HVAC system to function 24 hours per day, 365 days per year. Sudden temperature changes and extreme temperatures can cause equipment shut down and shorten the life span of equipment.
The majority of communications equipment rooms at the College do not have dedicated or building HVAC distribution.

It is recommended that the communications equipment rooms at new and renovated buildings be built to provide dedicated space, power, and HVAC to allow for multiple generations of future equipment and cabling installations. Communications room requirements should be standardized across the district and room requirements should be issued to the Architectural and engineering teams for each building construction project.

Building Communications Cabling Pathways

Figure 1 – Exposed cables are routed along walls and ceiling areas.

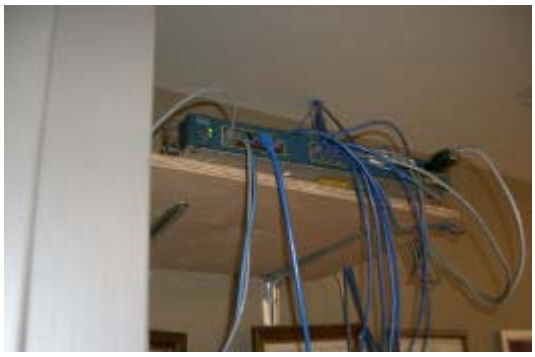


Figure 2 – Cable is distributed from an equipment location through a hole in the ceiling and to outlet locations.

Figure 3 – Conduit is used for horizontal cable distribution in few locations.

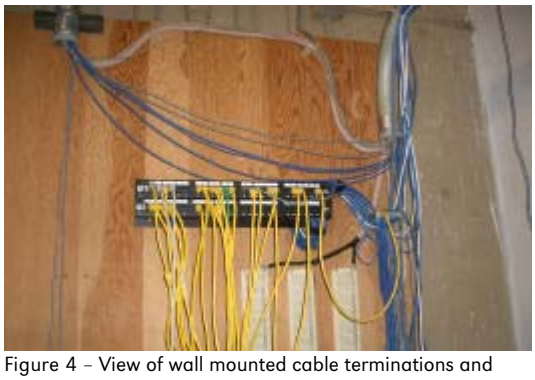


Figure 4 – View of wall mounted cable terminations and conduit distribution paths.

Building Dedicated - Communications Riser and Horizontal Pathways

The horizontal communications cabling system infrastructure includes the pathway and support hardware which concentrates, supports and protects horizontal cable media between its origination point in the equipment room and the workstation outlet location. The riser pathway supports backbone cable distribution between stacked floors. The existing campus buildings were not designed with horizontal or riser cabling pathways. As a result cabling is distributed using wall mounted hooks, wiremold cable containment or otherwise surface mounted.

Riser pathways at buildings with multiple floors have been cored where possible. However, there are few instances where communications equipment rooms stack on one another that allow the cored riser pathway to be most beneficial. Horizontal pathways have been created with the use of j-hooks in accessible ceiling spaces or placed above ceiling tiles with no containment method. This type of installation does not provide for cable protection and does not allow cable to be replaced efficiently. Cable replacement will cause significant disruption in these spaces.

It is recommended that new riser and horizontal pathways be installed as part of existing building renovations. New pathways should be based on a District standard for distribution requirements.

Building Cabling

The majority of telecommunication outlets throughout the College consist of enhanced Category 5 cabling and connectors. These outlets are used to connect computers, VoIP telephones and peripheral equipment to the campus data network. The cabling currently supports 100Mbit connection speeds to the data network. It has not yet been determined if these cable installations will support 1000Mbit speed connections.

The cabling is generally in good condition but is exposed in many classroom installations. It is recommended that new and renovated buildings include dedicated pathway infrastructure for the distribution of communications. The District is working to standardize on the installation of AMP Category 6 cabling. It is recommended that a standard cabling specification and installation design be developed for use by Architectural and engineering design teams working on new and renovated building projects.

Campus Communications Infrastructure

Figure 1 – Distribution from manhole connects campus communications services to data center equipment.

Figure 2 – Incoming services route through manhole located at the LADM building.

Figure 2 – Manhole location at bookstore is the southern end of campus communications infrastructure spine.

Figure 2 – Pull box at Gymnasium location. Communications cabling is routed through Electrical vault.

Campus Communications Infrastructure

The existing campus communications cabling pathways consist of conduit duct banks, manholes and pull boxes. Access at infrastructure pathways is made at manholes and pull boxes for cable servicing and installations. Duct banks consist of 3 or 4 inch trade size conduits running between backbone manhole and pull box locations. Smaller conduits of 2 inch trade size are typically run from manhole or pull box locations to building main equipment rooms for connection to campus telecommunications services. (See attached Campus Technology Infrastructure and Communications Cabling drawings for details.)

A single spine of campus conduit exists which runs from the West end of campus starting at the College Center and extends up to the Book Store building. The duct bank path runs in the area between the parking lots and campus buildings. Conduit duct banks are located in open areas and do not run under buildings at any portion of the run. The manholes are pre-cast concrete and sized at approximately 6'wide by 10' in length x 6'in depth. They are in good condition but have standing water in most locations. It appears that irrigation water drains into the manholes requiring them to be pumped multiple times each year. The flow of water into manholes may be reduced by providing new seals at lids, bolting lids and sealing any crack in manholes.

The main campus duct bank consists of (2) 4" and (3) 3" conduits encased in concrete. The conduits at the central spine area are in generally good condition but close to capacity with the current cabling installations. A portion of conduit pathways contain copper telephone cabling that has been abandoned. Removal of abandoned cable will help to provide usable conduits for future cabling installations.

In addition to the center spine conduit pathway running between the parking lots and building locations, there is a conduit duct bank running the main campus drive. This duct bank has been in place since the initial campus construction was completed. The majority of these conduits are currently unused for distribution of campus backbone communications cabling. A portion of these duct bank conduits are congested with overgrown with tree roots. This conduit pathway may be used as a redundant path to mitigate having a single point of failure in the center spine conduit path. However, the existing conduit pathway should be replaced with a new concrete encased conduit pathway to prevent future conduit or cable damage from tree roots.

It is recommended that as part of the campus master plan that additional campus main duct bank routes be added to increase capacity and provide for route redundancy for backbone cable distribution. This redundancy will help to eliminate any single point of failure location in the campus backbone which would leave a group of buildings without campus communications services in the event of a duct bank disruption.

Campus Communications Cabling

Figure 1 – Air blown optical fiber tubes extend from campus infrastructure to building equipment rooms, as seen here.

Figure 2 – Air blown optical fiber tubing originates here in the Library/LRC building.

Figure 3 – Backbone cabling and fiber tubes exit the Library basement

Figure 4 –Communications equipment room with wall-mounted campus backbone cabling (copper & fiber).

Campus Backbone Cabling

The College has an installation of air blown fiber pathways running throughout the campus infrastructure. The fiber pathway originates in the Library/LRC building and extends to each building on campus. The air blown fiber system is a series of tubes connected to allow for the installation of optical fiber. Fiber is placed in the tubes using a stream of compressed air. The use of this type of cabling system provides an infrastructure that can be used and reused for generations of cabling. When a fiber type requires replacement the existing fiber strands are removed and new fiber is installed in the same tube. The installation maximizes the infrastructure capacity.

The existing optical fiber installed consists of multimode 62.5 micron and is connected using Opti-jack connectors. Fiber strands are terminated in wall mounted or rack mounted termination panels at each building.

The backbone copper cabling installed across the campus is now in limited use as the majority of telephone signals are distributed over backbone fiber cabling using the new VoIP system. The copper cabling is still used to connect outside phone lines to fax modems and direct line phones.

Legacy copper air core cabling has been abandoned in place and limits conduit capacity at incoming service duct banks. Campus duct bank capacity will benefit from the removal of abandoned cabling.

It is recommended that the campus standardize on the use of 50 micron multimode optical fiber for campus backbone cabling. This fiber will provide for increased bandwith in the transition to a 10Gigabit backbone. Single mode optical fiber should be installed to buildings that have a cable distance greater than 500 meters from the data center.

The technology requirements on Campus are continually evolving and an expected emphasis will be on

- An increasing number of computers on Campus typically concentrated in computer labs.
- Increasing demand for Internet access.
- Increasing demands for access to personal communication including telephone and intercom, including wireless access.
- Increased use of remote monitoring and control systems.
- The potential for distribution of video across the network.

Wireless voice and data communications is likely to play a role in the future of the campus technology requirements, but in the near term strategy for a role-out of wireless networking has not been completed.

Key Aims and Assumptions for the Development of the Infrastructure plan

The following key points underscore the planning for the development of the IT Infrastructure on Campus.

- The plan should identify a backbone infrastructure route that serves, but is separate from, the current buildings and the sites of future buildings as identified in the master plan. This approach will facilitate the renovation and construction of campus buildings in any sequence without interruption to voice and data network services.
- The infrastructure should be designed for construction in stages to minimize initial cost. The infrastructure plan will ensure that the component constructed at each stage forms a viable part of the final campus wide infrastructure.
- The infrastructure will reflect the increasing operational dependence on the network and aim to provide physical and logical network redundancy.
- Existing infrastructure that is in good condition and with a long lifespan should be retained and incorporated into the long-term plan in order to reduce costs.
- The Data Center will continue to occupy the current space in the Library/LRC in the near future. However, planning for the IT infrastructure will emphasize the move of data network equipment to a new data center location leaving the existing data center as a location for redundant core equipment.

Classroom Audiovisual Systems

Figure 1 – Example of newer instructor media station with dedicated computer and document camera.

Figure 2 – Push button AV control panel at instructor station allows for equipment selection and volume control.

Figure 3 – Example of legacy instructor station, generally larger in size.

Figure 4 –Instructor station DVD and VHS source equipment. Source images are displayed via ceiling mounted

Educational Technology

The College makes use of installed and portable audiovisual (AV) equipment in classrooms and conference rooms. New classrooms include a dedicated instructor station that houses a dedicated computer, document camera and source equipment. Video and computer Images are displayed to the student audience with the use of a single ceiling mounted projector and projection screen. The system has a push button control panel at the instructor station which allows for the selection of computer and video sources to be shown on the projection screen. The control panel also allows for volume control of audio distributed by wall mounted speakers. Other classrooms make use of portable projection equipment for electronic image display. Portable slide projectors and overhead projectors are used for film projection.

It is recommended that the College and District work to standardize the AV requirements for typical classroom types. AV room standards would be used by design teams planning construction for renovated and new buildings. Standards should emphasize the use of conduit infrastructure that will be used to install cabling between day one and future equipment. System requirements such as controls and ALS equipment should also be standardized. The standards should include methods for centralized monitoring capabilities of AV systems that will allow for remote help and support for faculty.

F | SITE & BUILDING LIGHTING

01 LIGHT LEVELS

Figure 1.1 – Street lighting - restricted height and wide spacing lead to uneven lighting.

Figure 1.2 – Child Development parking – Low, sparse fixtures inadequate for area of parking lot.

Figure 1.3 – Library perimeter – adequate lighting along building fades to unilluminated landscape.

Figure 1.4 – Service road - unilluminated

Light Levels
(Security/Safety)

The amount and evenness of light reaching the ground are two of the most important factors in creating a safe nighttime environment. Around building perimeters these are predominantly acceptable. However, notable exceptions included:

- Street lighting is very uneven, and crosswalks are not highlighted and do not employ reflectors or reflectorized tape.
- Parking lots have variations in light levels exceeding 10-to-1, and drop to 0.1 foot-candles or lower in many perimeter areas.
- Landscape areas in plazas and around parking lots and pathways are not illuminated in many areas, creating hiding spaces for animals and or people. (This includes the park at the corner of Campus Drive and the road to the Maintenance Facilities.)
- Service roads are totally unilluminated. Some of these are in areas where students or parents may travel (such as up to the practice field,) potentially on foot and by automobile.
- Stairs at some locations are not specifically illuminated, posing a trip hazard.
- The sports field is only illuminated using portable light fixtures, which could potentially lose power during use.
- Many building entries are not illuminated to higher levels, as recommended by the Illumination Engineering Society of North America (IESNA.)

01 LIGHT LEVELS

Figure 1.5 – Bookstore - Stairs illuminated by building mount fixtures (off during site walk.)

Figure 1.6 – Sports field – Portable floodlights inadequately illuminate area.

Light Levels, cont'd
(Security/Safety)

- Around building perimeters these were predominantly acceptable. However, notable exceptions included:
    - Stairs at some locations are not specifically illuminated, posing a trip hazard.
    - The sports field is only illuminated using portable light fixtures, which could potentially lose power during use.

02 GLARE

Figure 2.1 – Wall pack with prismatic refactor – visible lamp partially blinds pedestrians.

Figure 2.2 – Post top at top of stairs – Pedestrians see into fixture when ascending stairway.

Figure 2.3 – Student Services – floodlight illuminating stairs partially blinds pedestrians.

Figure 2.4 – Ceiling mount fixture – where visible, fixture is major source of glare.

Glare
(Security/Safety)

Glare is one of the major detrimental factors to visibility at night. When there is direct view of a very bright light source, the viewer's retinas contract, letting in less light in order to protect his eyes. This has the effect of making his entire view appear darker and impairs the effectiveness of these fixtures.

- Fixtures using visible lamps (including pole lights, wall packs, and floodlights) actually reduce visibility.

03 COLOR RENDERING

Figure 3.1 – Street lighting – low pressure sodium source emits light in only two wavelengths.

Figure 3.2 – Metal halide – this is a moderate to good color rendering source.

Figure 3.3 – New wall sconces – These use flourescent, for moderate to good color rendering.

Figure 3.4 – High pressure sodium – Environments appear various shades of gold and brown.

Color Rendering
(Safety/Security)

Color rendering is a major factor in visibility (and thus the utility of fixtures depending on the light sources used in particular fixtures.) High color rendering fixtures render all colors fairly accurately (reds are reds, blues are blues, etc.) Low color rendering sources can be somewhat monochromatic, making it difficult for people or objects to stand out from their backgrounds or for viewers to identify exactly what or who is being seen.

Currently:

- Low pressure sodium is currently being replaced by induction lamp fixtures in parking lots and roadways. Low pressure sodium is the absolute worst color rendering source available and should only be used where required by nearby observatories, etc.
- High pressure sodium is being used in wall packs at some locations (Childhood Development, etc.) This renders most colors as gold or brown.
- Metal halide, fluorescent, and incandescent sources throughout the site use moderate to good color rendering lamps.

04 FACADE LIGHTING

Figure 4.1 – Sconces scatter light, including upon buildings across courtyards.

Figure 4.2 – Building integrated lighting serves to illuminate building as backdrop + surrounding.

Figure 4.3 – Building mount uplights illuminate tower and night sky.

Façade Lighting
(LEED/Security)

Illumination of building facades not only adds to the ambiance of the college., but it also improves safety by providing a bright backdrop against which people and animals will stand out and eliminating nooks and crannies in which someone might disappear.

Currently:

- Sconces scatter light in all directions, effectively floodlighting buildings and providing illuminated backdrop to walkways and plazas.
- Incorporated light fixtures illuminate façade as well as area below.

05 LANDSCAPE LIGHTING

Figure 5.1 – Landscape uplight is a source of light pollution, when functional.

Figure 5.2 – Non-illumination of landscape surroundings leads to dark areas.

Landscape Lighting
(LEED/Security)

Illumination of landscaping (either by highlighting large trees or the use of area lighting via pole lights) can not only add to the ambiance of the college, but it also improves safety by providing a lighted backdrop against which people and animals will stand out and eliminating nooks and crannies in which someone might disappear.

- No functioning landscape lighting currently exists, leading to dark surroundings to campus.
- Nonfunctioning bullet uplights would be source of light pollution if operable.

06 SIGNAGE

Figure 6.1 – Parking signage – illuminated only by vehicular headlights


Figure 6.2 – Flags – currently unilluminated

Signage
(Wayfinding)

Illumination of signage at night makes it much easier for new students, or students seeking an unfamiliar building, to find their way around and not get lost.

Currently:

- Building identity signs are internally illuminated
- The main monument sign (at Campus Drive and Sand Canyon Road) is floodlighted
- The monument sign at the bus turnaround has inadequate number of floodlights, which are currently not functioning.
- Parking lot signage has no illumination.

07 VANDAL RESISTANCE

Figure 7.1 – Non-vandal resistant sconce located too close to ground.

Figure 7.2 – Most older lensed steplights are no longer functioning.

Figure 7.3 – New sconces do not employ screws or other fasteners to hold bottom panel in place..

Figure 7.4 – Ground mount landscape lighting should be provided as durable floodlights.

Vandal Resistance

College campuses can be high abuse environments. Fixtures should be kept out of reach wherever possible, and when this is not possible, vandal resistant fixtures should be used. However, polycarbonate lenses should be avoided, as this material yellows quickly and becomes brittle.

Currently:

- Fixtures that are not rated as vandal resistant are sometimes located within easy reach.
- Steplights with lenses rather than grills have been provided and have not stood up to abuse.
- There are removable parts on some fixtures, which will disappear or be damaged.

08 LIGHT POLLUTION

Figure 8.1 – Wall pack with prismatic refractor – Light is distributed up as well as down.

Figure 8.2 – Fluorescent sconce – Light is scattered in all directions.

Figure 8.3 – Cut-off optics – Light is directed only below horizontal

Light Pollution
(LEED)

LEED requirements state that true cut-off fixtures should be used in all cases and that uplights should not be used if it cannot be guaranteed that no light pollution will be created.

Currently:

- Most fixtures on site do not use cut-off optics, causing a lot of light to be discharged directly into the night sky.
- Many newly installed fixtures do not use optics at all but simply scatter light in all directions.

09 SOLAR POWERED FIXTURES

Figure 9.1 – Cobra head fixtures collect solar energy during the day.

Figure 9.2 – Fixtures cannot store enough energy to last entire night during the winter.

Figure 9.3 – Some fixtures currently not operating at all.

Solar Powered Lighting
(LEED)

The use of renewable energy sources, including solar, can add to LEED accreditation. Currently, some solar powered light fixtures are installed about the campus.

- Benefits include:
    - Fixtures do not require power from Utilities and so save on energy consumption/cost.
    - Fixtures are not affected by campus-wide power failures.
- Drawbacks include:
    - Fixtures cannot store enough energy to last an entire night during winter (this is affected by their placement on buildings, i.e., how much sunlight they receive during the day.)
    - Fixtures are not architecturally integrated but stick out obviously.

LIGHTING -
11x17 DIAGRAM - SITE LIGHTING

LIGHTING LEVEL SITE MAP
– KEY –

COLOR	AREA TYPE	IES RECOMMENDED LIGHT LEVELS (avg.)	IES RECOMMENDED UNIFORMITY (max: min)	MEASURED LIGHT LEVELS	MEASURED UNIFORMITY (max: min)
	PATHWAYS	0.5fc	4:1	5.0 to 0.1	1:1 (best) 20:1 (worst)
	BUILDING ENTRIES	5.0fc (min.)	n/a	15.0 to 0.3	–
	PARKING LOTS	0.9fc (min.)	4:1 (avg: min)	8.8fc to 0.1fc	13:1 (best) 88:1 (worst)
	ROADWAYS	0.8fc	5:1	3.5 to 0.1	35:1
	SPORTS (TENNIS)	100fc (collegiate) 50fc (high school)	2.5:1 4:1	50fc+ (estimated)	2.5:1 (estimated)
	SPORTS (SOCCER)	150fc (collegiate) 50fc (high school)	2.5:1 4:1	–	–
	LANDSCAPE	none	none	0.5 to 0.0	–

LIGHTING -
11x17 DIAGRAM - TROUBLE SPOTS

01 OVERVIEW

Figure 1.1 – Fixtures with cut-off optics not only reduce light pollution but can achieve greater illumination levels.

Figure 1.2 – Sodium light sources render all colors as gold, brown, or black, thus reducing visibility.

Figure 1.3 – High color rendering sources render color in all wavelengths of the visible light spectrum.

Figure 1.4 – Cut-off light sources use recessed optics that prevent view of lamps except from directly below.

Overview

Based on a review of the existing lighting on the site the following general items should be addressed:

- Where they fall below recommendations from the Illuminating Engineering Society of North America (IESNA,) light levels should be increased to meet minimum standards. This can be achieved through the replacement or addition of light fixtures.
- Where light levels have been designated as particularly uneven (streets, parking lots) replacement fixtures should be provided that meet IESNA minimum recommendations.
- In order to provide improved color rendering (i.e., visibility) fluorescent, induction lamp, and metal halide sources should be used with a color rendering index (CRI) of 80 or higher.
- Fixtures that currently produce high amounts of glare should be replaced with full cut-off fixtures where optical control is imperative and diffuse, low brightness fixtures where unsophisticated optics are required.
- In order to meet LEED requirements, all future landscape or façade-mounted lighting should employ true cut-off optics in order to minimize light pollution.

Specific recommendations will be made by area and fixture in the following sections.

02 STREETS

Figure 2.1 – Fixtures with high performance optics are available in many shapes and sizes. (USArchictectural DSB)

Figure 2.2 – Fixtures with high performance optics are available in many shapes and sizes. (Kim Archetype)

Figure 2.3 – Fixtures with high performance optics are available in many shapes and sizes. (AAL Largent)

Street Lighting

Main Road

The current street lighting on the campus:

- falls below IESNA minimum light level recommendations (0.8 foot-candle average)
- is far less uniform that IESNA worst-case recommendations (5-to-1 max-to-min ratio)
- uses a very poor color rendering light source (low pressure sodium, which emits light in only 2 wavelengths.)
- uses fixtures that are not full cut-off.

This lighting is currently being replaced with fixtures that employ a high color rendering induction lamp. This may be appropriate if these are provided as full cut-off fixtures and IESNA minimum requirements will be attained.

In any case:

- High color rendering lamps are recommended. (Metal halide is suggested, as much better optical control is achievable with it.)
- Fixtures should be spaced so as to achieve IESNA recommendations of 0.8 foot-candle average or greater, and 5:1 max:min ratio or better. This can be done by:
    - Decreasing the distance between fixtures
    - Increasing pole heights
    - Using fixtures with well-designed type I or type II reflectors

02 STREETS

Figure 2.5 – Crosswalks on campus are currently poorly illuminated.

Figure 2.6 – Strategically placing pole lights at crosswalks not only provides illumination but helps define path.

Figure 2.7 – In-grade paver lights help define pedestrian path of travel.

Figure 2.8 – Driveover paver lights can integrate grazing/spray type optics to minimize light pollution.

Street Lighting (cont'd)

Crosswalks

In addition, crosswalks should be more brightly illuminated to increase visibility of pedestrians for drivers.

This can be done by:

- Providing reflectors or reflectorized paint at cross-walks.
- Providing additional light fixtures at either ends of cross works.
- Integrating recessed marker lights with cross walks.

Service Roads

Service roads are currently unilluminated. These should be illuminated to minimal requirements of:

- 0.3 foot-candles (average)
- 10:1 max:min

03 PARKING LOTS

Figure 3.1 – Evenness is even more important than light levels in aiding visibility.

Figure 3.2 – Fixtures with high performance optics are available in many shapes and sizes. (Kim Entablature)

Figure 3.3 – Fixtures with high performance optics are available in many shapes and sizes. (ASL Eurotique)

Figure 3.4 – Fixtures with high performance optics are available in many shapes and sizes. (Kim Matrix)

Parking Lot Lighting

The current parking lot lighting on the campus:

- falls below IESNA minimum light level recommendations (0.9 foot-candle minimum)
- is far less uniform that IESNA worst-case recommendations (4-to-1 avg-to-min ratio)
- uses a very poor color rendering light source (low pressure sodium, which emits light in only 2 wavelengths.)
- uses fixtures that are not full cut-off.

This lighting is currently being replaced with fixtures that employ a high color rendering induction lamp. This may be appropriate if these are provided as full cut-off fixtures and IESNA minimum requirements will be attained.

In any case:

- High color rendering lamps are recommended. (Metal halide is suggested, as much better optical control is achievable with it.)
- Fixtures should be spaced so as to achieve IESNA recommendations of 0.9 foot-candle minimum or greater, and 4:1 avg:min ratio or better. This can be done by:
    - Decreasing the distance between fixtures (by adding additional fixtures as required)
    - Increasing pole heights
    - Using fixtures with well-designed reflectors

In many cases there are wooded areas directly adjacent to parking lots. These create places predators (human or animal) might lay in wait. Because of this it is recommended that the zone of this landscape within 20'-0" of the parking lot be treated as parking lot as far as designing to meet IESNA criteria.

04 PEDESTRIAN PATHWAYS

Figure 4.1 – Fixtures with high performance optics are available in many shapes and sizes. (Bega 8082)

Figure 4.2 – Fixtures with high performance optics are available in many shapes and sizes. (Kim Era)

Figure 4.3 – Fixtures with high performance optics are available in many shapes and sizes. (Sternberg Artisan)

Figure 4.4 – Fixtures with high performance optics are available in many shapes and sizes. (ASL Eurotique)

Pedestrian Pathways

Pole Lights

The current pathway lighting on the campus:

- falls below IESNA minimum light level recommendations (0.5 foot-candle average) in most areas not directly adjacent to buildings
- uses a wide variety light sources of different energy efficiency and lamp life
- uses some fixtures that are full cut-off and others that are very inefficient and sources of light pollution and glare.

This lighting is currently being replaced with fixtures that employ a high color rendering induction lamp. This may be appropriate if these are provided as full cut-off fixtures and IESNA minimum requirements will be attained.

In any case:

- High color rendering lamps are recommended. (Metal halide is suggested, as much better optical control is achievable with it.) Using a minimum number of lamp types will ease maintenance.
- Any fixtures provided should use full cut-off optics. This will both:
    - Minimize glare
    - Minimize light pollution and so require with LEED criteria and the 2005 Title24 requirements
- Fixtures should be spaced so as to achieve IESNA recommendations of 0.5 foot-candle average or greater, and 4:1 max:min ratio or better. This can be done by:
    - Decreasing the distance between fixtures
    - Increasing pole heights
    - Using fixtures with well-designed reflectors

Current fixtures on campus do not seem to have been selected with a mind to aesthetic integration with the architecture of the buildings and hardscape. Many options are available at this point in time that can meet both performance and aesthetic criteria.

04 PEDESTRIAN PATHWAYS

Figure 4.5 – "Moonlighting" – Fixtures mounted high in trees can provide area lighting as well as landscape illumination.

Figure 4.6 – Large scale decorative fixtures can be provided to illuminate landscape as well as pathways.

Figure 4.7 – Post top fixtures can be integrated with hardscape elements.

Pedestrian Pathways (cont'd)

Landscape-mount Area Lighting

An alternative to the use of pole lights (or building mount fixtures where pathways run along structures) is to use tree mount downlights. There are many very tall trees on campus, and the use of these for "moonlighting" pathways in this manner also can serve to illuminate the trees themselves, providing landscape lighting (covered in a later section.)

Plaza

Currently this area is illuminated with a few pole lights mounted at the north, east, and south ends of the plaza. This results in uniformly low light levels across the majority of the walkway. Lighting integrated into the four landscaping rectangles provides almost no illumination (and is currently not functioning.)

Recommendations are to either:

a) provide one large pole in the center of each landscape quadrant (this will serve to both illuminate the short trees below and the plaza beyond,) or

b) provide pedestrian scale pole lights at the corners of the landscape rectangles that will illuminate the plaza and the landscape bed.

05 STAIRWAYS

Figure 5.1 – Where pole lights are located at tops of stairs, they can be sources of glare for those ascending.

Figure 5.2 – Although this is a fairly sturdy installation for this type of fixture, it is an easy target for vandals.

Figure 5.3 – Steplights with polycarbonate lenses will eventually fall to vandalism.

Figure 5.4 – Glare from floodlights actually counteracts the illumination they provide.

Stairway Illumination

Existing Conditions

Currently the stairways are illuminated using one of the following types of fixtures/techniques:

- pole light fixtures (Where these are mounted at the top of stairs, those ascending have a view directly into the extremely bright lamp.)
- landscape mushroom lights (Although they seem to be undamaged for the most part, these are an easy target for vandals.)
- steplights employing polycarbonate lenses (These lenses were selected for their vandal resistance, but they become opaque and brittle under prolonged exposure to the sun.)
- flood lights (These are a high source of glare and so reduce visibility.)
- bollards (These are an easy target for vandals, and only fixtures specifically designed to be vandal resistant should be used.)
- building mount downlighting (partially concealed by integration in coffered ceiling)
- spill light (Some stairs do not have fixtures adjacent but rely on light from nearby buildings, parking lot lights, etc.)

It is recommended that vandal resistant, non-glare fixtures be provided for all stairways. The most critical areas for illumination are the top and bottom of the stair and any landing, as that is where pedestrians are most likely to trip (due to the change in slope.)

05 STAIRWAYS

Figure 5.5 – Strategically located ceiling mount fixtures provide high level of illumination.

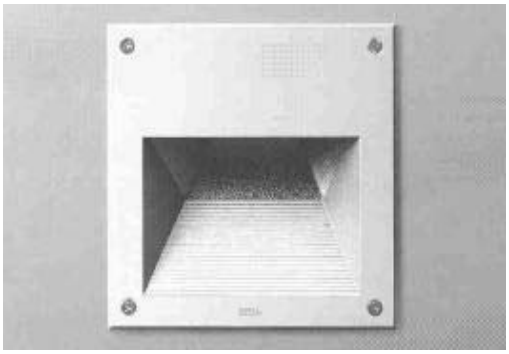


Figure 5.6 – Steplights with cut-off optics provide some protection against vandalism.

Figure 5.7 – Handrail integrated lighting can provide high levels of glare-free illumination.

Figure 5.8 – Vandal resistant bollard (Kim VSB)

Stairway Illumination (cont'd)

Recommendations

The following methods are recommended for illumination of stairways:

- building mount downlighting partially concealed by integration in coffered ceiling (While the use of one or two high brightness fixtures could become a source of glare, the use of many low brightness fixtures should not. Proper integration as well insures limited visibility of the fixture itself.)
- vandal resistant steplights using cut-off optics and/or protective grills (These should be located so as not to provide a glary view into the fixture interior to pedestrians ascending stairs.)
- handrail-integrated fluorescent lighting (This provides high light levels with little glare.)
- vandal resistant bollards (Optics should be provided/oriented so as not to shine light in the eyes of pedestrians ascending stairs.)
- building mount wall packs with cut-off optics (Optics should be provided/oriented so as not to shine light in the eyes of pedestrians ascending stairs.)
- post top fixtures mounted at the foot of stairs (located so as not to provide a view into the fixture interior to pedestrians ascending stairs)
- tree or building mount floodlights with louvers, baffles, or other glare control options (These should be located high enough so as to aim almost straight down and out of view of pedestrians, not becoming a source of glare.)

06 BUILDING ENTRIES

Figure 6.1 – Ceiling mount fixtures with diffuse lenses can provide high light levels with low surface brightness.

Figure 6.2 – Cut-off wall pack fixtures provide area lighting but also illuminate wall below to highlight entry.

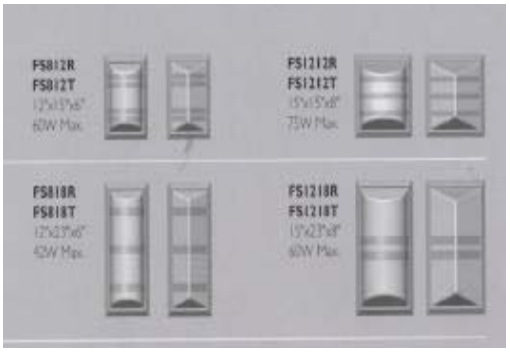


Figure 6.3 – Vandal resistant decorative sconces can come in various shapes and sizes. (Kenall Millenium FreeScale)

Figure 6.4 – Uplighting can be used to indirectly illuminate entries if layout doesn't cause light pollution.

Building Entry Illumination

Current Conditions

IESNA recommends a 5.0 foot-candle minimum at all building entries. Current campus lighting does not meet this in most instances.

- In some locations no additional lighting is provided at building entries.
- In other areas the lighting provided does not reach 5.0 foot-candles.

Recommendations

It is recommended in all locations that low-glare fixtures be provided that can:

- achieve the IESNA recommended 5.0fc minimum
- illuminate adjacent walls and surfaces for improved visibility
- be used as emergency lighting (This would prohibit the use of metal halide unless the College has an inverter system.)

Fixtures that can achieve this are:

- Downlights (surface mount or recessed)
- Ceiling mount vandal resistant fixtures (Polycarbonate lenses are discouraged.)
- Cut-off wall packs
- Low brightness, vandal resistant decorative sconces (Polycarbonate is discouraged.)
- Indirect light fixtures (where there is a white ceiling off of which to bounce light)

07 BUILDING PERIMETERS

Figure 7.1 – Non-vandal resistant fixtures should not be used where they are in easy reach.

Figure 7.2 – Highly visible glary fixtures are not recommended because they actually reduce visibility.

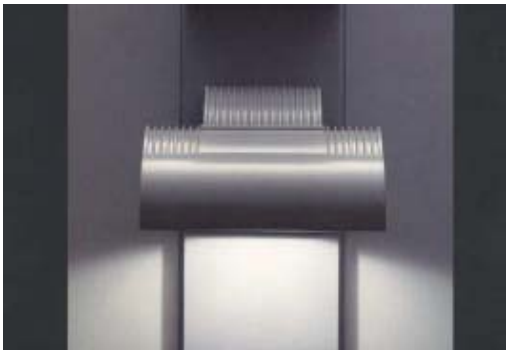


Figure 7.3 – The use of cut-off wall packs is a LEED criteria and required for new construction under 2005 Title24.

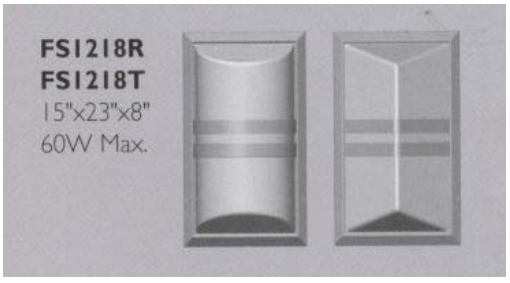


Figure 7.4 – Vandal resistant fixtures can be provided that still aesthetically integrate with building architecture.

Building Perimeters

Existing Conditions

The current pathway lighting around buildings tends to meet IESNA recommendations of 0.5 fc average and 4:1 max:min ratio.

At its best it incorporates concealed light fixtures that illuminate building architecture. At its worst it provides glary or non-vandal resistant fixtures within easy reach of pedestrians.

Recommendations

It is recommended that:

- Non-vandal resistant fixtures be replaced
    - with vandal resistant fixtures, or
    - with fixtures out of easy reach
- Non-cut off fixtures be replaced with full cut-off fixtures to assist in LEED accreditation. Any area lighting fixtures on new buildings will have to incorporate cut-off optics in order to comply with Title24 2005.
- Fluorescent, induction lamp, and/or ceramic metal halide sources be used for their superior color rendering.

07 BUILDING PERIMETERS

Figure 7.5 – Lighting integrated into coffers not only illuminates ceiling and building facades, but pathways.

Figure 7.6 – Architecturally integrated lighting can illuminate façade and provide area lighting for building

Figure 7.7 – Fluorescent billboard type fixtures can illuminate architecture as well as provide area lighting near

Figure 7.8 – Metal halide cut-off fixtures can illuminate architecture as well as provide area lighting near buildings.

Building Perimeters (cont'd)

Recommendations (cont'd)

- fixtures be located so as to illuminate architecture (covered in later section) as well as pathways. (Many fixtures currently achieve this but have been located irregularly in relation to the architecture, falling short of the strikingly beautiful effect that could have been achieved.) Examples are:
    - centering ceiling mount fixtures in building coffers (Where ceiling mount fixtures are tucked into coffers around the Library, they have only been located in some and not in a regular pattern. If fixtures would have been provided in every coffer (perhaps at a lower intensity,) not only would the ceiling have been fully illuminated, the building façade would have been evenly illuminated.)
    - integrating downlights at building eaves (For instance, at the College Center this would not only illuminate what is now a dark building façade but would provide lighting for the area around the building.)
    - locating fluorescent billboard lights at the top of tall walls (illuminating both the wall and the area below, which would be a stairway in the case of the east end of Student Services A.)
    - positioning cut-off wall packs high up on walls (or just below building ledges) in order to illuminate the façade below as well as the surrounding pathway and landscape

08 BUILDING FACADES

Figure 8.1 – Where beam distribution can be controlled so as to prevent directly illuminating sky, uplights are usable.

Figure 8.2 – Where uplights will not cause light pollution, they can be used to accent architecture.

Façade Lighting

Existing Conditions

Almost no lighting is currently provided specifically for illumination of architecture. What exists at the moment is:

- some uplighting at the stair tower at the Learning Resources Center (This would go against the light pollution guidelines for LEED certification.)

- coffer- integrated ceiling mount fixtures at the Learning Resources Center, Library, and Administration Building.

Façade lighting not only serves to create a more inviting nocturnal environment for students and accentuate the architecture, but it adds an element of safety, as it provides a bright backdrop against which any person or creature in the foreground will be visible.

Recommendations

Please see the previous section on Building Perimeters for suggestions that will both facilitate façade and area lighting.

In order to minimize light pollution façade lighting should be done mainly from illuminators mounted high and aiming down, but exceptions would be:

- spot lights that can direct all light on a horizontal surface (for instance, a clock high on a tower)

- uplights that are located under building ledges or canopies and so could not be expected to throw light directly into the sky

Where light fixtures are used solely to illuminate architecture, there is no necessity to use high color rendering white sources (like fluorescent or ceramic metal halide.) The use of high pressure sodium, colored lamps, or color filters may be appropriate depending on the particular circumstances.

09 PERIMETER LANDSCAPE

Figure 9.1 – Where fixtures are mounted high in mature trees, landscape and pathway lighting can be achieved.

Figure 9.2 – Post top fixtures can be used to illuminate adjacent landscape areas as well as pathways.

Landscape Lighting

Existing Conditions

With the exception of several non-functioning bullet lights at Learning Resources A, no lighting is currently provided for the illumination of landscaping.

Recommendations

Because of this we have many dark areas a short distance from pathways, parking lots, etc. As suggested previously, these areas should be taken in to consideration when planning area lighting for pathways, parking lots, and streets.

Apart from creating a more inviting nocturnal environment for students and highlighting trees, landscape lighting also adds an element of safety, as it provides a bright backdrop against which any person or creature in the foreground will be visible. For that reason the use of tree mount downlighting has been suggested (see section on Pedestrian Pathways.)

Lamp life should be taken into consideration when using tree mount fixtures, as access by motorized lift will be required. If appropriate induction lamp or LED fixtures are available when design is undertaken, those would be encouraged.

The use of landscape uplighting is discouraged because of LEED criteria regarding lighting pollution. As well, these fixtures are susceptible to vandalism, whether accidental or intentional.

10 SIGNAGE

Figure 10.1 – Existing building signage is internally illuminated, although unevenly.

Figure 10.2 – Where sign lighting is uplighted, barn doors, louvers, and other accessories can minimize light pollution.

Figure 10.3 – Low profile fluorescent sign lighters can be used to downlight monument signage. (AAL Pivot)

Figure 10.4 – Low profile fluorescent sign lighters can be used to downlight monument signage. (Cole SL)

Signage Illumination

Existing Conditions

Currently building designation signage is internally illuminated (although poorly,) and some (but not all) monument signs are illuminated.

Recommendations

The internally illuminated signage might be examined by a signage consultant with an eye to providing even internal illumination (although this signage seems to violate the letter of LEED guidelines, it might be argued that it does not violate the intent.)

All monument signage should be provided with some sort of floodlighting.

- If uplighting is to be used, it should be designed in such a manner as to minimize direct illumination to the night sky.
- Some form of downlighting is encouraged. Low profile fluorescent sign lights are available that will be minimally obtrusive.

Where street or other informational signage is located:

- this can be coordinated with the layout of parking or pedestrian light fixtures so as to receive illumination from them
- should be provided with reflectorized lettering and graphics for high legibility when viewed from a motor vehicle

11 SPORTS FIELD

Figure 11.1 – Existing lighting consists of gas-powered construction floodlights.

Figure 11.2 – Sports lighting fixtures can be arrayed on poles on both sides of the field to provide even illumination.

Figure 11.3 – Fixtures are recommended that use internal as well as external glare control.

Sports Lighting

Existing Conditions

Currently temporary gas-powered road construction type floodlighting is employed at the track/practice field located north of the tennis courts. This is unacceptable to to:

- glare
- very harsh shadowing
- inadequate illumination
- likelihood of power failure (running out of gas)

Recommendations

If this area is to be used during evening hours, a proper sports lighting system is recommended.

- This would employ arrays of sports lighting spot lights mounted on multiple poles running along both the north and the south lengths of the field.
- Poles would be quite tall in order to provide appropriate aiming angles and minimum glare.
- Fixtures could be accessed via lift, or a permanent ladder and catwalk could be provided.
- Fixtures with high glare control (including internal visors) are encouraged to minimize visibility from off site.

12 EMERGENCY LIGHTING

Emergency Lighting

Typically, code requires that emergency lighting be provided within buildings, in some cases creating an illuminated path all the way out from a building to the adjacent roadway.

However, as this site is in a secluded area apart from the nearby residential and commercial areas, it is encouraged that some site lighting (including pedestrian pathways and parking lots) be included on an emergency back-up system.

Currently, the solar powered cobra head fixtures that still function fulfill this requirement. If those should be deleted, this suggested emergency back-up system might be implemented.

13 SOLAR POWER

Figure 13.1 – Solar panels can be concealed atop roof tops and aimed for optimal energy collection.

Figure 13.2 – Solar panels can be integrated into building facades, hidden in plain view.

Figure 13.3 – Solar panels can be integrated into building facades, hidden in plain view.

Figure 13.4 – Solar panels can serve double purpose as sun screens for building interiors.

Solar Powered Lighting Fixtures

Existing Conditions

Currently, there are a couple dozen solar powered “cobra head” style light fixtures located on building facades and in parking lots about the campus. Some of these function, and some do not.

Problems associated with this type of fixture include:

- Fixtures run out of power prior to sunrise.
- Fixtures use low intensity lamps, as they cannot store the power to run high output lamps for an extended period of time.

An additional problem with the existing fixtures on site is that they use a dropped lens and so violate LEED guidelines regarding light pollution.

Recommendations

The use of solar power is greatly encouraged. However, individually powered fixtures are not recommended because of their current unreliability.

Existing buildings currently have a great amount of roof space. Perhaps some of this can be dedicated for the placement of solar panels, which will be much more effective and useful. As well, future buildings could be designed with solar panels incorporated into building facades or other architectural elements.

14 LIGHTING CONTROLS

Figure 14.1 – Control systems can control groups of fixtures independently and in relation to daylight and/or time.

Site Lighting Controls

Existing Conditions

At the present time different fixtures about the site

- seem to be controlled independently
- turn on in some cases far before sunset

Recommendations

A campus-wide exterior lighting control system should be provided that incorporates an astronomical time clock and/or photosensors. It may be appropriate that different fixtures come on at different times (for instance, the lights under a building canopy before the parking lot lights,) but they should turn on in relation to the amount of sunlight available.

Astronomical time clocks allow the on- and off-switching of the lights to be set in relation to sunset and sunrise. The clock compensates for the time of year so that lights can come on at 5PM in the dead of winter and 8:30PM in the middle of summer.

G | PARKING & CIRCULATION

As part of the first phase of the Crafton Hills Community College Master Planning, this assessment summarizes the analysis of the existing parking and circulation systems as they exist today. Through parking utilization surveys, campus tours and interviews with campus personnel, both current deficiencies and opportunities for improvements at the campus were identified.

PROJECT SITE DESCRIPTION

The college is located in the City of Yucaipa, served mainly by the Interstate Highway 10 (I-10). Major arterials in the vicinity serving the campus are Yucaipa Boulevard, Sand Canyon Road, Sixteenth Street, and Oak Glen Road/Live Oak Canyon Road.

Located on a bluff north of Yucaipa Boulevard, there are only two accesses to the campus, the east access through Yucaipa Boulevard to Campus Drive or west access through Sand Canyon Road to Campus Drive. Campus Drive wraps around the campus on the east side and to the north and then connects with Sand Canyon Road to the west. The campus is bounded by Sand Canyon Road to the south. Figure 1 illustrates the configuration and the location of the campus.

Crafton Hills College opened in September of 1972. In the fall of 2004, the campus had approximately 5,700 students enrolled with approximately 309 faculty and staff. Combined, the number of students, staff and faculty translates to approximately 2,044 Full Time Equivalents (FTE). Table 1 summarizes the breakdown of the college's current enrollment by headcount and FTE.

Students, staff, faculty and visitors are served by parking Lots A through I, located on the north side of the campus. There are an additional seven surface parking lots designated to serve different parts of the campus. All the surface parking lots can be accessed using Campus Drive. Along Campus Drive, there is on-street parking available with the exception of the areas at roadway curvature and curb cuts. On-street parking on Campus Drive does not have any time limitations and/or restrictions.

EXISTING CONDITIONS AND CURRENT DEFICIENCIES

Parking and Circulation System Issues

Lots A through I currently provide a total of 953 parking spaces. The temporary (gravel) lot, Police Station Lot, Custodial Lot, Occupational ED 1 and 2 (OE 1 & 2), College Center Lot (CC), Performance Art Center Lot (PAC), and the Child Development Lot (CDC) provide a total of 265 spaces. Assuming a 20-foot car length, there are approximately 379 parking spaces along Campus Drive East, Campus Drive North, and along the segment of street leading up to CDC for a total supply of 1,597 spaces. Figure 2 illustrates the location of the parking supply.

An hourly parking occupancy survey was conducted on Tuesday, March 22 between the hours of 8 a.m. and 7 p.m. Tuesday, March 22 is the first Tuesday of the spring 2005 term. According to school officials, Tuesday is the peak day of the week.

Occupancy survey showed that during the peak day of the week, the entire campus is adequately served. With an overall supply of 1,597 spaces, peak utilization occurred between 10 and 11 a.m. with 1,019 spaces occupied or approximately 64% occupancy. Figure 3 summarizes the utilization survey for the entire campus.

Lots A Through F

Lots with specific designation such as the Police Station Lot, Custodial Lot do not serve students, faculty or staff. To get a better sense of how the campus is served from a purely academic standpoint, survey results for Lots A through I were isolated. With a total supply of 953 spaces, there were 900 spaces occupied (94% occupancy) in Lots A through I during the peak hour (between 10 and 11am). Figure 4 summarizes the utilization for Lots A through I.

Eight out of the nine lots (Lots A through I) reached an occupancy rate at or exceeding 90% between the hours of 9 a.m. and 3 p.m. Lots A and B exceeded 100% occupancy, indicating vehicles illegally parked at red curbs or double-parked. Table 2 summarizes the survey for Lots A through I.

Lots A through F and I experience peak utilization during the daytime and Lots G and H experience peak utilization both during the day and evening hours. According to Vice President Laurens Thurman, the athletic fields across from Lots G and H are leased to the community and are utilized during the evening hours. The peak utilization during the evening at Lots G and H may be attributed to community usage of the athletic fields. Occupancy in Lot D appears to be low due to short-term parking. With the exception of one hour, Lot I is generally underutilized between the hours of 8 a.m. and 7p.m. The underutilization of Lot I may be due to its distance from the campus.

Designated Off-street Lots

The utilization survey for the remaining off-street lots showed that peak utilization occurred between the hours of 11 a.m. and 12 p.m. With a total supply of 265 spaces, only 40 spaces were occupied during the peak hour (15% occupancy). Figure 5 illustrates the survey results for the remaining off-street lots.

A detailed look at each of the seven designated lots showed the available spaces for students, faculty and staff are underutilized. Occupational ED 1 & 2 are completely unused, as is the temporary (gravel) lot. Table 3 summarizes the survey for each of the designated lots.

On-street Parking

Figure 6 illustrates the areas of on-street parking covered in the utilization survey. There were 16 segments of Campus Drive surveyed. Table 4 lists all 16 segments and the utilization survey results for each segment. Figure 7 illustrates the on-street parking utilization results as a whole. Consistent with the off-street survey results, on-street parking utilization also experiences peak usage between 10 and 11 a.m. With an estimated total of 379 available spaces, 79 spaces (21%) were utilized during the peak hour.

Combined, on-street segments 1 and 2 contain approximately 200 spaces. The survey showed that these two segments are completely unused mainly due to their distance from campus. Currently there is no pedestrian connection between Campus Drive East and the campus buildings. When parked on segments 1 or 2, one would be required to walk up the slopes of Campus Drive East without a proper sidewalk to get to the campus. Aside from the lack of pedestrian access, segments 1 and 2 are located even further than Lot I, making the area of the on-street parking supply the least desirable choice for parking.

The remainder of the segments of surveyed on-street parking along Campus Drive also experience the same inadequacies as segments 1 and 2. With a lack of pedestrian access provided, the on-street parking supply is not appealing and will continue to be underutilized.

Pedestrian Access

Users of Lots A through I are accommodated by the sidewalk fronting the campus buildings, located between the buildings and the lots. Entryway onto the sidewalk is limited due to the grade difference between the elevation of the campus buildings and the lots. In particular, because of the grade differences, handicapped ramps cannot be provided for Lots A, B and C. Within the lots, there appeared to be no designated pedestrian walkway to channel foot traffic, creating vehicular and pedestrian conflicts during the campus peak hour.

Pedestrian access in other designated parking lots is similar to the operations of Lots A through I.

There is no pedestrian access for on-street parking. There are no sidewalks provided along Campus Drive. Immediately adjacent to the roadway curb is landscaping. Users of the on-street parking spaces need to walk on Campus Drive into one of the surface parking lots to get to campus, creating more pedestrian and vehicular traffic, not just at the surface parking lots but also along Campus Drive.

Existing Transit Services

The Omnitrans serves all of San Bernardino County (SBC). The SBC transit service currently has two routes into Crafton Hills College: Line 8 and Line 9. Line 8 is the San Bernardino-Mentone-Yucaipa route and Line 9 is the San Bernardino-Redlands-Yucaipa route. Both routes run along Yucaipa Boulevard, stopping on Campus at the turnaround south of parking Lot D to Sand Canyon Road. Figure 8 illustrates the bus routes.

Beginning at 6 a.m., Lines 8 and 9 run at approximately one-hour intervals. Line 8 stops its services to the campus at 5 p.m. and Line 9 stops serving the campus at 7 p.m. According to Vice President Thurman, Omnitrans does not intend to expand services and/or extend the current transit services to campus.

Service and Emergency Access

Crafton Hills College has a maintenance yard and a designated area for incoming deliveries. This designated area is up in the hills, north of the campus, west of the athletic fields. The only access to the receiving area is through the road adjacent to Lot A. According to Vice President Thurman, the receiving yard mostly gets deliveries from cargo vans, however, on occasion, semi trucks traverse the small access road through winding curves to make deliveries.

With the receiving and maintenance yard tucked away in an area away from campus activities, the campus traffic is separated to minimize vehicular conflicts. As the campus grows, however, the small access road, the only access the receiving yard, would present a problem as deliveries are expected to be made more frequently by semi trucks. Without adequate turning radii for trucks, Campus Drive East may be blocked, preventing other traffic, including emergency vehicles, from accessing the campus.

Emergency access to campus buildings appears to be well signed and striped. Within the campus grounds, emergency access for the fire department and the police department appears to be adequate, but emergency access to the campus from the external street network appears to be constrained.

Located on a bluff, Crafton Hills College is relatively distant from the nearby street network. Having only two accesses to the campus, school officials discussed the consequences of one of the access becoming inaccessible during emergency situations like the San Bernardino brush fires that occurred this past winter.

FUTURE OPPORTUNTIES

Parking Management

Overall, the campus is adequately served from a parking standpoint. Utilization surveys showed only 64% of the entire parking supply is used during the peak hour on a peak day of the week. While the current parking supply of approximately 1,600 spaces seem to be the serving the campus adequately, school officials have said students often complain of the lack of available parking. School officials have said that during the peak hour, students are circulating Lots A through I looking for available parking while lots like the CDC, PAC, and OE 1 & OE 2 are empty.

The survey shows nearly 40% of the supply is unused (265+379/1,597). The primary reason for the underutilization of 40% of the available parking is due to distance from campus. Other reasons are the less apparent locations of the designated lots or the lack of available pedestrian access.

There are a number of measures that can be easily implemented to use the empty parking lots better. For example, Vice President Thurman indicated that the CDC is a much better access for students from a pedestrian standpoint because the lot is at grade with the campus buildings whereas Lots A through I are located at a grade lower than the campus building, requiring the need to take the stairs to get to campus. Even so, not too many students on campus know the existence of the CDC lot. Thus, with enhanced signage on Campus Drive on both ends of the road to advertise the availability of the other lots, students and visitors would be more likely to utilize areas other than Lots A through I. As a secondary effect, the advertisement of the other lots can also lead to channeling the right people to the right places better.

Parking Garages

In the future, as the campus grows, the parking management measures mentioned above may not be appropriate to meet demand requiring the need to provide more supply.

The March 2005 survey shows that currently, the campus parking demand is at 0.5 spaces per FTE (1,019 peak usage / 2,044 FTE in 2004). With a supply of 1,597 (using 90% utilization as full capacity), the campus can add another 830 FTEs before the current supply becomes inadequate:

1,597 current supply * 90% full capacity threshold = 1,437 current supply
1,437 spaces/0.50 space per FTE = 2,874 FTE
2,874 - 2,044 current FTE = 830 additional FTEs

School officials have discussed building a new parking garage to meet future needs. There are a few locations on campus that are suitable for the said parking facility. Based on site surveys, the locations of Lots A, B and C would be ideal. Currently, because of their elevations, these lots cannot provide handicapped access. Given their elevations, the parking garage can be built from the ground up,matching one of the garage floors to the grade of the campus buildings to serve the disabled. As shown in the utilization surveys, parking supply located farther away from the campus core become underutilized. Lots A, B and C are in an ideal location as they are close to most of the main functional buildings on campus.

Another possible location for a parking garage would be at the existing gravel lot located at the entry way on the west side of the school. The area of the gravel lot is not as big as the areas of Lots A, B and C combined, requiring more grading in the surrounding areas. As in Lots A, B and C, the gravel lot is located at a lower grade than the campus buildings and is ideal for a structure. Because it is not located close enough to the campus, a parking garage at this site would not allow direct access to the campus buildings.

Pedestrian Access

The lack of sidewalks reduces the attractiveness of the on-street parking supply. Further, the lack of sidewalks creates pedestrian and vehicular conflicts as pedestrians are forced to walk on the streets without separation from vehicular traffic. It is recommended that a 10-foot sidewalk be constructed all along Campus Drive, beginning at the intersection of Sand Canyon Road and Campus Drive to the southeast, extending all the way to the intersection of Campus Road and Sand Canyon Road to the northwest. It is expected, as pedestrians enter the core area of the parking supply (Lots A through I), that they would be using the access roads from the lots to the campus. The proposed sidewalk is only needed at the north side of Campus Drive, the segment of Campus Drive from Lot I to the east to Lot A to the west.

To make better use of the available parking along Campus Drive the segment from the intersection of Sand Canyon Road and Campus Drive to the southeast, it is proposed that cut-through pedestrian walkways be constructed across the bluff from Campus Drive to the OE 1 and OE 2 buildings. This direct access from the east side of the Campus Drive would negate the need for users of the on-street parking supply to walk up the hills of Campus Drive, looping around Lot I to get to campus.

Expanded Transit Services

According to Vice President Thurman, the San Bernardino County Omnitrans bus service does not anticipate an expansion of services or addition of routes to Crafton Hills College.

Vice President Thurman discussed the benefits of having the current bus routes extended into the evening hours beyond 7 p.m. Utilization in the evening showed that four of the A through I lots experience occupancy above 70% at 7 p.m., indicating a large number of evening students that could benefit from the extension of current transit services. Likewise, during the campus' morning peak hour, added routes and or addition of services (more frequent intervals) to the existing Lines 8 and 9 could draw more ridership.

A variety of campuses have approached transit operators to expand or add services to schools by supporting/funding the construction of an on-campus transit hub that facilitates the ingress/egress of buses to and from the campus. Coordination with Omnitrans is an opportunity to reduce future parking demand by providing more transit services.

Service and Emergency Access Improvements

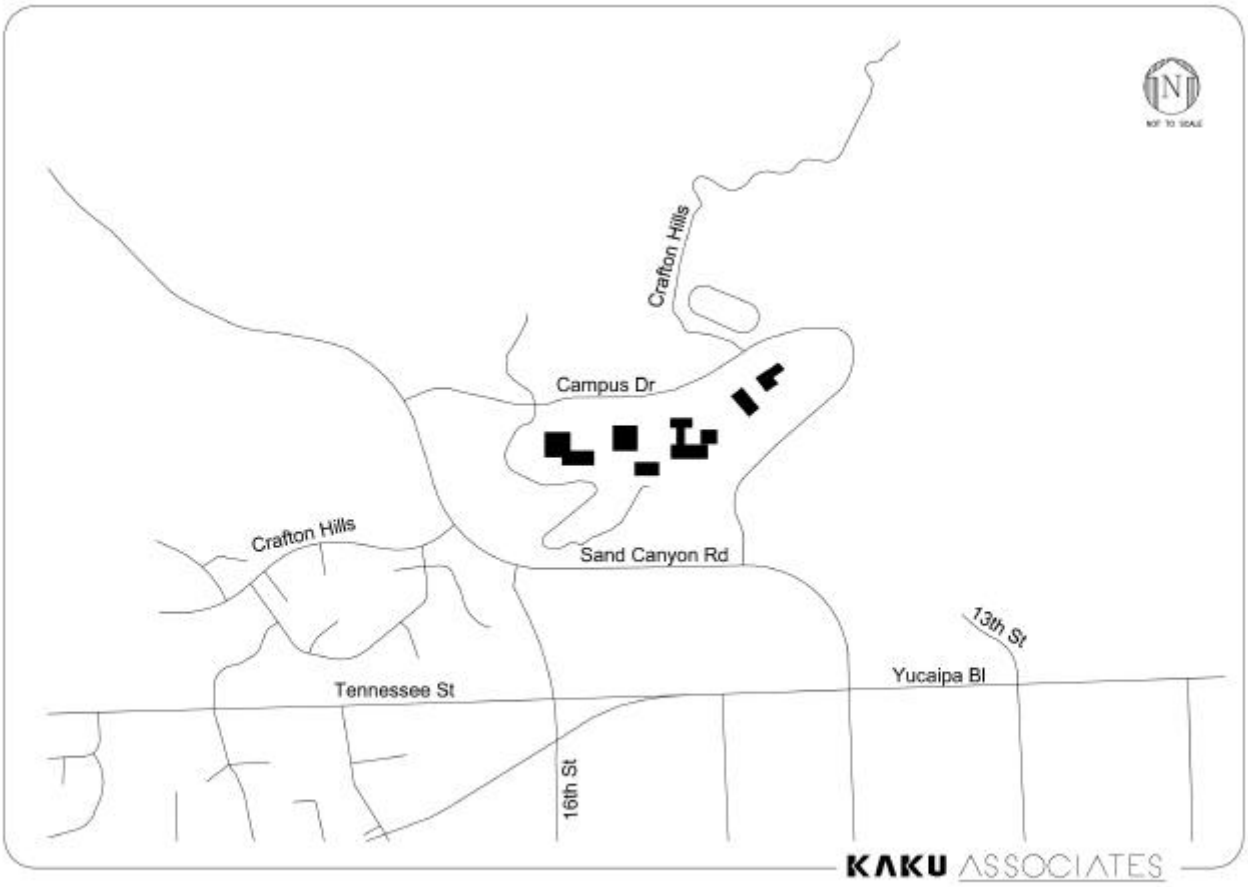
Ingress and egress to the campus site is minimal with two access points. Blockage to one of the access could prevent the vehicular operations in and out of campus and create a dangerous situation during an emergency scenario, as school officials have said. In order to minimize potential blockage to any of the accesses, the service road to the receiving and maintenance yard on the north side of Campus Drive (north of Lot A) should be improved to accommodate semi trucks. The service road should be widened and a truck turning movement analysis of the service road and Campus Drive should be conducted.

Minimizing the potential for blockage to the existing two access points would not serve the campus adequately during emergency situations. Both the east and west access roads loop around the bluff to get to the campus. The distance from the external street (Yucaipa Boulevard and Sand Canyon Road) network system to the nearest campus building is not conducive to response time during emergency situations. Sharing the same concerns as the school officials, it is suggested that additional access be constructed that would shorten the distance from the external street network system to the core of the campus.

An ideal third access would be along Sand Canyon Road west of Campus Drive East to the south of the school. The proposed access would be constructed to intersect Sand Canyon Road through the area called the Peninsula to reach the campus buildings to the north. This proposal would allow a faster connection from external roadways to the campus.

As a part of the same effort to reduce emergency response times, an additional alternate access surrounding the campus would benefit campus vehicular operations. From a traffic standpoint, campus growth indicates greater capacities at the entry points to the school. In the future, not only will two access points be detrimental to the campus emergency response times, but the two accesses may not be adequate to accommodate the anticipated growth.

For example, all parking lots currently unload directly to the north segment of Campus Drive. Lot I as well as the lots in OE 1 and OE 2 can be loaded directly to Campus Drive East. Similarly, the CDC lot can be unloaded directly onto Sand Canyon Road to the west. Located on a bluff, it is difficult to negotiate the grade differences between the levels of the lots and roadways. The benefits of added access, however, warrants additional discussion on this topic.



FIGUR E 1
PROJECT SITE

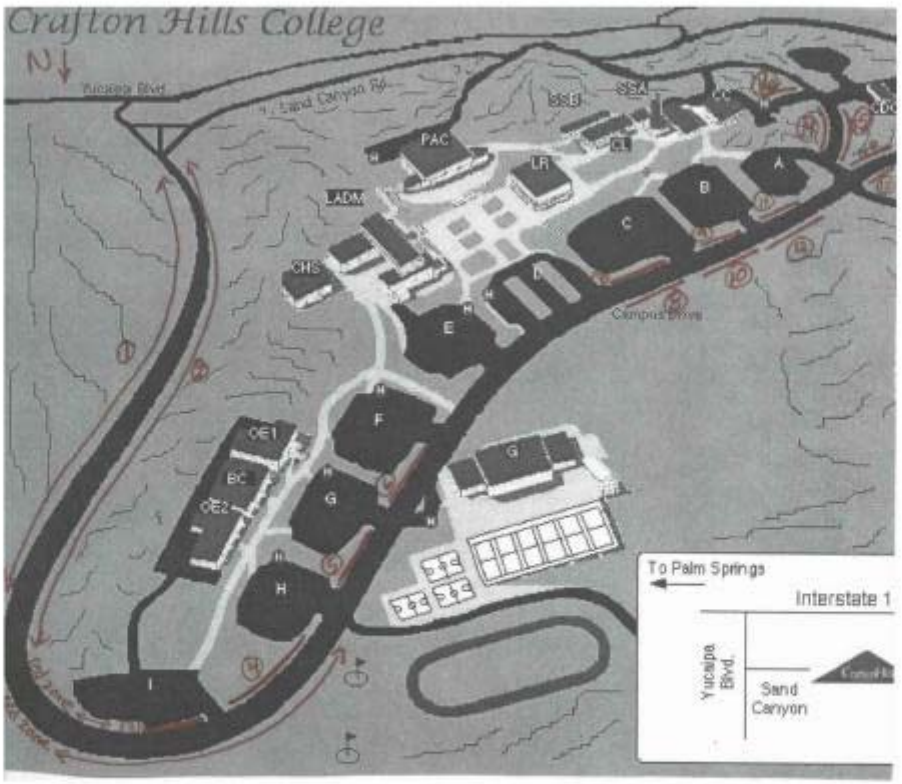


FIGURE 2
LOCATION OF PARKING UTILIZATION SURVEY

FIGURE 3
Parking Utilization for the Entire Campus

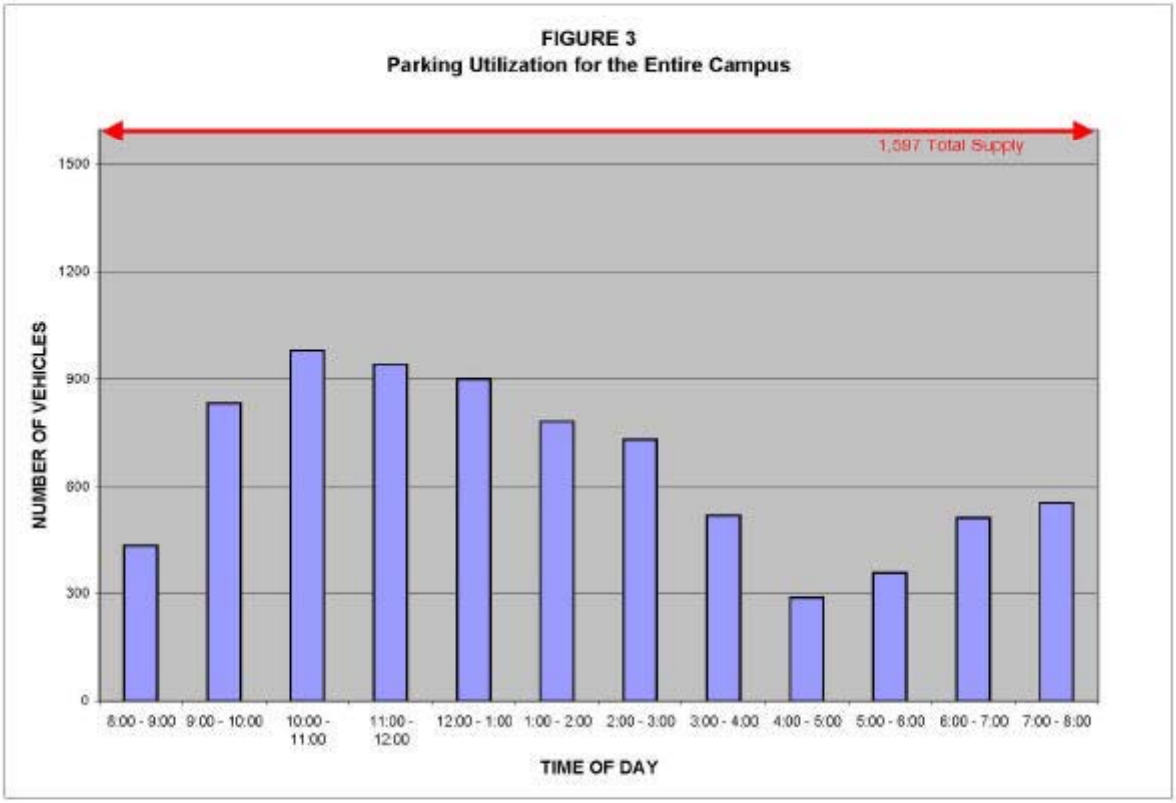
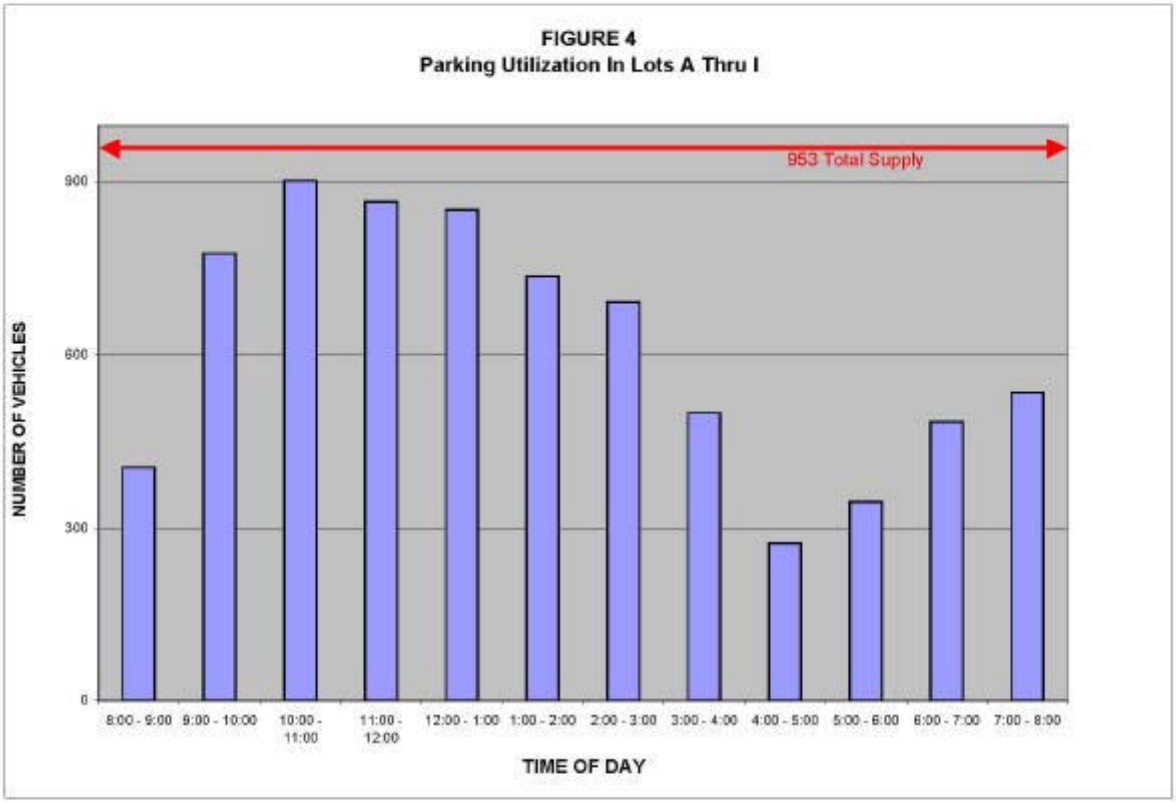


FIGURE 4
Parking Utilization In Lots A Thru I



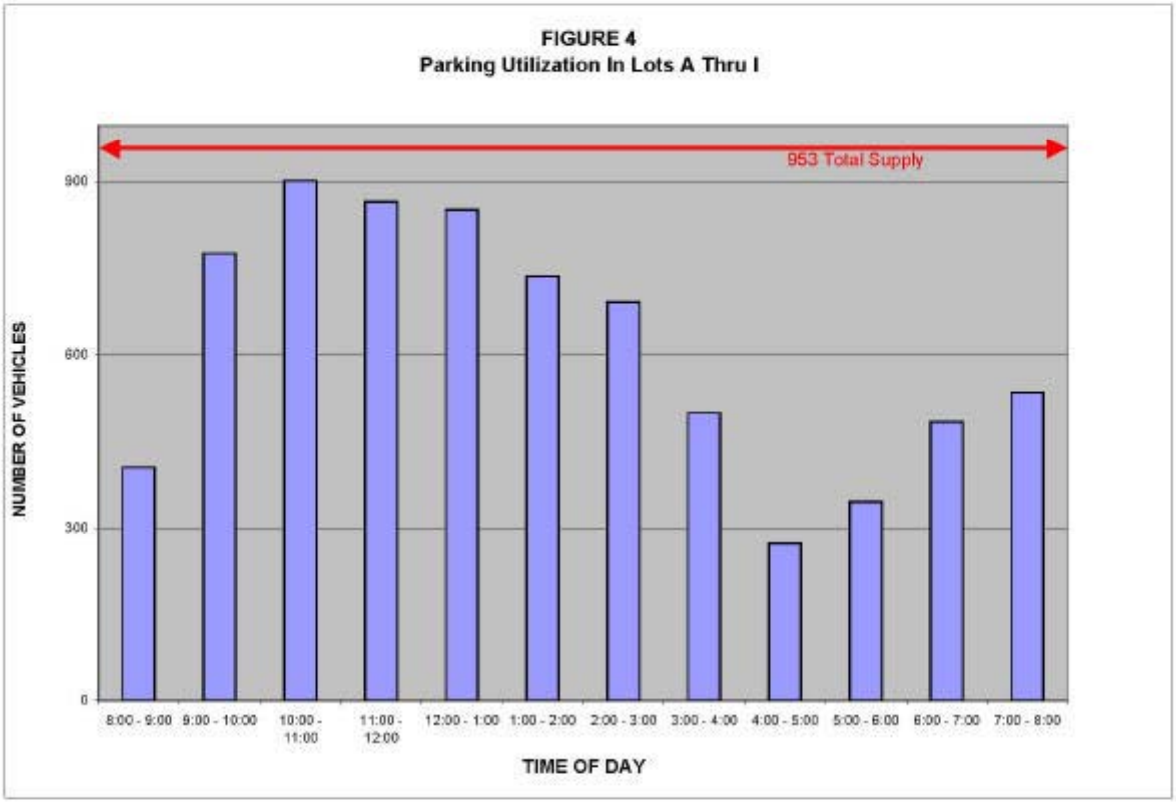
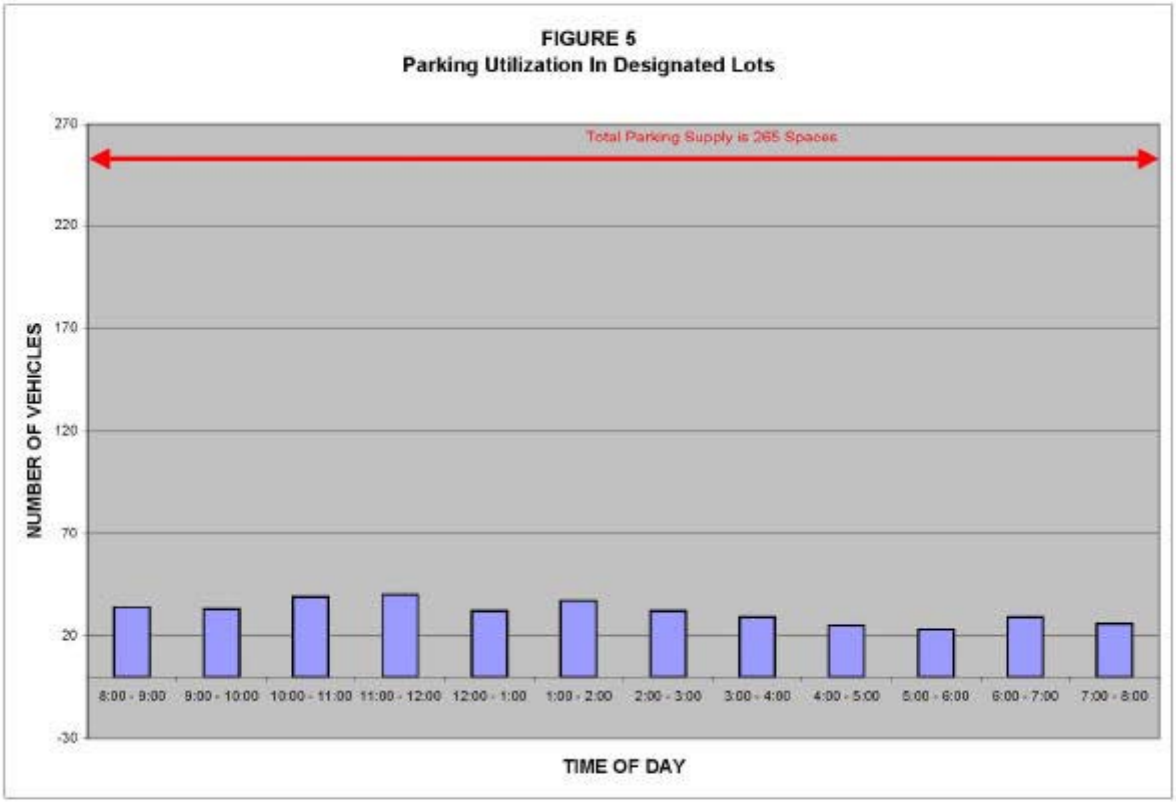


FIGURE 4
Parking Utilization In Lots A Thru I
953 Total Supply
900
600
300
0
NUMBER OF VEHICLES
8:00 - 9:00
9:00 - 10:00
10:00 - 11:00
11:00 - 12:00
12:00 - 1:00
1:00 - 2:00
2:00 - 3:00
3:00 - 4:00
4:00 - 5:00
5:00 - 6:00
6:00 - 7:00
7:00 - 8:00
TIME OF DAY

FIGURE 5
Parking Utilization In Designated Lots



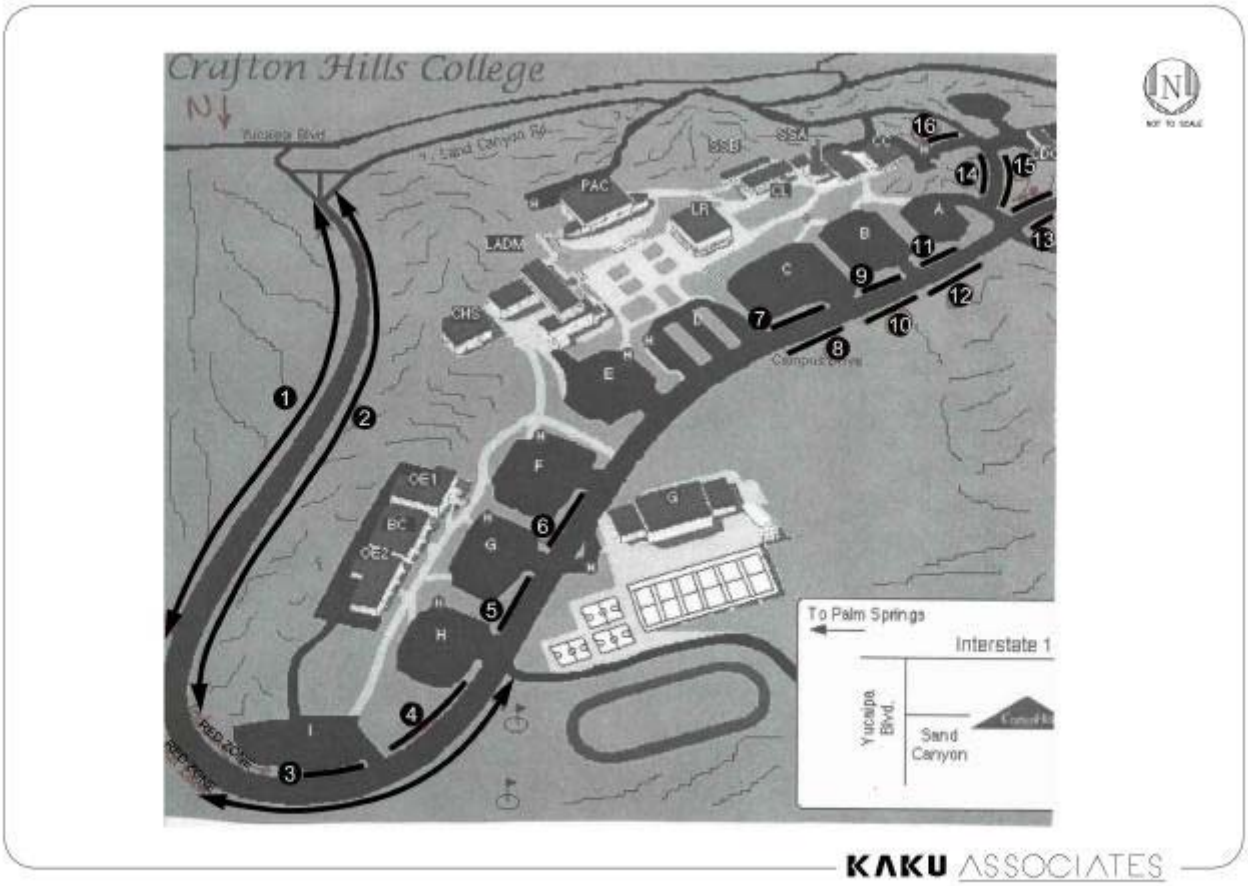


FIGURE 6
SEGMENTS OF ON-STREET PARKING SURVEY

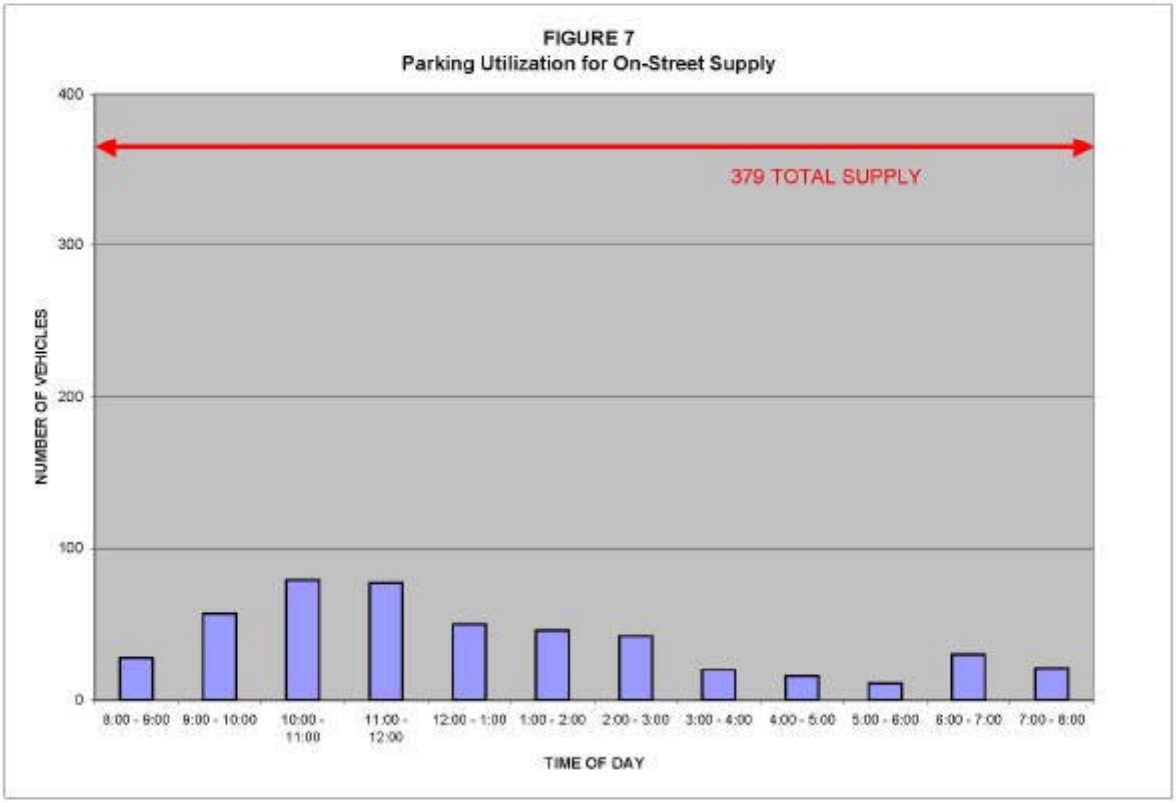


FIGURE 7
Parking Utilization for On-Street Supply
400
300
200
100
0
NUMBER OF VEHICLES
379 TOTAL SUPPLY
8:00 - 9:00
9:00 - 10:00
10:00 - 11:00
11:00 - 12:00
12:00 - 1:00
1:00 - 2:00
2:00 - 3:00
3:00 - 4:00
4:00 - 5:00
5:00 - 6:00
6:00 - 7:00
7:00 - 8:00
TIME OF DAY

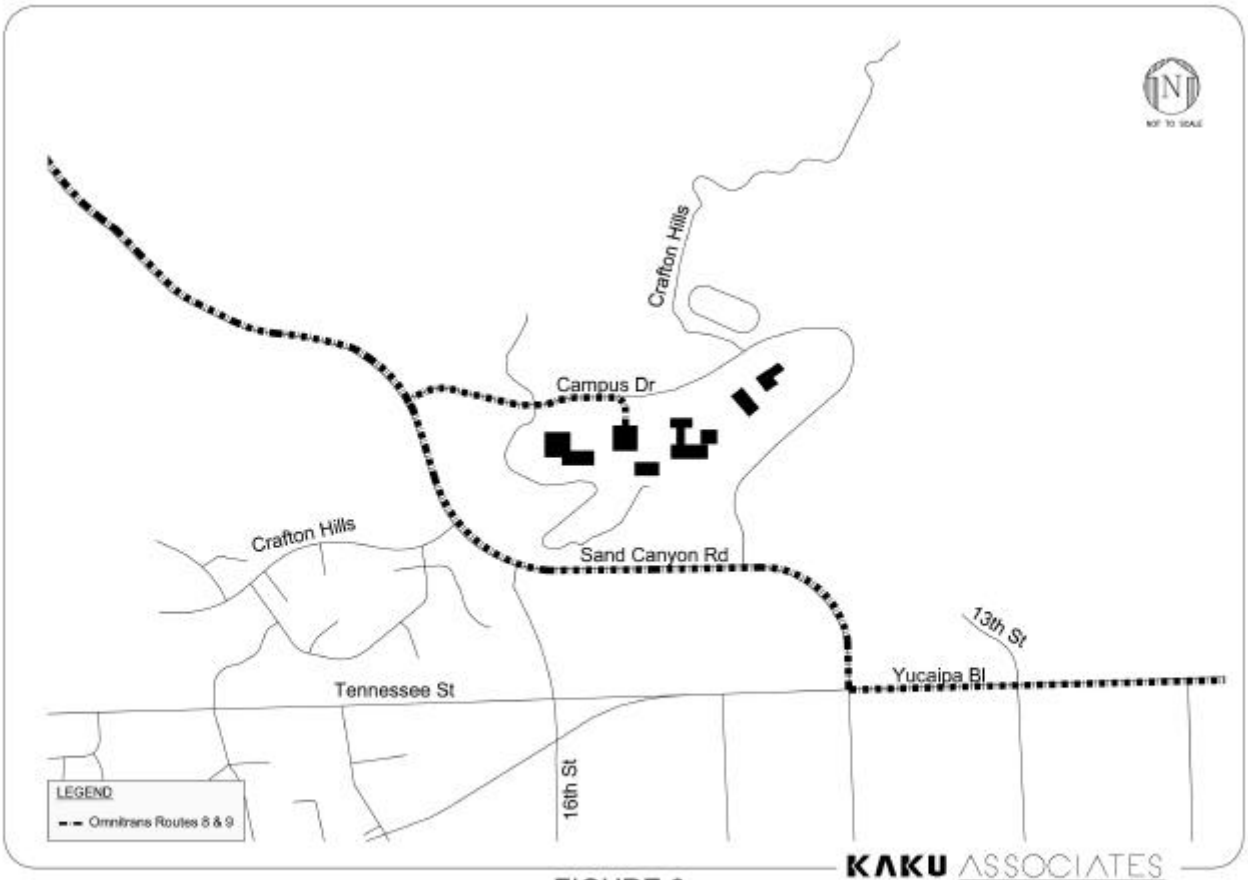


FIGURE 8
OMNITRANS SERVICES
BUS ROUTES TO CAMPUS

TABLE 1
CRAFTON HILLS COLLEGE MASTER PLAN
ENROLLMENT FOR ACADEMIC YEAR 2004

Category	Head Count [a]	FTE [b]
Students	5692	1811
Faculty	189	119*
Staff	120	114*
Total	6,001	2,044

[a] Source: Crafton Hills College Vice President Laurens K. Thurman

[b] Full Time Equivalent (FTE)

* 2003 data (latest available)

H | SECURITY

Introduction

The following report of security-oriented observations is made with the awareness that certain Campus upgrade projects and operational changes are either underway or in the planning stages, and certain surrounding community projects are in various stages of implementation. These are:

- The Siemens Physical Plant Upgrade Project, which includes some security and lighting enhancements.
- Contemplation of unifying the campus police forces, with the potential of the "head end", (communications or dispatch), being located at the Valley College campus.
- Based on two studies, potential of the campus population doubling within a few years.
- The introduction of a major residential housing development, just to the West of the Campus. This development may finalize at 3,500 + homes, plus the addition of homes and a new road, in the tract to the South.
- The possible introduction of a swimming pool to the campus, with involvement of local government agencies.
- The possibility of the introduction of a parking structure in the vicinity of the present "A" Lot parking area.

When appropriate, references to these project/s or potentials shall be made within the report, within the context of observations on existing security conditions.

It is also a presumption of this report section that the Campus has since its inception experienced a sense of isolation or "out of sight, out of mind", relating to much of the typical weekend and after hours crime and vandalism that plagues some community college campuses in the southern California region. With the projected growth, both in enrollment and the surroundings, this condition will surely change to one more in line with the "norm". At the same time, it is presumed that no one considers "security" to be the primary undertaking of the college. The thrust of this report is to highlight current conditions and practices that, if altered, implemented, or corrected, could enhance the existing security/police procedures or applications.

This report presents findings based upon observations of the current practices and conditions relative to the Campus Police force, control of access to Campus facilities, and the safety and security of staff, students, and visitors to the Campus. In the assessment leading to these findings, observations were made of the specific access points to buildings relative to the contents within and areas where cash is present. Attention was also paid to areas or zones where the potential for harm to befall individuals, either through a hazardous condition or the actions of an individual or group, existed. Attenuation of the observed potentials was considered in several ways, including the application of an electro-mechanical solution or an enhancement, alteration, or introduction of a procedure that could assist in mitigating the condition.

The electro-mechanical systems considered were: Access Control with badging capability; Closed Circuit Television (CCTV), digital with recording and network transmission capabilities; alarms, both exterior and interior; and exterior lighting and signaling.

Observations were also made of the Police Department operations, including Communications. In cases where observations suggested changes to the current operations, these are also noted. For simplicity, this report is broken down into system or operational sectors, as many of the conditions noted have a more Campus-wide perspective. Thus, there are comments relative to Access Control, CCTV, alarms, lighting, Police operations, and earthquake/emergency preparedness. Specific physical locations or facilities concerns are addressed within the relevant system or operational section.

SECURITY – ACCESS CONTROL

Figure 1 – Proximity Card Reader, (wireless), without keypad. Only addressed with a radio frequency interface card.

Figure 2 – Proximity Card Reader, with Keypad. Can be programmed to actuate through use of either or both.

Figure 3

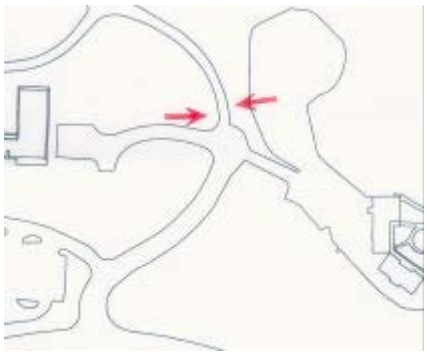


Figure 4

Current State:

- Two keyed systems are in use across the Campus: Sargent and Corbin-Russwin.
- Key control within these two applications is not reported as good, especially as relates to masters and sub-masters.
- Process underway of currently applying an initial, Software House, C-Cure 800, access control System to 36 specific doors
- Present application employs both proximity card readers and combination proximity card readers with numeric keypads, (see figures 1 and 2, on the left)...
    - Procedure of use of keypad portion of readers needs to be reviewed carefully. This type of application leads to system breaches, as there is no traceable "credential" in the hand of, keypad only, enabled users. Database maintenance will need to be effected on a constant and timely basis.
    - In the process of application of some of the electric strikes, used as the electro-mechanical locking device on some of the access controlled doors, the anti-pry plate has been removed and not reapplied, due apparently, to interference with the electric strike. With some of these doors it is appears possible to access the locking "bolts".
    - HVAC pressure differentials and door closer speeds and pressures need to be reviewed, campus wide, but especially for any doors involved with access control. At least one door has been noted as failing to secure with normal use, due to air pressure, (Communications, East door).
- Application of access control should be extended to all perimeter doors of the campus. Through such an application, door status can be assured without physical inspection, as currently required. This is one, in a group of, "force multipliers/levers" that, when applied, can avoid costly manpower additions.
- Consideration should be given to the application of card access controlled rolling or swinging gates to the maintenance/ Receiving/ Custodial Yard and the access road to the rear of the Performing Arts Center.
    - The "Maintenance Yard" gates are, once again, being left open between 1500 and 2300 hours, M-F, to facilitate custodial comings and goings, see figure 3.
    - The gates to the North access road are bent out of shape and currently un-securable. "Apparently locked" means are currently being employed through the use of a chain looped over the left upright; no locks involved, see figure 4.

SECURITY - ALARMS

Figure 1 – Four "cashier" windows in the Registration Office, from the outside.

Figure 2 –The same four windows from the inside...

Figure 3 –Lot "B" from opposite the SSA Building

Current State:

- Only one area uses alarms at the present time. This is the new Bookstore. There is a duress alarm for the cashier that reports to an offsite contract alarm company, who will call the SB Sheriff.
- There are several other locations on Campus, where cash exists, but none of them have alarms. Besides the main Business Office, in the Administration Building, there is the Student Cafeteria, the Office of Records and Registration in SSA, the Child Development Center, and Communications, where proceeds from parking are managed. (See further on cash, under Campus Police)
- At the Office of Records and Registration, there are four "cashier windows" which appear to be protected, from the outside. From the inside however, the cash stations are accessible as they are not walled in and the main door to the space is often left open.
    - The presence of the "cashier" windows is actually a negative from a security perspective, as it signals where the money is; it would be better if the stations inside were inaccessible, (see figures 1 and 2, to the left).
    - The balance of the Campus is directed to use the phone system for personal alarm needs. There are two problems with this approach, 1) if the need for an alarm is due to a personal confrontation, reaching for a phone might tend to worsen the situation; the use of a discreet duress button can often go unnoticed, and, 2) the phone method adds steps to the reporting process, and, given the limited response capability present on Campus, may delay the potential resolution. Consideration should be given to utilizing discreet duress alarms at all locations where cash is handled, in the counseling area, and in main administrative offices.
- There are currently no "panic" alarms or phones in the various parking lots. As several of these are remote from the Campus walkways and staff, both in distance and grade differential, the potential is high for situations to go unreported and/or responded to (see figure 3, to the left).
- Motion detection type alarms do not appear to be utilized anywhere on the campus. Consideration should be given to their use in some of the more remote areas of the campus, such as the CDC, the Maintenance/Receiving/Custodial Yard, the service road to the PAC, and in the Paramedic area where medications are stored. These alarms need to be direct to the Campus Police to allow rapid response.

SECURITY – CLOSED CIRCUIT TV

Figure 1 –Toward 03-Student Center / Cafeteria

Figure 2 –Westward, toward 02-Library.

Figure 3 – From South of 04-Student Services A toward Lot B.

Figure 4 –Westward, toward the 02-Library

Current Conditions

- The only Closed Circuit Television currently installed on the Campus is at the Child Development Center. This system is currently not operative. The system consists of four cameras, two in the front, one on the South side, and one in the rear watching the main play yard.
- The system is capable of operation; however, it is not currently hooked up at the campus data center in the Library.
- Neither of the cameras at the front of the building have the main driveway as a point of focus. Typically in abduction scenarios at childcare centers, it happens quickly and the child is taken from the site in a vehicle. In recovery of the child, the greatest assistance comes from a good vehicle description and license number. As currently configured, this system will not provide that information.
- Consideration should also be given to enhancing the system at the CDC in making selected images available to parents via the network.
- Part of the Siemens Project calls for eleven new cameras to be introduced. Of these, ten are slated to be interior cameras focused on specific points of interest; one will be a pan, tilt, and zoom exterior camera. It is with the exterior cameras that the greatest force multiplication could be realized. These allow "virtual patrols", thus cutting down on the time required for physical presence by the Police. Consideration should be given to covering the more remote locations, such as the 09-Maintenance/Receiving/Custodial Yard and the North access road, 08-The Performing Arts Center, the rear of the 06 & 07 OE Buildings, and 17-Book Store.
- CCTV, at its best, is a proactive force multiplier. The more usual role is as a visual deterrence and a research tool. However, if the images are fed to the front line protective force, they can become a means of leveraging the available work force and their response capability. The technology exists today to allow this to happen. Alarms and CCTV images can be fed to the Officers, either in their vehicle, or even while afoot.
- The Campus does suffer from expansive landscaping that is a hindrance to exterior CCTV coverage. (See figures 1-4)

SECURITY-STREETS AND PARKING LOTS

Figure 1 –.

Figure 2 –.

Figure 3 –

Figure 4 –

Existing Conditions

- As mentioned in the introduction, parking is at a premium on the Campus, especially during the daytime, at the beginning of each registration period. The crowding creates some marked hazard areas, where conflicts between vehicles and pedestrians are potentially high. Of special concern should be the five crosswalks of the main street. These are delineated, on the surface only, with yellow paint. During evening and night hours, this is easily overlooked, or at anytime, when "previewing" the parking lots for a potential slot.
- Consideration should be given to adding lighting to these crosswalk areas. The least expensive solution might be with solar powered light bollards. These could be placed on switches that would allow them to be activated when pedestrians desire to cross. In any case, extra lighting or signage should be applied to these crosswalks and to convergence areas in the parking lots that lead to Campus access stairs or walkways. see figures 1-3 as examples of typical crosswalks.
- In general, traffic speeds on and near the Campus tend toward the high end. There is little or no use of speed bumps, and physical evidence in the form of skid marks exists to prove that the basic speed limit of 25 mph is exceeded on many occasions.
- The traffic problems are only going to increase as the Campus expands and the surrounding community elements encroach. Measures should be undertaken to protect pedestrians and to gain control of speeds on the main road. The major signage at each entrance is not impacting vehicle usage sufficiently, no matter how imposing, see figure 4.
- The lighting on the parking lots is of a type (pressure sodium's) that is not conducive to CCTV coverage. The spectrum of these lights is not of a type to allow the highest quality of CCTV images.
- Lighting on the road up to the 09-Maintenance/ Receiving/Custodial Building is insufficient for the heavy usage it gets by Custodial staff during the evening hours. The same applies to the North service road to the rear of 08- the Performing Arts Center.

SECURITY – POLICE FORCE

Figure 1 – One of three Campus Police vehicles outside of the West end of 10-Gymnasium.

Figure 2 – Light on over Lecture Hall doors at 2:30 PM, on a Sunday.

Figure 3 – One example of a proven product, which performs the suggested procedures.

Existing Conditions

- The current coverage levels are one officer per shift. This is never a "good" situation as there is no redundancy.
- The existing force could be leveraged through the introduction of several of the aforementioned "systems" additions and enhancements. Consideration should also be given to the utilization of security officer level personnel to handle parking related matters.
- At present, the Police make cash pickups and deliveries. This is a function that could be returned to the staff from the areas that generate the potential deposits. In many cases, the amounts involved are minimal, and the use of a sworn officer in uniform only draws attention to the procedure. Of course, there are the coverage level and response time considerations to be made with the involvement of the Police in this function as well.
- The force needs to reinstate the proper level of training. As the Campus grows, their capabilities need to keep pace. Technology and computer training should be part of the on-going process. The ability to leverage the existing force through the application and utilization of technology depends on their capability to interface with same.
- Communications needs to be considered as a critical and permanent position. Permanent, trained staffing should be available to cover call-sicks, training, and special events. Currently, clerical staff from other areas are asked to cover the above, as an adjunct duty and sometimes on overtime, when there are shortages in manpower.
- The Police, being the one department that is on duty at all times, should be allowed to access and be trained in the operation of the lighting circuits across the Campus. There are numerous occasions where savings could be realized if they were able to access the switching, and the time may arise when they might need to turn on circuits, (see figure 2, to the left).
- Currently, reports by the Police Force are generated and compiled by hand. Consideration should be given to obtaining and utilizing one of the available software programs that cover much of this process and automatically produce both the required and desired reports, (see figure 3, on the left).
- The role of the force would be greatly aided if there were some extensions to when staff would be on-site, for example after 11 PM and on weekend nights. Currently, the potential for doors ajar and related problems exists at all times. This detracts from patrol for trespassers, etc., which is increasing with the growth of the Campus and its surroundings.

SECURITY – EMERGENCY MANAGEMENT

Current Conditions

- At present, the Campus is planned as a Regional Evacuation Center by the County Sheriff and Fire Departments for major disasters such as earthquakes. This designation will only solidify and expand, as the build out of the surrounding communities transpires. The major drivers in this designation are the athletic field, which provides a superior helicopter landing area, and the surrounding "golf course", which provides ample area for a sizable "tent city".
- When such an eventuality transpires, it is incumbent that the Campus Police have already established the intimate knowledge of the expectations of the planning. This awareness comes from constant contact with the agencies mentioned and the participation in some of the same training and drills that they undergo. At present, this interface is lacking.
- A simple example of the above: The Sheriff's Department has requested that they would like to have floor plans of all the structures on the site and area plans of the Campus on file, for preparedness in the event of an incident. The Police do not have access to such plans. It would also be advantageous for copies to be available in their vehicles, which is where they would need to be for the most rapid employment. This need for plans applies to any situation that calls for a response, especially if it were SWAT related, not just earthquake.
- There is a tremendous resource on campus in the Fire and Paramedic Programs. Program Staff should be involved in upgrading the Campus' preparedness and in interfacing with the Police Force in emergencies. Training courses such as Earthquake Management, as offered by: The California Specialized Training Institute, (CSTI), in San Luis Obispo area should be undertaken. This is a State run offering and the costs are minimal for governmental employees. The knowledge and contacts derived are well worth the time and expenditure, and it would put the Police Force on a par with other local responders.
- Evidence of Campus preparedness such as water, medical supplies, waste, body preservation, and food stores were not observed. The amounts available in the cafeteria and the Fire/Paramedic programs may not meet the needs. Given a loss of power, consideration needs to be given to self-generation. The Campus may need to maintain the majority of those present at the time for an extended period.
- The CDC should be given special consideration.
- No evidence of earthquake gas shutoff valves was observed. This may render certain areas and/or buildings as "part of the problem", and not, at least, a neutral element

SECURITY - CONCLUSION

As mentioned in the Introduction, the College Campus has enjoyed a long period of low level security requirements. The evidence, both in projection reports and local observation, of new roads and civil engineering flags, leads to the conclusion that this period is rapidly coming to an end. One only need visit the upper water tank and observe the fresh graffiti for proof. Meeting the demands of a safe educational environment that will not present the District with an unacceptable level of liability dictates that change in equipment, methods, and procedures are undertaken in the security arena. Rather than throw additional work forces at the problems as they arise, it is our recommendations that the judicious application of security technology and the re-thinking on the uses of the existing Police Force be undertaken. There is still time to re-align the existing security systems and Police Force to be able to cope with the changes before they are overwhelmed. The ability to meet future demands without creating a disproportionate financial drain to the primary role of the College resides in introducing leveraging and force multiplying systems elements and procedures, so that they are in place well before the capabilities are required.

I | SITE SIGNAGE

SITE

Figure A – Project entry monument.

Figure B – Project monument at center of campus.

Figure C – Parking lot identification sign.

Vehicular Wayfinding

Campus Drive serves as the only campus access and enters off Sand Canyon Road. There are two entrances into the campus serving as a South and West entry onto this connector road.

Project monument signs are located at each entrance providing a sense of arrival onto the campus (see figure A). There is an additional monument located at the central quad, parking lot D, visitor's entrance and parking (see figure B).

A series of parking lots along Campus Drive provide direct, front door access to specific buildings/departments within the campus. These lots are identified by parking lot identification signs that list those buildings/departments served by each lot (see figure C). These signs currently provide the only means of wayfinding along Campus Drive but require the motorist to scan each sign for their destination. A clear directional sign system identifying up coming destinations is missing. Visitors and new students are not provided with directions to visitor parking, admissions or administration. Deliveries are not addressed nor are accessible parking lots.

The existing lot identification signs have no illumination for evening visibility. Existing graphics contain parking restrictions that appear larger and more important than the lot and building/department identification.

Recommendations:

Provide a vehicular directional wayfinding system along Campus Drive that identifies a list of buildings/departments and visitor information along with directional arrows to direct motorists and provide destinations that lie ahead. This system should be designed with flexibility in mind allowing for future expansion and modifications. Internal or external illumination should be incorporated. If additional ambient lighting along road and lots are provided, signs could be non-illuminated with reflective copy.

Provide in combination with matching parking lot identification signs increasing legibility of lot I.D. letter and building/department copy. Reduce size of permit information and provide lighting as stated above.

SITE

Figure D – Freestanding building identification sign.

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Figure E – Wall mounted building identification.

Pedestrian Wayfinding

Parking lots serve as pedestrian entrances into building clusters and onto primary/secondary walkways. From this point there are no wayfinding signs to provide directionals to buildings and/or departments. There are no directory maps to provide an overview campus plan with buildings/departments identified.

Buildings are identified by a freestanding illuminated concrete building identification sign (see figure D) and/or non-illuminated building mounted wood sign panels (see figure E). Buildings have multiple entrances that can be accessed from both primary and secondary pedestrian paths yet they lack identification of the building's name and/or departments within. Most classrooms have exterior entrances with no interior hallways and lack building identification at their door.

Building mounted signs are limited to one entrance only and have limited visibility because multiple approaches and doors are used. These signs have no evening illumination and do not enhance the architecture.

There are a few freestanding signs but not enough to provide a system of identification, and their quantity, scale, location and color render them invisible. The scale of the sign panel limits the size and content of the graphic to properly identify the building names and departments. Their size is overpowered by the landscaping and architecture. The concrete fabrication provides no visible contrast against the architecture.

Recommendations:

Identify the primary walkway with a series of wayfinding directionals providing directional arrows addressing specific buildings/departments along the walkway. This system should be designed with flexibility in mind allowing for future expansion and modifications. Ambient lighting should be sufficient.

Visible from this walkway, provide freestanding building identification signs that list departments within. These signs should have scale, color and internal illumination. Multiple locations may be necessary.

SITE

Provide building mounted wall signs that can be installed at all entry points to building/department and visible from all approaches. Utilize an architectural contrasting material and color to add visibility. Exterior or ambient lighting should be sufficient.

Provide freestanding illuminated directory maps/kiosks at central quad and at other key points for use by visitors and new students. Map would show campus plan and identify building names and departments.

SITE SIGNAGE

Figure 1 – View of project entry monument. Typical for both campus entries.

Figure 2 – View of project monument at center of campus.

Figure 3 – View of project entry restrictions sign. Typical for both campus entries.

Figure 4 – View of accessible parking entry sign. Typical at all parking lot entrances.

Project Monuments (see figures 1 & 2)

Existing signs are showing signs of decay. Concrete is cracking and concrete color stain is fading. Letter finish is faded. Illumination is inadequate to light entire sign element. Landscaping is incomplete or is in need of maintenance.

Option A Recommendation:

Refinish and repair concrete structure. Refinish existing letters and provide higher degree of contrast to the background. Replace illumination with continuous lighting mounted at base and concealed within landscaping. Provide, replace or repair landscaping.

Option B Recommendation:

Replace existing signage with new monuments, lighting and landscaping.

Project Entry Restrictions (see figure 3)

Existing signage is scaled too large and multiple sign messages are redundant.

Recommendation:

Replace existing signage with clear and concise graphics and message. Sign should be reduced in scale and can incorporate accessible parking entry sign message (see figure 4). The accessible parking code information is only required at the two entry points of the campus and is not required at each parking lot entrance.

SITE SIGNAGE

Figure 5 – View of typical parking lot identification sign.

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Figure 6 – View of parking lot "A" identification sign with added directional sign.

Figure 7 – View of temporary parking lot sign.

Figure 8 – View of typical parking permit information.

Parking Lot Identification (see figure 5)

Existing signs lack design sensibility. Permit information is larger than lot and building identification and takes away from wayfinding message.

Figure 6: Multiple signs appear at the same location with different messages. One sign is parking lot identification and the other is a building and lot directional sign.

Figure 7: Temporary lot sign does not match other signage.

Figure 8: Multiple parking permit information signs appear throughout the lot although the same message appears on the parking lot identification sign at the entrance.

Recommendation:

Replace existing signage with new signage system. Lot identification and building identification graphics should be the most important message. Minimize the size of the parking permit information or remove it to another sign. Include additional directional information within the same sign.

SITE SIGNAGE

Figure 9 – View of typical accessible parking stall sign.

Figure 10 – View of typical staff parking sign.

Figure 11 – View of reserved parking stall sign.

Figure 12 – View of visitor parking stall sign.

Pole Mounted Regulatory Signs (see figures 9 - 12)

Existing signs lack design sensibility and continuity of color and graphics. Some sign poles have been bent from cars hitting them.

Recommendation:

Replace all regulatory signs with new signage system of matching color, graphics and design. Provide wheel stops at end of stalls to eliminate bent poles.

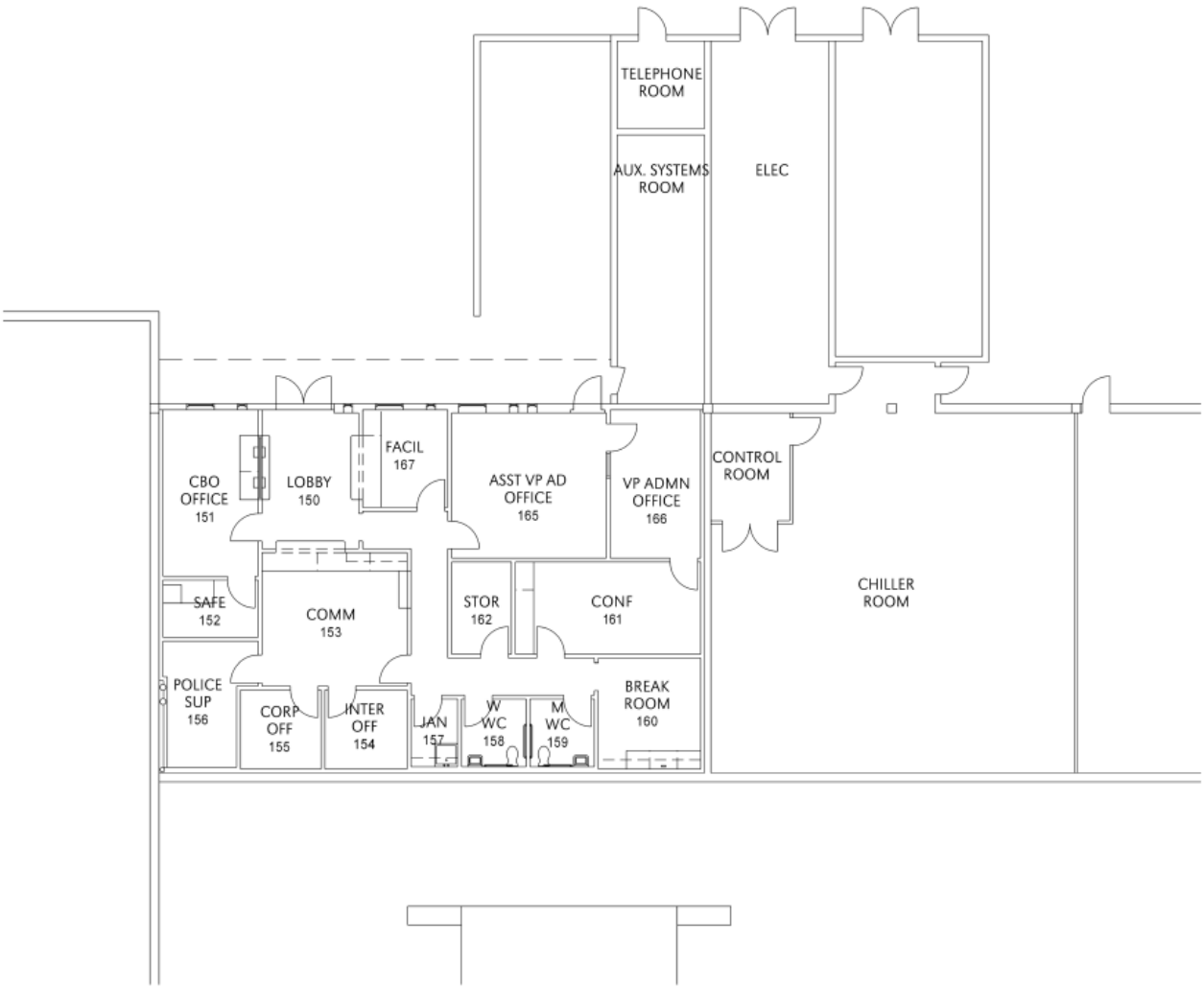
1 | LABORATORY/ ADMINISTRATION

01 LABORATORY/ ADMINISTRATION

SQUARE FOOTAGE:

	ASF	GSF
FIRST LEVEL	9,205	16,915
SECOND LEVEL	11,050	15,255
THIRD LEVEL	3,665	6,035
TOTAL	23,920	38,205

01 LABORATORY/ ADMINISTRATION



FIRST LEVEL - NORTH

1" = 20'

Two code-compliant exits required

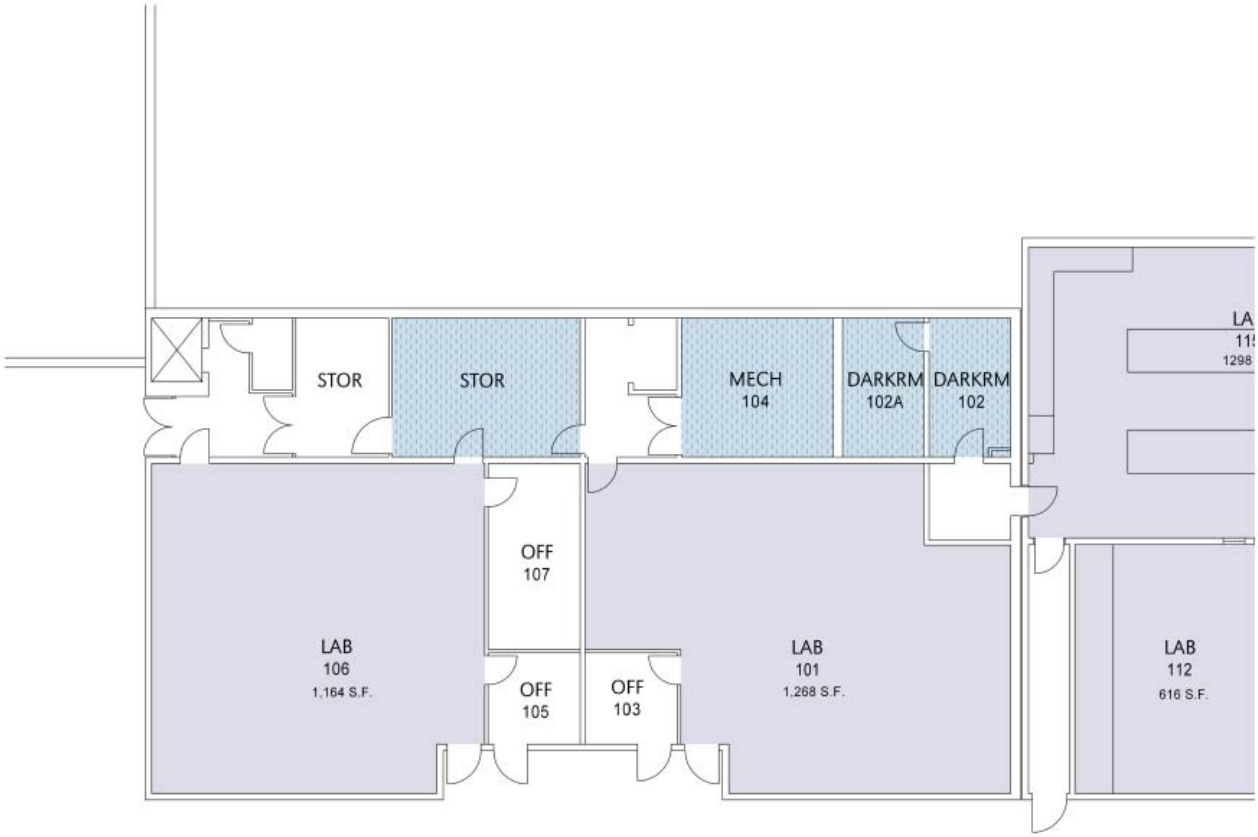
Inaccessible area (non-ADA)

Sprinklered area

More than one intervening room to exit

Non-compliant exit route

01 LABORATORY/ ADMINISTRATION



FIRST LEVEL - SOUTH (1 of 2)

1" = 20'

Two code-compliant exits required

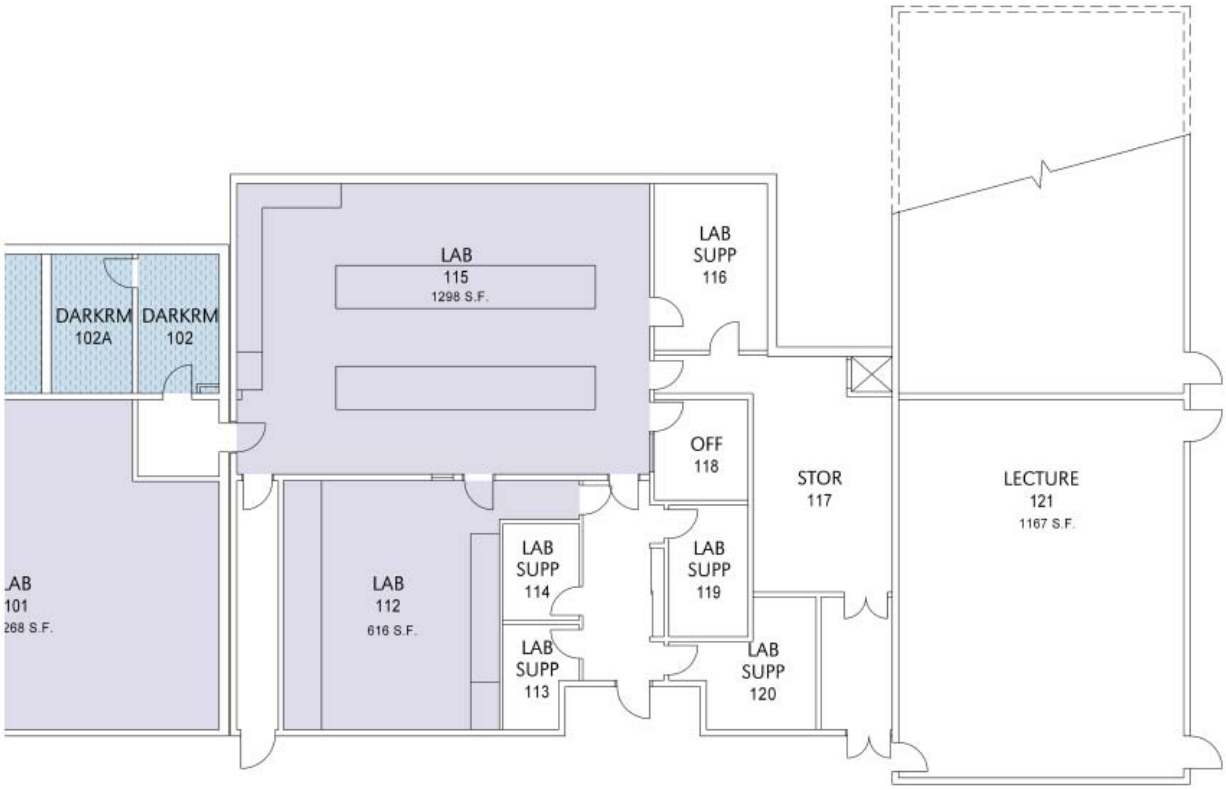
Inaccessible area (non-ADA)

Sprinklered area

More than one intervening room to exit

Non-compliant exit route

01 LABORATORY/ ADMINISTRATION



FIRST LEVEL - SOUTH (2 of 2)

1" = 20'

Two code-compliant exits required

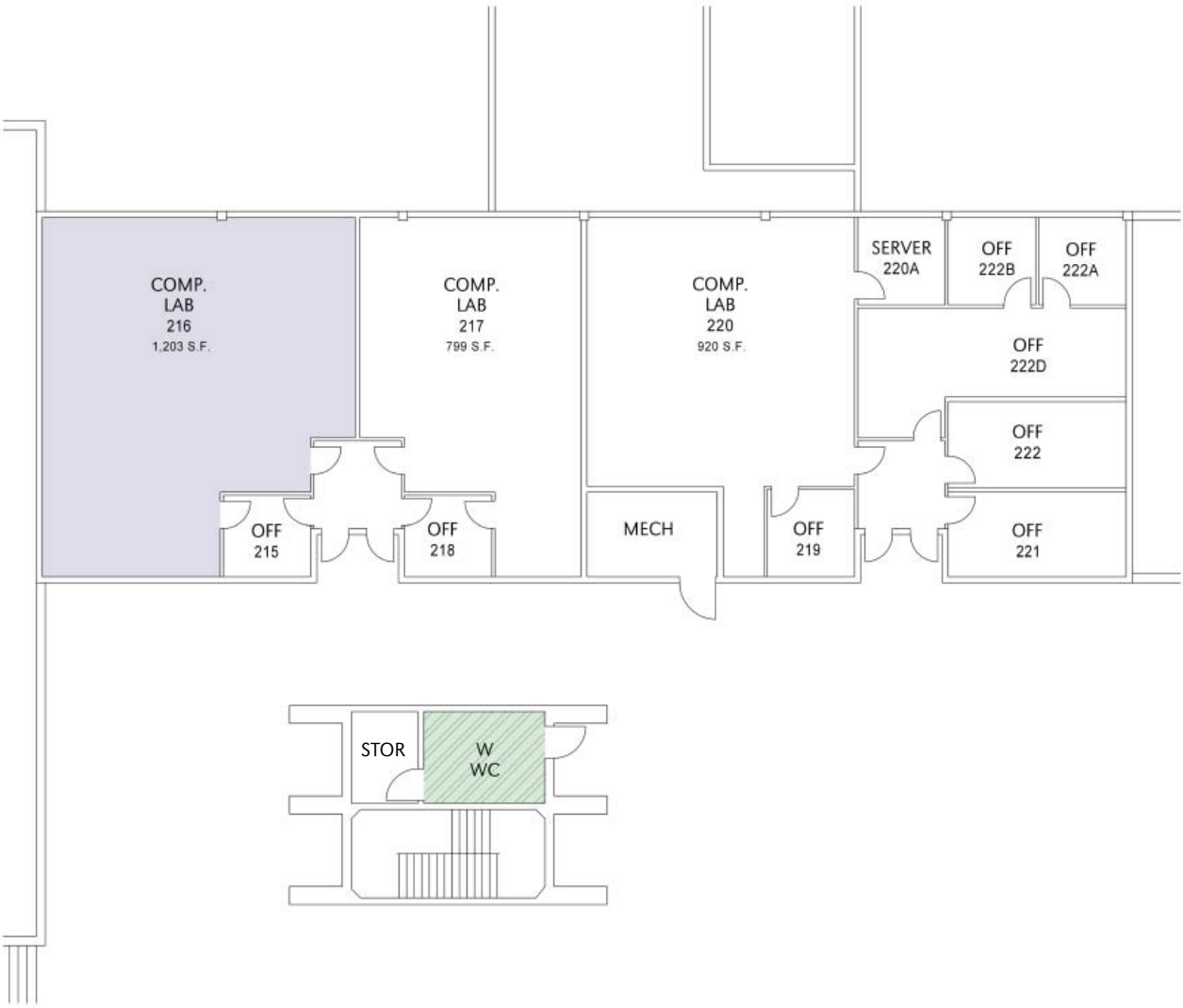
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

01 LABORATORY/ ADMINISTRATION



SECOND LEVEL - NORTH

1" = 20'

Two code-compliant exits required

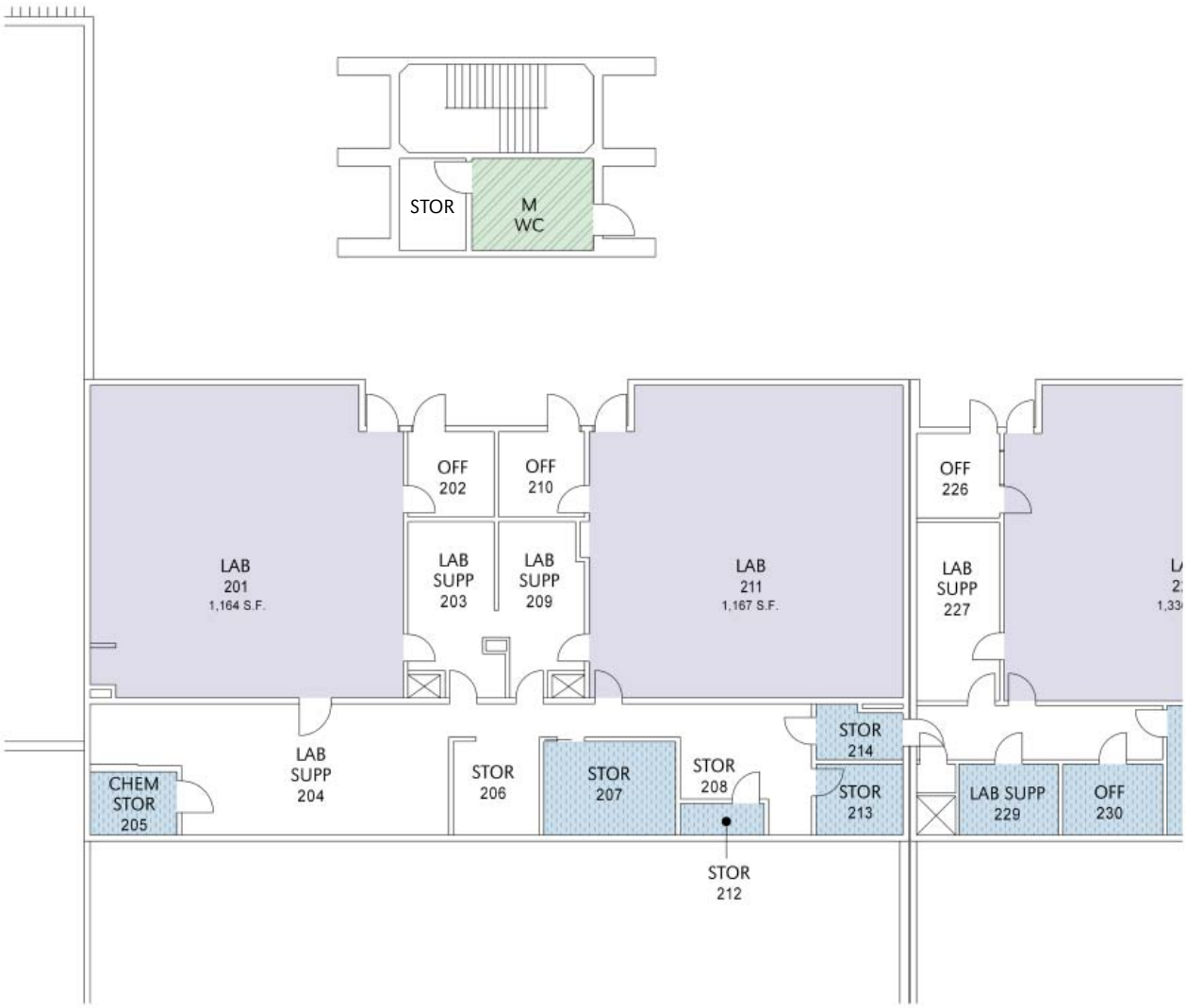
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

01 LABORATORY/ ADMINISTRATION



SECOND LEVEL - SOUTH (1 of 2)

1" = 20'

Two code-compliant exits required

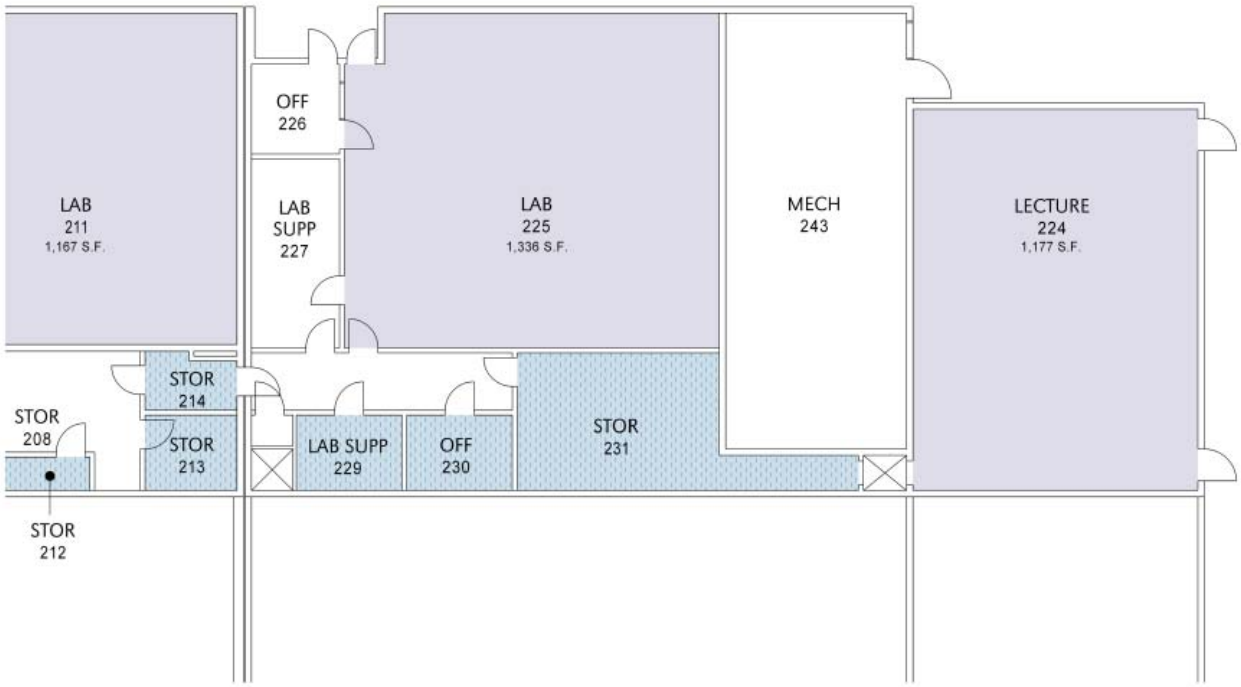
Inaccessible area (non-ADA)

Sprinklered area

More than one intervening room to exit

Non-compliant exit route

01 LABORATORY/ ADMINISTRATION



SECOND LEVEL - SOUTH (2 of 2)

1" = 20'

Two code-compliant exits required

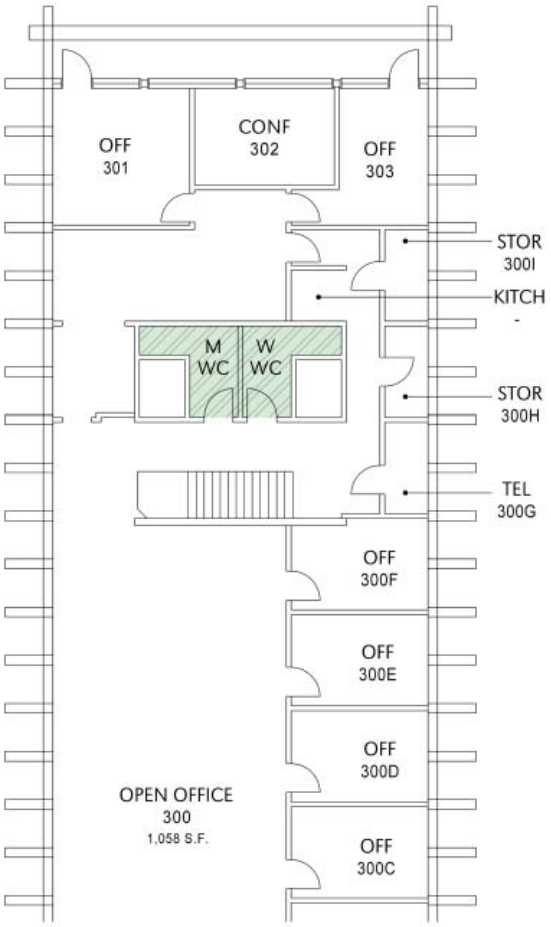
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

01 LABORATORY/ ADMINISTRATION



THIRD LEVEL (1 of 2)

1" = 20'

Two code-compliant exits required

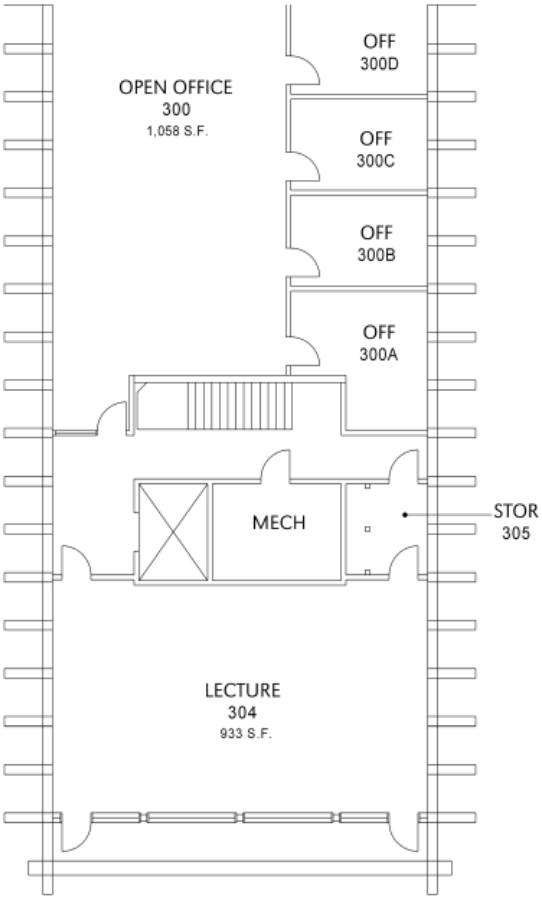
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

01 LABORATORY/ ADMINISTRATION



THIRD LEVEL (2 of 2)

1" = 20'

Two code-compliant exits required

More than one intervening room to exit

Inaccessible area (non-ADA)

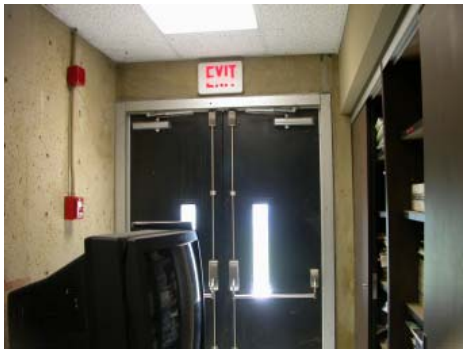
Non-compliant exit route

Sprinklered area

01 LABORATORY/ ADMINISTRATION

Lab 201 - Non-compliant seating and fixtures.

Lab 225 - Non-compliant seating and fixtures; low light levels.



Exit corridor - Exit passage blocked due to storage items.

Storage room - Temporary partitions have been installed that render room inaccessible.

Fire & Life Safety

- No fire sprinklers or smoke detectors.
- Lack of fire rated doors and/or doors with UL rating have been painted over.
- Illuminated exit signs missing from some areas.
- Electrical panels are not located in closets.
- Exposed electrical and data conduit throughout
- Exit passages are used as storage areas.
- No GFCI outlets throughout.

ADA

- Lack of compliant workstations in labs.
- Lack of compliant door hardware throughout.
- Pocket doors need to be replaced with compliant doors.
- Lack of compliant fixtures at lab sinks and workstations.
- Thresholds at doors need to be replaced.
- Non-compliant toilet rooms and fixtures.
- Non-compliant handrails and handrail extensions.
- Contrast warning stripes must be added to treads at stairs.
- Non-compliant drinking fountains.
- Non-compliant pay phones.
- Lecture halls lack accessible seating.

01 LABORATORY/ ADMINISTRATION

Water damaged ceiling

Inadequate ventilation - Office converted for use as server room. Existing systems cannot handle heat load.

Lecture hall seating - Many seats and tablet arms in the lecture halls are damaged.

Roof at first level south – Clogged drains, blistering and ponding are common problems.

Maintenance

- Prevalent water damage to ceilings and walls at first level.
- Acoustic and glue-on ceiling tiles need to be replaced due to water damage and/or loss of adhesive.
- Flooring (carpet, linoleum, VCT) needs to be replaced due to stains, gouges, or wear.
- New paint needed at gyp board walls.
- Light levels in labs and lecture halls are insufficient.
- Replace diffuser grills.
- Replace wall base throughout.
- Closers at some doors are broken or do not work due to interior air pressure.
- Existing roofs are a built-up roofing system.
- Roofs show signs of water ponding.
- Roof and overflow drains are filled with debris.
- The strainer is missing from many of the drains, causing drains to become clogged
- Patched roof areas are
- Severe blistering throughout the roof, blisters as high as 2-3 inches.
- Blisters in some areas have started to crack, creating areas for potential leaks.
- At some areas of the roof perimeter the flexible flashing has started to delaminate.
- Due to large trees overhanging the roofs, a significant amount of leaves have collected on the roof thus preventing water from flowing smoothly and clogging drains.
- Roof hatches do not meet current standards, difficult to open & close
- At the Admin bridge roof, the flashing at roof top equipment is cracked and delaminating.

01 LABORATORY/ ADMINISTRATION

Building Description

Site and Building Configuration

The Laboratory/Administration site consists of 4 separate structures. The north laboratory/equipment structure, the center administration structure, the south laboratory area, and the southeast laboratory/lecture hall structure. The site slopes down in the north direction at the north structure and slopes down in the south direction at the south and southeast structures. The north, center, and south structures were constructed in 1970 and the southeast structure was constructed in 1977. The total square footage for the structures is 30,621.The north structure is two stories high with the second floor approximately 15 feet high and the roof approximately 28 feet high. The center structure is two stories high with the second floor approximately 19 feet high and the roof approximately 34 feet high. The south structure is two stories high at its center with the second floor approximately 15 feet high and the roof approximately 28 feet high. The north 35 feet and the south 35 feet of this structure is one story high. The southeast structure has lecture halls on its east side, which slope down to the south. The roof of the south lecture room is approximately at the height of the north lecture room floor. The height of the low roof is approximately 15 feet and the high roof is approximately 15 feet above the low roof.

Structural System

Structural plans were available for this building. The primary roof and floor gravity system for the north, center, and south structures consists of concrete decks spanning to concrete beams or concrete walls. The primary roof gravity system for the south east structure consists of plywood spanning to 2 x rafters spanning to steel beams or wood ledgers bolted to concrete walls. The primary elevated floor gravity system for the southeast structure consists of concrete decks spanning to concrete beams or concrete walls. The foundation system consists of a combination of spread footings and continuous footings. Evidence of settlement was not observed. The primary lateral system for the north, center, and south structures consists of concrete diaphragms spanning to exterior and interior concrete walls.

The primary roof lateral system for the southeast structure consists of plywood sheathing diaphragms spanning to exterior and interior concrete walls. The primary floor lateral system for the southeast structure consists of concrete diaphragms spanning to exterior and interior concrete walls.

01 LABORATORY/ ADMINISTRATION

Overall Seismic Deficiencies and Expected Seismic Performance

The north, south and southeast structures have well distributed lateral load resisting concrete walls. However, for the southeast structure only, the connection of the concrete walls to the plywood diaphragm appears to be inadequate. ESI recommends analysis and strengthening of the wall to roof diaphragm connections and adding crossties for the full width of the building to a standard similar to Los Angeles City Division 91. An example of wall to roof ties is shown in figures 1, and 2, and an example of cross ties are shown in figure 3. Ties are shown for budgeting purposes only and will be revised base on future analysis. Also, for the center structure only, the north south lateral load resisting walls appear to be inadequate at both the first and second level. ESI recommends analysis of the lateral load resisting concrete walls to determine if they possess adequate strength to resist seismic loads. Included is figure 4, which shows the location of the proposed two story walls. The length and location is shown for budgeting purposes only and will be revised based on future analysis. In a seismic event the windows and non-bearing gypboard walls would probably suffer typical damage in the form of broken glass and cracked gypboard walls. The ceiling would probably suffer typical damage in the form of cracked and displaced tiles.

01 LABORATORY/ ADMINISTRATION

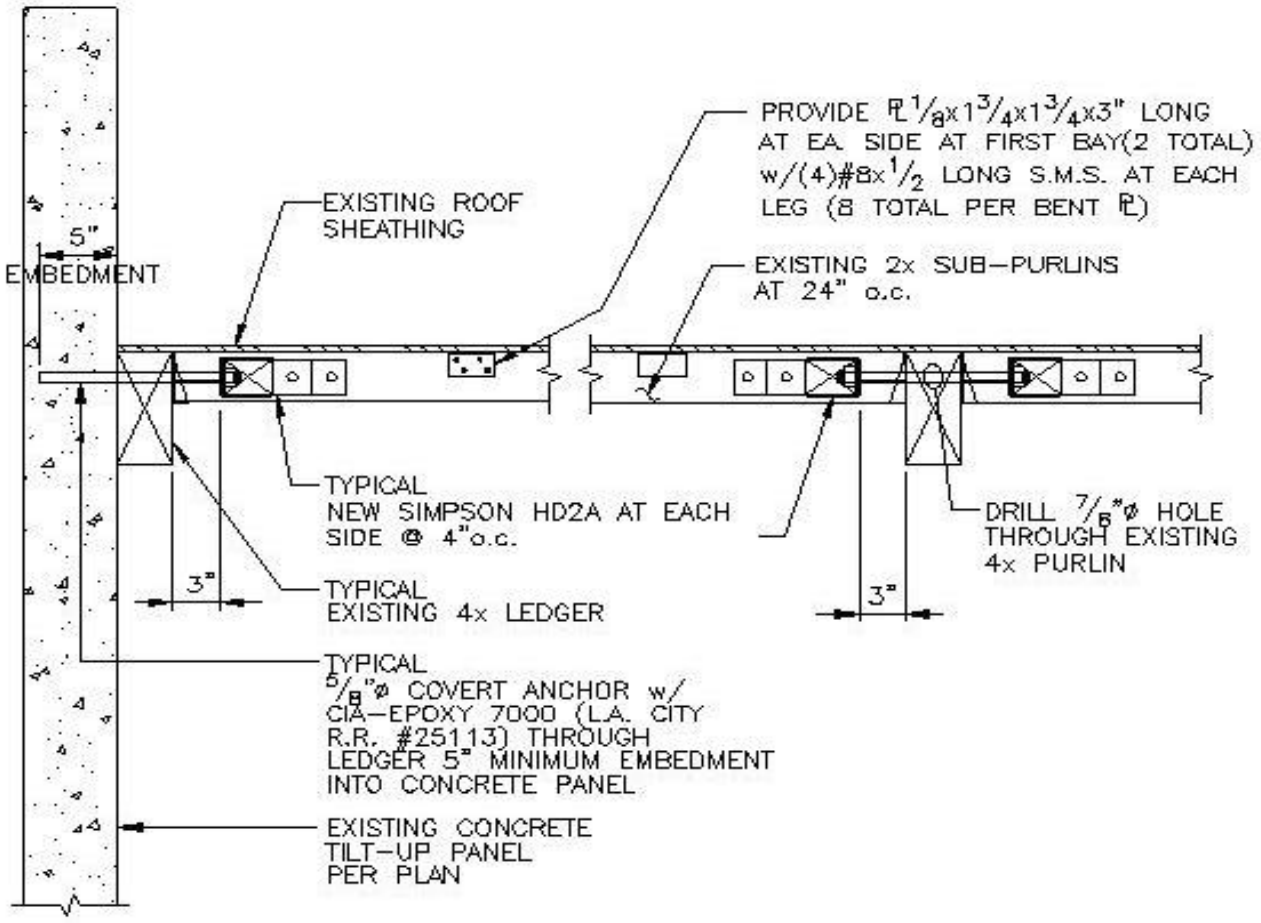


FIGURE 1. TYPICAL SUB-PURLIN TO EXISTING CONCRETE CONNECTION DETAIL

01 LABORATORY/ ADMINISTRATION

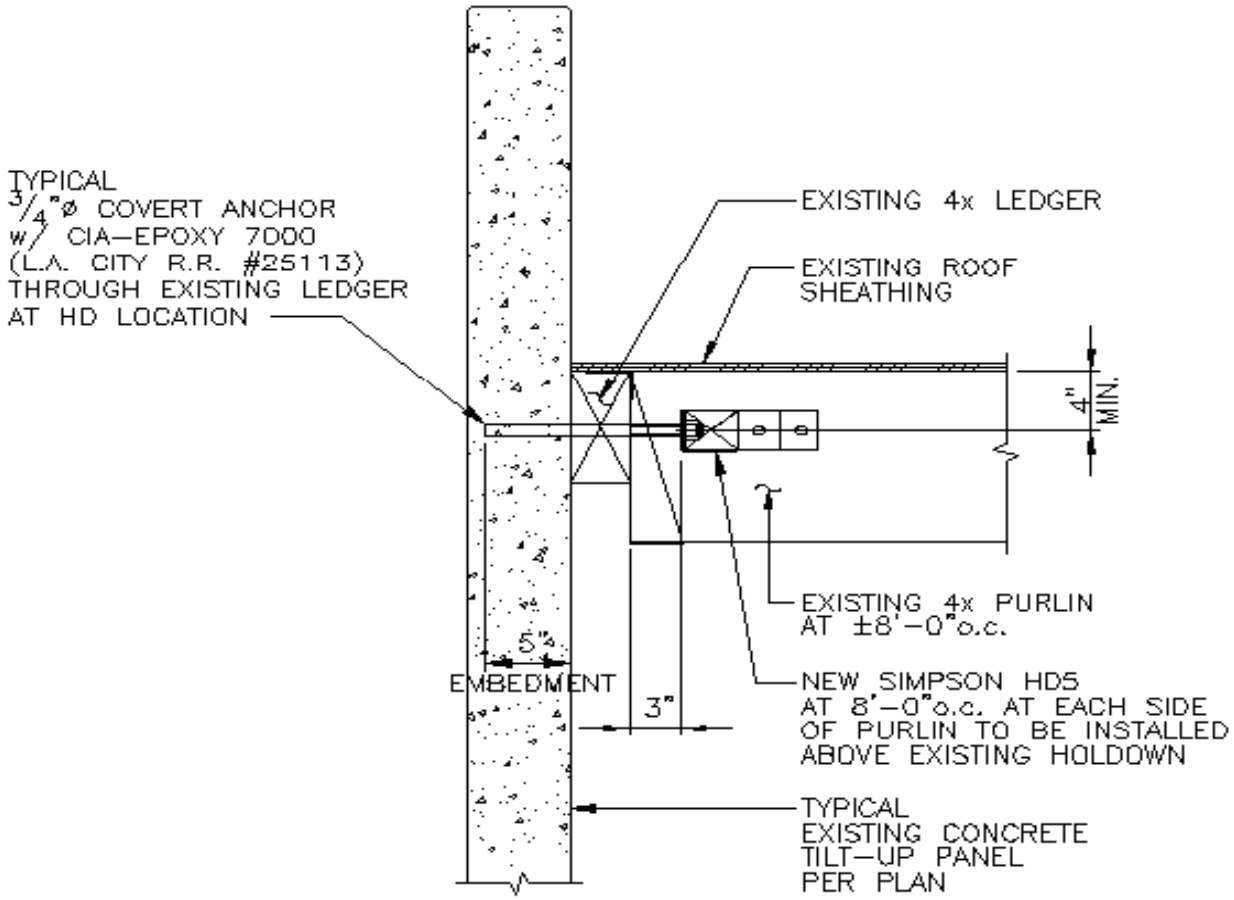


FIGURE 2. TYPICAL PURLIN TO EXISTING CONCRETE CONNECTION DETAIL

01 LABORATORY/ ADMINISTRATION

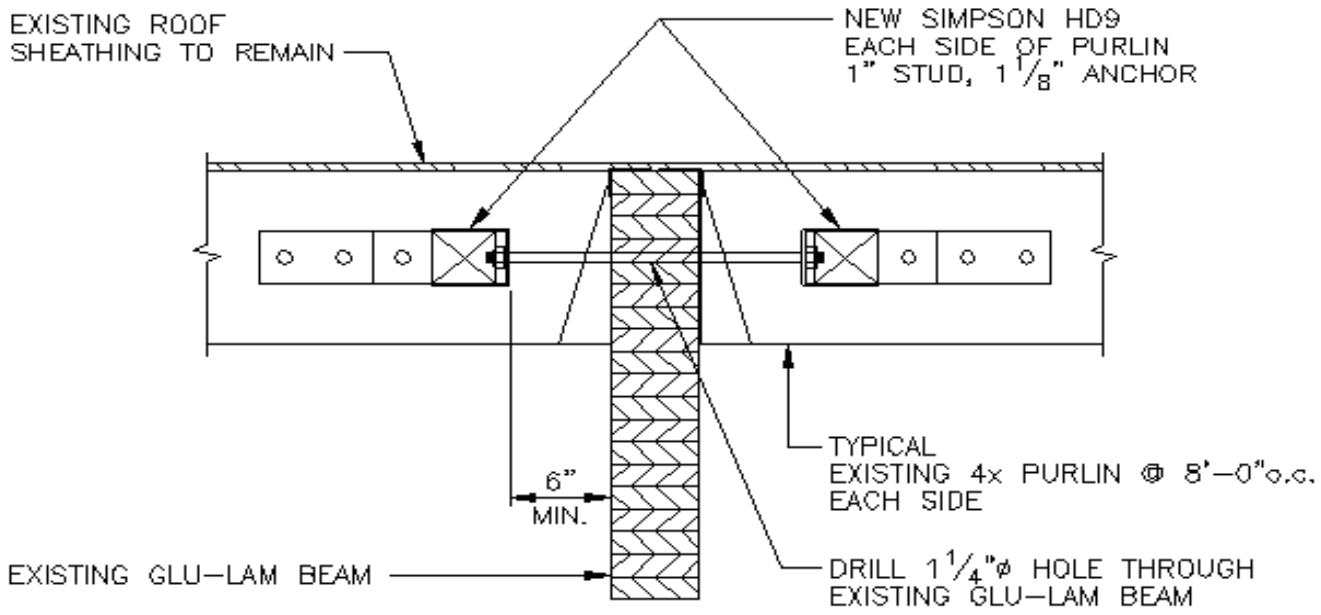


FIGURE 3. TYPICAL CROSS TIE PURLIN TO GLULAM BEAM CONNECTION DETAIL

01 LABORATORY/ ADMINISTRATION

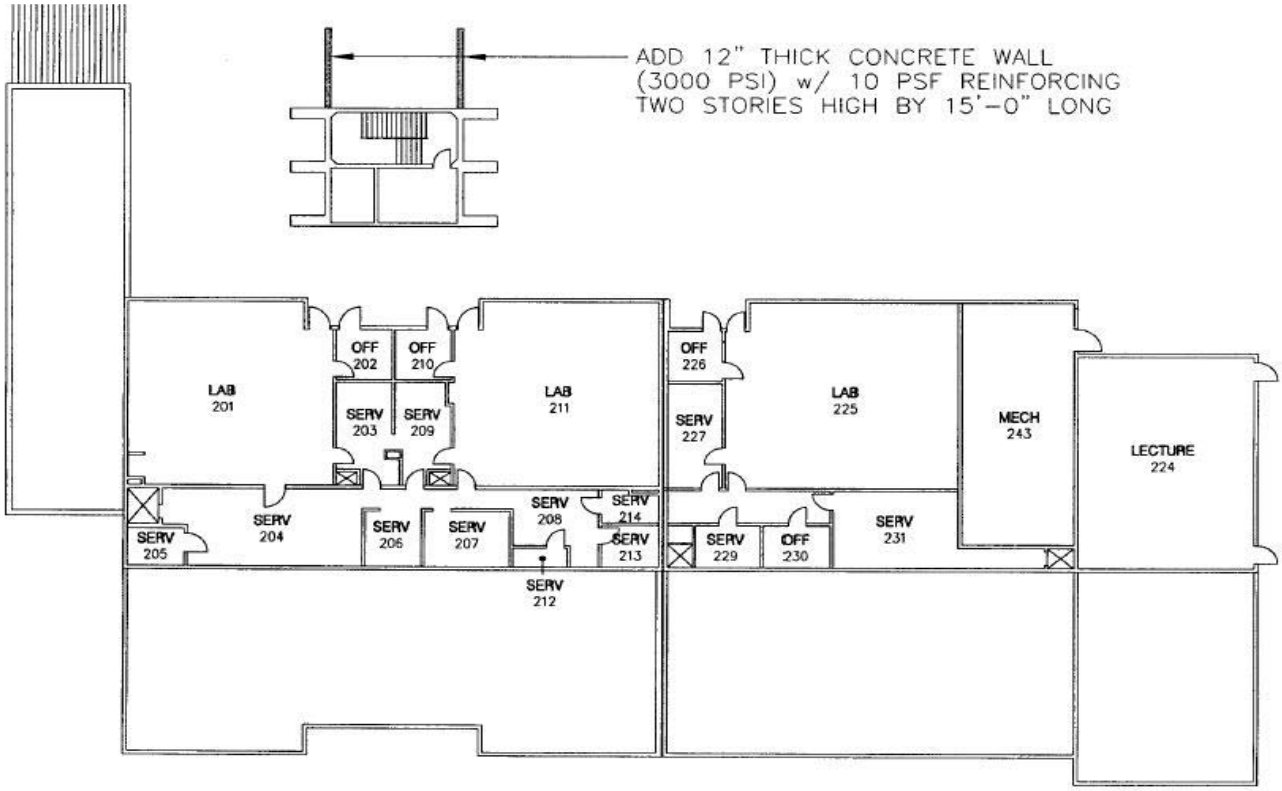


FIGURE 4. PROPOSED ADDITIONAL WALL LOCATION

01 LABORATORY/ADMINISTRATION

General Description

The Laboratory and Administration building is a two story building that was constructed in 1970. The old bookstore, work rooms and main campus heating hot and chilled water plants are located in the north building. The laboratory classrooms and additional work rooms are located in the south building. The second floor is occupied by the administrative department.

Several retrofits that have been done include: An additional chiller and boiler were added to the main campus chilled and heating hot water plants in 1975. The office space in the administrative department was expanded in 1978 and an addition to the south building was added in 1978. New cooling towers were installed in 1999. New boilers and chiller renovations are currently in the scope of work to be done by Siemens.

A double deck constant volume multi-zone air handling unit supplies the majority of conditioned air to the north building. Two fan coil air handling units located in the ceiling currently serve the old bookstore. All air handling units receive the necessary heating hot and chilled water from the main campus boiler and chiller plants. The south building is served by a double deck constant volume multi-zone air handling unit located in the mechanical room. The laboratory classrooms and a chemical fume hood are exhausted via a utility fan located in the administrative building. The two story addition built adjoining the south building is served by two double deck constant volume multi-zone air handling units located in the same mechanical room. The addition also contains three chemical fume hoods operated by individual utility fans located in the mechanical room. The air handling units receive the required heating hot and chilled water from the main campus boiler and chiller plants. The administrative portion of the building is served by a double deck constant volume multi-zone air handling unit and a constant volume single zone air handling unit. Each air handling unit is located in its own mechanical room. The air handling units receive the required heating hot and chilled water from the main campus boiler and chiller plants.

Deficiencies

General

- No insulation is provided for the walls and roof.
- Thermostats are mounted at heights noncompliant with the American's with Disabilities Act (ADA).
- No seismic bracing is provided for the piping and the ductwork.

Mechanical Room #103

Contains one multi-zone air handling unit.

- Spring vibration isolators for the air handling unit are shot and need to be replaced.
- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.

01 LABORATORY/ADMINISTRATION

Figure 1 – Example of vibration isolators that are shot and need to be replaced.

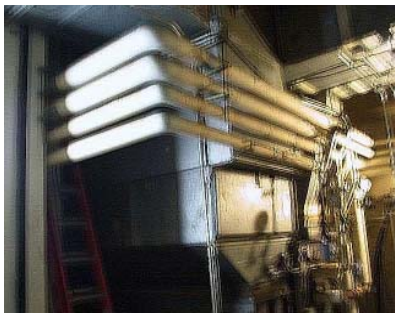


Figure 2 – Example of no seismic bracing on the piping or the duct work.

Figure 3 – Example of door gaskets that need to be replaced.

Figure 4 – Example of a plumbing vent less than 3'-0" away from a building opening.

- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.

Mechanical Room #227

Contains one multi-zone air handling unit.

- There is no 3'-0" code required minimum clearance provided in front of electrical panels and Variable Frequency Drive.
- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.

Mechanical Room #245

Contains two multi-zone air handling units and several utility fans provided for the chemical fume hood exhaust.

- No P-trap is provided on the condensate drains, allowing units to leak conditioned air through the pipes.
- The air handling units and ductwork need environmental cleaning.
- The gaskets on both air handling units' doors need to be replaced.
- Both air handling units' interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling units' are shot and need to be replaced.

Mechanical Room #301

Contains one multi-zone air handling unit.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.
- Motor cover is missing.

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Mechanical Room #406

Contains one single zone air handling unit and laboratory and chemical fume hood utility fan.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.
- Plumbing vent is less than the 3'-0" code required clearance from outside air intake.
- The outlet of exhaust fan 10 serving the chemical laboratory is less than the 10'-0" code required clearance from an outside air intake.

Central Plant (117, 118, 119)

- Chillers and boilers renovation/replacement is currently in the scope of the performance contract work provided by Siemens.
- According to the maintenance building supervisor the underground chilled and heating hot water distribution system has developed numerous leaks and has severely deteriorated. This causes frequent system shutdown for maintenance.

Recommendations

- Replace the bearings on the fans.
- Replace the fans' sheaves and belts.
- Environmentally clean the air handling units and ductwork.
- Refurbish the air handling units.
- Install P-traps on condensate drains.
- Replace vibration isolators on the air handling units.
- Replace the gaskets on the units' doors.
- Replace the interior liners.
- Move outlets away from outside air inlets and building openings.
- Install seismic bracing on the piping.
- Install seismic bracing on the ductwork.
- Lower the height of the thermostats to ADA levels.
- Replace existing underground chilled and heating hot water distribution systems.

01 LABORATORY/ADMINISTRATION

General Description

- The Laboratory and Administration complex consists of three buildings that were constructed in 1970. Retro-fit work was done in 1978 which expanded the office spaces in the Administration building.

Piping

- Domestic hot and cold water piping are galvanized steel. Some part of the piping has been rusted out.
- Gas piping system is galvanized steel. Gas pressure regulator outside the building delivers gas at low pressure to the building. Gas piping is in fair condition.
- Waste piping is service weight cast iron.
- Laboratories waste and vent piping is polypropylene acid waste pipe.

Fixtures

- Level 2330 public toilets, water closets are wall mounted flush valve with new Geberit automatic flush valves. Units are in fair condition.
- Toilet rooms on level 2350 have floor mounted flush tank water closets.
- Urinals are wall mounted flush valve with new Geberit automatic flush valves. Units are in fair condition.
- Lavatories are wall mounted with newly furnished Geberit automatic faucets. Units are in fair condition.
- Floor drains do not have trap primer; therefore they do not comply with current code.
- Floor sinks in equipment room #227 and #301 do not connect to trap primers, and the room is being used as outside air plenum; therefore they do not comply with the current code.
- Hose bibs in and outside of the building do not have vacuum breakers; therefore they do not comply with current code.

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Electric water heater

Gas water heater

A hose bibb without vacuum breaker

Air compressor

Equipment

- Each public toilet is served by an electric water heater located in adjacent custodial room #217 and 218. The water heaters do not have expansion tank and earthquake straps; therefore they do not comply with current code. Units are in fair condition.
- A gas water heater is located in boiler room #118 without expansion tank and earthquake straps serving level 2330. The unit is not operational.
- An electric water heater is located in mechanical equipment room #103 without expansion tank and earthquake bracing; therefore they do not comply with current code. Units are in fair condition.
- A vacuum pump is located in equipment room #103 serving the labs. Unit is in fair condition.

Fire Protection

- Building complex is covered by fire hose cabinets without hose, supplied via domestic water system.
- In Custodian rooms #217 and 218, boiler room #118, Storage room 105 level 2315, and all lab storage room level 2330 are covered by automatic fire sprinkler heads. The water supply is connected to (**Junior fire sprinkler system**) domestic water mains inside the building via OS&Y valves, check valves and flow switches.

Utilities Load

- Domestic cold water: 186 FU = **88 GPM**
- Sewer: **181 Fixture Unit.**
- Natural Gas: 6" low pressure gas entering Lab/Admin building via a gas pressure regulator.
- (2) Space heating boilers and (1) future boiler each at 3200 CFH. (2) Water heaters at 180 CFH and 120 CFH. Lab benches and fume hoods at 90 CFH.
- **Total natural gas load 9,990 CFH.**

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Recommendations

- Re-pipe the whole building complex and replace all galvanized domestic hot and cold water piping with copper piping.
- Provide and install a sheet metal pan with all solder joints under the 4" main domestic water line in basement running over the transformer, pipe drain line to approved receptor.
- If the building is re-piped with copper pipes, then re-rout the 4" domestic water line from overhead of the transformer in basement to another location.
- Provide and install trap primers to all floor drains and floor sinks.
- Provide and install half or ¾ grating over all floor sinks.
- Provide new hose bibs to replace existing, or install vacuum breakers at all existing hose bibs.
- In boiler room 118, level 2315, remove gas water heater and circulating pump and related piping. Provide and install point of use electric water heater for two sinks on second floor.
- Plans have been submitted to renovate first floor level 2315, west of the chiller room. An electric storage type water heater has been dedicated to serve this tenant improvement. Provide and install approved earthquake straps and bracings for all water heaters and circulating pumps.
- Provide and install gas earthquake valve upstream of the existing pressure regulator.
- Inspect all domestic water pressure reducing valves for proper operation.
- Inspect and test all backflow preventers by a certified agency for proper operation.
- Drain and clean all junior fire sprinkler systems. Test OS&Y valves, check valves and flow switches for proper operation.

01 LABORATORY/ADMINISTRATION

Figure 1 – Service equipment

Figure 2 – Oil-filled fuse cut-outs.

Figure 3 – Simplex clock system generator

Figure 4 – Zinsco panel board

Power System Description

- Service to the complex consisted of high voltage feed at 4160V stepped down by several transformers to 120/208V, 3ø, 4-wire and 480V, 3ø, 3-wire systems.
    - 300KVA transformer (T7) 4160-120/208V.
    - 300KVA transformer (T8) 4160-120/208V.
    - 500KVA transformer (T9) 4160-480V.
    - 500KVA future transformer (T10) 4160-480V.
    - 600A, 480V, 3ø, 3-wire distribution panel "DP-LA".
    - 800A, 120/208V, 3ø, 4-wire distribution panel "DP-LB".
    - 800A, 120/208V, 3ø, 4-wire distribution panel "DP-LC".
- Power distribution for the building consisted of the following:
    - (14) Panel boards: L1-1, L1-2, L1-3, L1-4, L2-1, L2-2, L2-3, L2-4, L2-5, L2-6, L2-7, L3-1, L3-2 and L3-3.
    - (8) Motor control centers (MCC): LCTP, LBP, LCP, LP-1, LP-2, LP-3, LP-4 and LP-5.
    - (2) Future MCC's: LCP-2 and LCP-3.

Lighting System

- Lighting fixtures are recently retrofitted with high efficiency fixtures by Siemens.
- General lighting consists of fluorescent fixtures with T-8 lamps.
- Exit lights are master/slave pair of overhead and low level exit fixtures with backup power.
- Exit signage is deficient. Most exit signs are illuminated.

Fire Alarm System

- Simplex Fire Alarm equipment are installed.
- Fire alarm pull stations are installed at exits.
- Fire alarm horns are installed at lobbies and corridors.
- Not ADA compliant.

01 LABORATORY/ADMINISTRATION

Figure 5 – Lighting

Figure 6 – Simplex fire alarm equipment

Recommendations

- The low voltage distribution equipment are discontinued models from Zinsco and no replacement parts are available. However, these existing equipment are still in good working condition and require regular inspection and maintenance.
- The oil-filled fuse cut-outs are discontinued models from G&W and no replacement parts are available. These equipment are in excess of their life expectancy. At this time, these equipment are still in good working condition and there is no immediate need of replacement. However, if any of the building will require renovations, replacement of all electrical equipment is strongly recommended.
- Periodic inspection of and, if necessary, torque adjustments of wire terminations at panel boards and distribution boards are recommended to eliminate possible loose connections.
- The power, lighting and life safety systems of this facility are adequate for its present requirements. Any future major additions or expansion would require a reassessment of its existing power, lighting and life safety infrastructure for adequacy.
- Exit signage should be reviewed for compliance.

01 LABORATORY/ADMINISTRATION

Figure 1 – View of Laboratory/Administration building.

Building Identification (see figure 1)

Existing freestanding illuminated concrete sign is showing signs of decay. Scale of the sign and its copy is too small for larger buildings. Concrete sign is not visible as it blends with concrete architecture. Illuminated sign panel is too small to identify buildings with several names, uses or departments. Exposed screws are visible in sign face. Illuminated faces do not provide the best copy visibility.

Option A Recommendation:

Repair concrete and sandblast to clean. Retrofit lamping and wiring. Replace acrylic panel with painted aluminum panel with routed out copy so that just the copy illuminates.

Option B Recommendation:

Replace existing signage with new sign system freestanding and/or wall mounted. Use of a consistent sign color will enable signage to be easily recognized and stand out against building color and landscape.

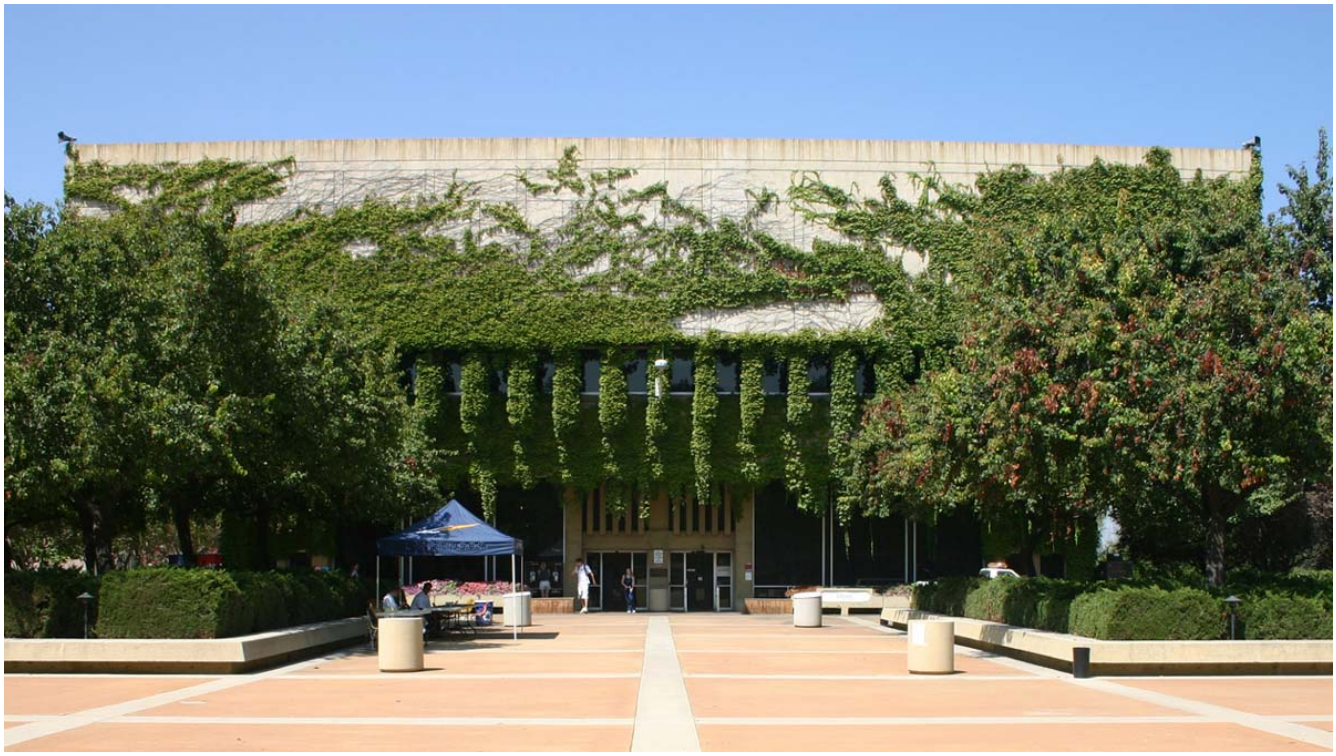
- Freestanding: Provide new illuminated painted sign cabinet with larger routed illuminated building names and/or departments.
- Wall Mounted: Provide new sign panels or individual letters mounted to building face or low walls. Sign panels/copy size scaled to size of building.

ADA:

Provide sufficient accessibility information and directionals to navigate to an accessible entrance or path.

2 | LEARNING RESOURCES/ LIBRARY

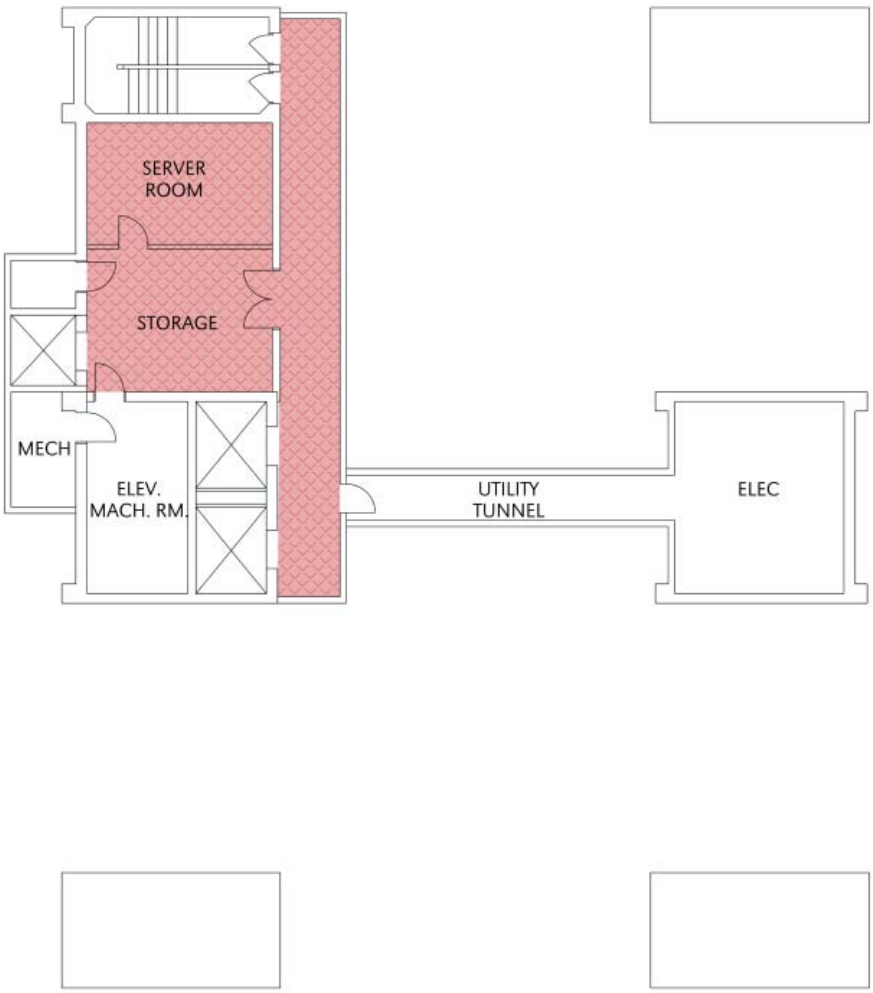
02 LEARNING RESOURCES/ LIBRARY



SQUARE FOOTAGE:

	ASF	GSF
BASEMENT LEVEL	420	2,595
FIRST LEVEL	5,905	8,045
SECOND LEVEL	9,355	12,295
THIRD LEVEL	9,515	14,600
TOTAL	25,195	37,535

02 LEARNING RESOURCES/ LIBRARY



BASEMENT LEVEL

1" = 20'

Two code-compliant exits required

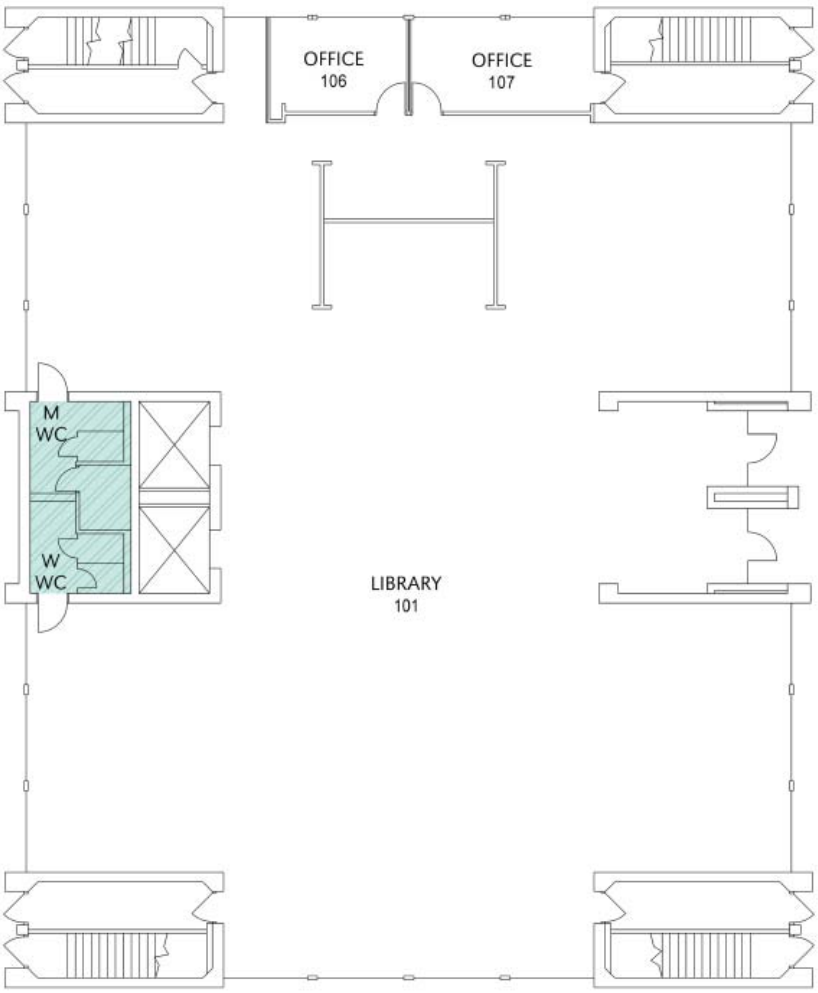
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

02 LEARNING RESOURCES/ LIBRARY



FIRST LEVEL

1" = 20'

Two code-compliant exits required

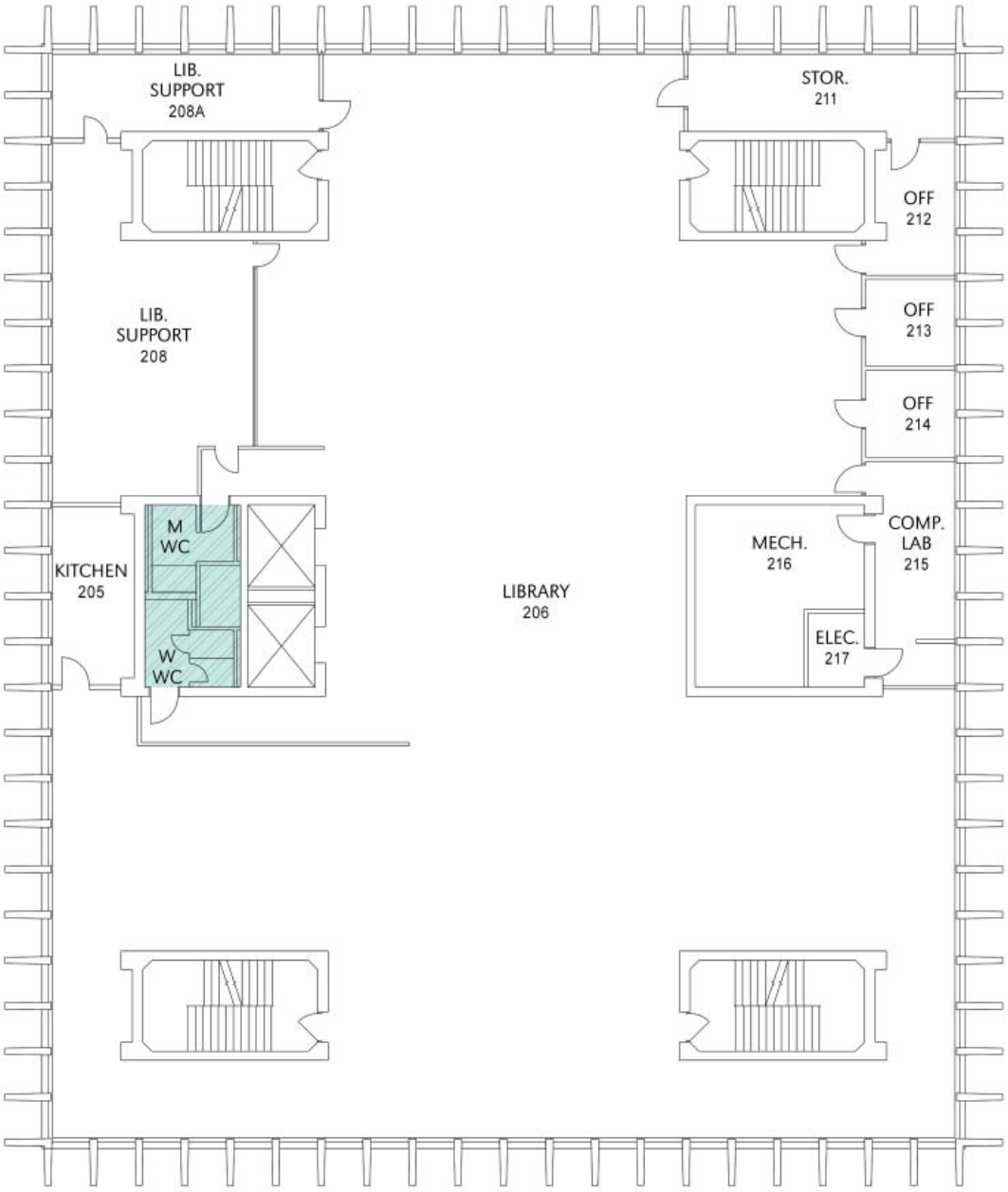
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

02 LEARNING RESOURCES/ LIBRARY



SECOND LEVEL

1" = 20'

Two code-compliant exits required

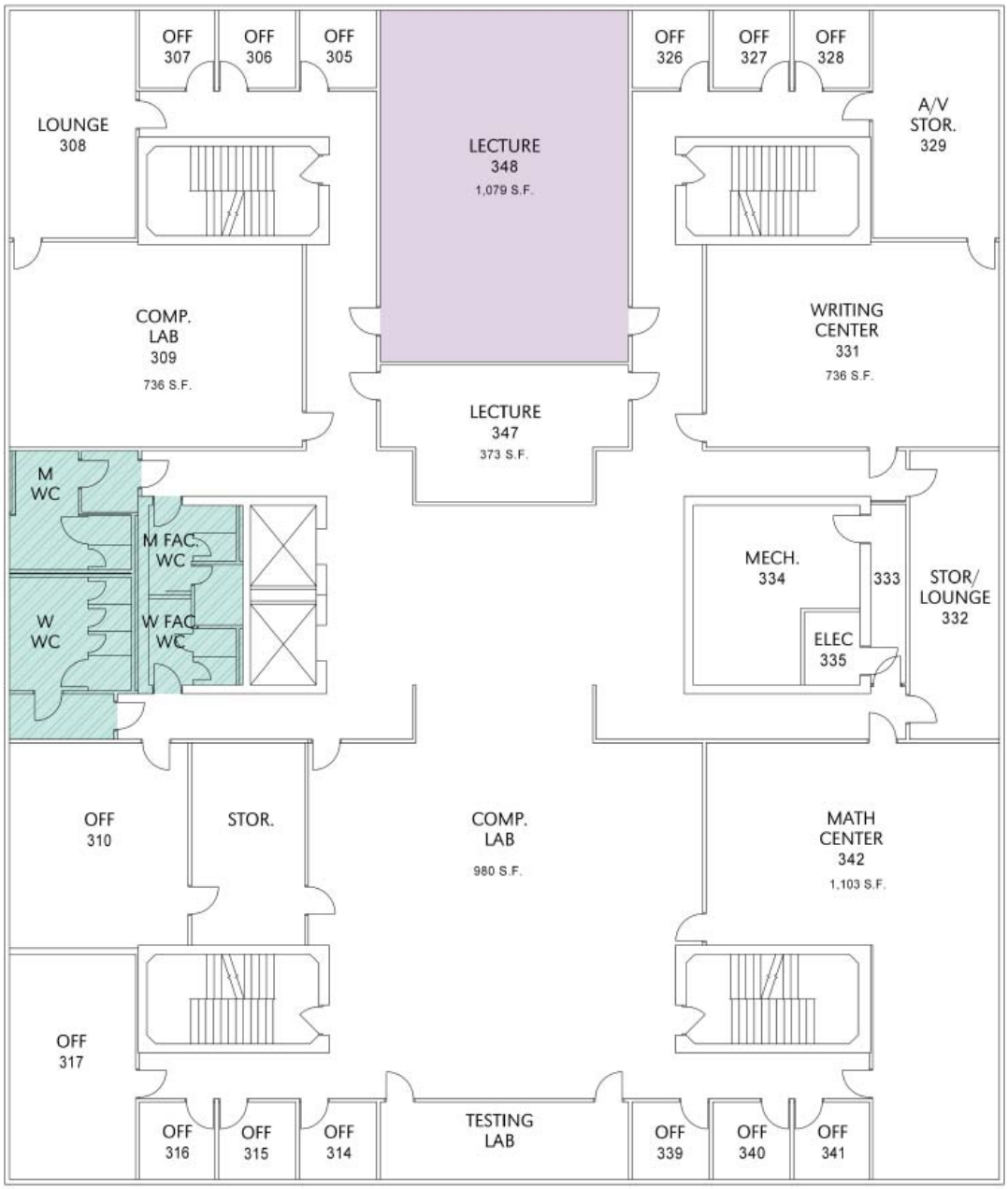
Inaccessible area (non-ADA)

Sprinklered area

More than one intervening room to exit

Non-compliant exit route

02 LEARNING RESOURCES/ LIBRARY



THIRD LEVEL

1" = 20'

Two code-compliant exits required

Inaccessible area (non-ADA)

Sprinklered area

More than one intervening room to exit

Non-compliant exit route

02 LEARNING RESOURCES/ LIBRARY

Lecture 347

Fire & Life Safety

- No fire sprinklers at first and second levels and portions of third level.
- No smoke detectors.
- Exit corridor at basement used as storage area.
- No GFCI outlets throughout.

Library support

ADA

- Lack of compliant door hardware throughout.
- Many doors throughout do not have proper push/pull side clearances.
- Thresholds/walk-off mats at main entry and exit should be replaced due to tripping hazard.
- Non-compliant toilet rooms and fixtures.
- Non-compliant handrails and handrail extensions.
- Contrast warning striped must be added to top and bottom treads at stairs.
- Non-compliant drinking fountains.
- Non-compliant pay phones.
- Auto-door operator should be added to main library exit.

Toilet facilities on third floor - Non-compliant door hardware.

Inaccessible drinking fountain

02 LEARNING RESOURCES/ LIBRARY

Replace old or worn items such as room divider.

Damage to wall base.

LRC/Library roof - Minor ponding at the library.

Maintenance

- Some acoustic ceiling tiles need to be replaced due to wear.
- Carpet at third floor classrooms needs to be replaced due to stains, gouges, or wear.
- Light levels in some classrooms are insufficient.
- Replace diffuser grills.
- Replace wall base where damaged/missing.
- Replace chair rails at classrooms.
- Existing roof is a built-up roofing system.
- Signs of minor ponding.
- No obvious signs of blistering or tearing.
- Minor delamination of the flexible flashing at the building perimeter.

02 LEARNING RESOURCES/ LIBRARY

Building Description

Site and Building Configuration

The site is generally flat where the building footprint occurs. The building, constructed in 1972, was one story high with a partial basement. Two levels were added in 1975, and the building now has 36,900 square feet and is three stories high. The second floor is approximately 20 feet high, the third floor is approximately 34 feet high, and the roof is approximately 47 feet high. The basement area is approximately 10 feet high.

Structural System

Structural plans were available for this building for both the original one story structure and the addition of two levels. The primary roof gravity system consists of concrete decks over the stairwells and elevator cores and a 30-foot by 80-foot area in the center of the building. The remaining roof area primary roof gravity system consists of concrete on metal deck spanning to steel beams, which span to concrete walls. The primary gravity system for the third floor, second floor and the area above the basement consists of a concrete deck spanning to concrete beams, which span to concrete walls. The foundation system consists of a combination of spread footings and continuous footings. Evidence of settlement was not observed.

The primary lateral system consists of concrete diaphragms spanning to exterior and interior concrete walls.

Overall Seismic Deficiencies and Expected Seismic Performance

The building does not have well distributed lateral load resisting concrete walls, does not appear to have adequate wall strength in the north south direction on the east side of the structure, and the concrete walls on the exterior of the third floor are essentially solid and much stronger than the second and first floor walls which means the structure has soft and weak stories. Therefore ESI recommends analysis of the lateral load resisting concrete walls to determine if they possess adequate strength to resist seismic loads. Included is figure 1 which shows the location of the proposed new wall. The length and location of the wall is shown for budgeting purposes only and will be revised based on future analysis. In a seismic event the windows and non-bearing gypboard walls would probably suffer typical damage in the form of broken glass and cracked gypboard walls. The ceiling would probably suffer typical damage in the form of cracked and displaced tiles.

02 LEARNING RESOURCES/ LIBRARY

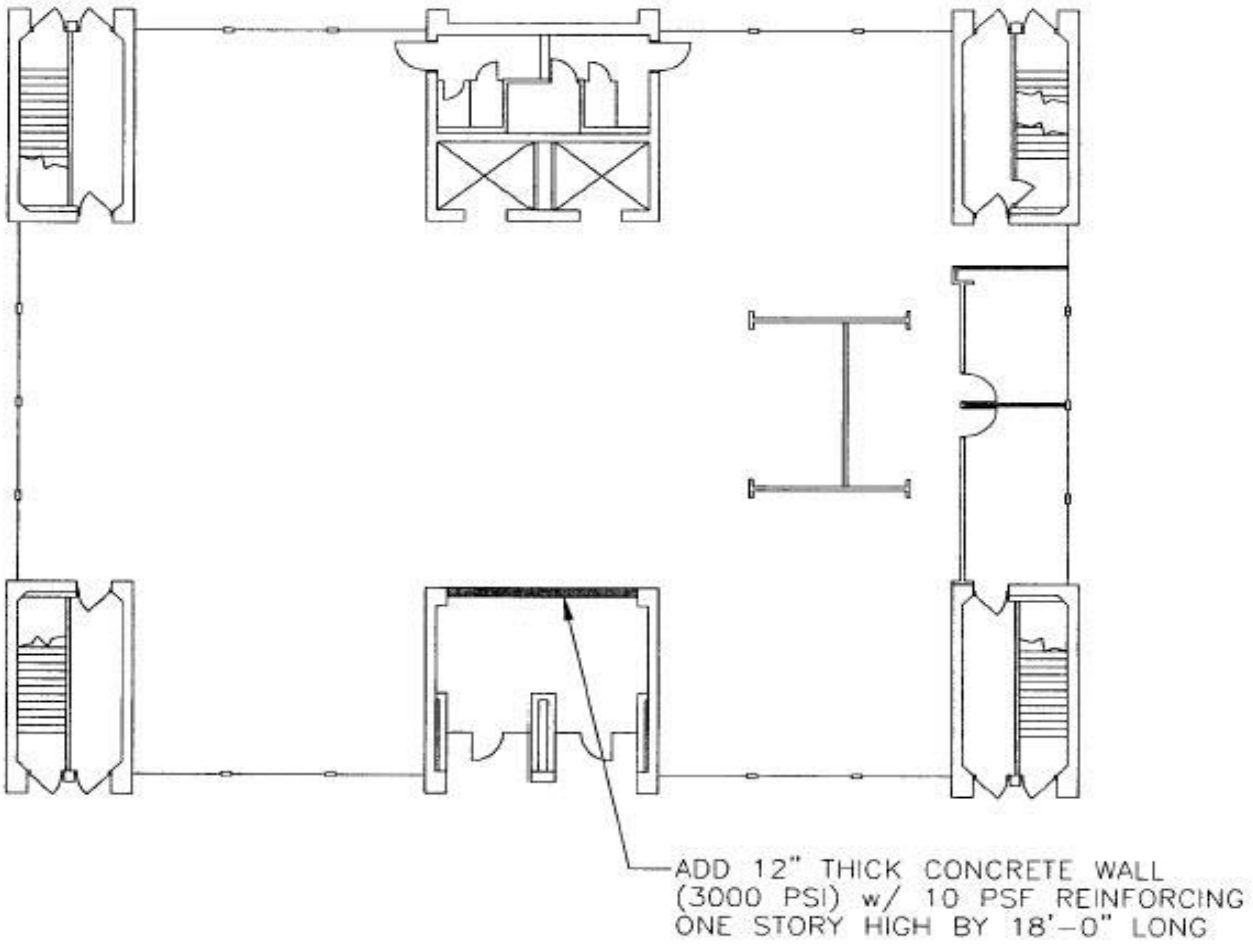


FIGURE 1. PROPOSED ADDITIONAL WALL LOCATION

02 LIBRARY

Figure 1 – Example of vibration isolators that are shot and need to be replaced.

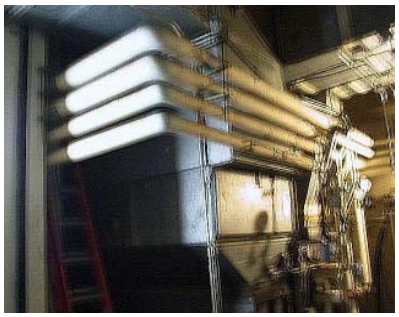


Figure 2 – Example of no seismic bracing on the piping or the duct work.

Figure 3 – Example of door gaskets that need to be replaced.

General Description

The Library was constructed in 1970 and consists of three floors and a basement. The main floor is served by a double deck constant volume multi-zone air handling unit and two constant volume single zone air handling units. The multi-zone unit is located in a mechanical room on the ground floor and the two single zone units are located in another mechanical room on the ground floor. The second floor is served by a double deck constant volume multi-zone air handling unit located in the mechanical room on the same floor. The third floor is served by two double deck constant volume multi-zone air handling units located in separate mechanical rooms on the third floor. All units receive the required heating hot and chilled water from the main campus boiler and chiller plants.

Deficiencies

General

- No insulation is provided for the walls and roof.
- Thermostats are mounted at heights noncompliant with the American's with Disabilities Act (ADA).
- No seismic bracing is provided for the piping and the ductwork.
- Toilets on the second floor have strong 'toilet' odor due to poor ventilation.

West Mechanical Room #114

Contains two single zone air handling units.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.
- No code required access is provided in front of the control panel mounted next to the ladder.

East Mechanical Room #115

Contains one multi-zone air handling unit.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.

02 LIBRARY

Mechanical Room #216

Contains one multi-zone air handling unit.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.

Mechanical Room #322

Contains one multi-zone air handling unit.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.

Mechanical Room #334

Contains one multi-zone air handling unit.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.

Recommendations

- Replace the bearings on the fans.
- Replace the fans sheaves and belts.
- Refurbish the air handling units.
- Install P-traps on the condensate drains.
- Replace the vibration isolators on the air handling units.
- Replace the gaskets on the unit's doors.
- Replace the interior liners.
- Environmentally clean the air handling units and ductwork.
- Install seismic bracing on the piping.
- Install seismic bracing on the ductwork.
- Lower the height of the thermostats to ADA levels.
- Patch any test holes or leaks on the air handling units.

02 LIBRARY

General Description

- The Library building was constructed in 1970 as a one storey building with partial basement. In 1975 two more stories were added to the existing building.

Piping

- Domestic hot and cold water piping are galvanized steel. Some part of the piping in basement and first floor has been rusted out.
- There is no gas service in this building.
- Waste piping is service weight cast iron.

Fixtures

- Water closets are wall mounted flush tank. Units are in fair condition.
- Urinals are wall mounted flush valve with new Geberit automatic flush valves. Units are in fair condition.
- Lavatories are wall mounted with newly furnished Geberit automatic faucets. Units are in fair condition.
- Floor drains do not have trap primer; therefore they do not comply with current code.
- Floor sinks in Mechanical room do not connect to trap primers; therefore they do not comply with the current code.
- Hose bibs in and outside of the building do not have vacuum breakers; therefore they do not comply with current code.

02 LIBRARY

Equipment

- There are (3) electric water heaters located in basement, second and third floors. The water heaters do not have expansion tank and earthquake straps; therefore they do not comply with current code. Units are in fair condition.
- A 2-gallon electric water heater is located below counter on second floor work room #205. The pressure & temperature relief valve drain is connected to tail piece of the sink. This connection does not comply with the code. Drain should run to approved receptor, i.e. floor sink or air gap fitting.
- A 4-gallon water heater is located below counter room #113. Unit is in fair condition.
- A duplex sump pump is located in the basement. Unit is in fair condition.

Fire Protection

- Building is covered by fire hose cabinets without hose, supplied via domestic water system.
- Basement is covered by a 3" fire main connect outside to domestic cold water main via OS&Y valve, check valve and flow switch. In addition Custodian room #1107 is covered by automatic fire sprinkler heads. The water supply is connected to (**Junior fire sprinkler system**) domestic water main inside the building via OS&Y valve, check valve and flow switch.

Utilities Load

- Domestic cold water: 186 FU = **82 GPM**
- Sewer: **173 Fixture Unit.**
- Natural Gas: none.

02 LIBRARY

Recommendations

- Re-pipe the whole building and replace all galvanized domestic hot and cold water piping with copper piping.
- Provide and install trap primers to all floor drains and floor sinks.
- Provide and install half or ¾ grating over all floor sinks.
- Provide new hose bibs to replace existing, or install vacuum breakers at all existing hose bibs.
- Provide and install appropriate size expansion thank at all domestic electric water heaters.
- Provide and install approved earthquake straps and bracings for all water heaters.
- Inspect all domestic water pressure reducing valves for proper operation.
- Inspect and test all backflow preventers by a certified agency for proper operation.
- Drain and clean all junior fire sprinkler systems. Test OS&Y valves, check valves and flow switches for proper operation.

02 LIBRARY

Figure 1 – Oil-filled fuse cut-outs for T-5

Figure 2 – Transformer T-5

Figure 3 – Distribution panel "DP-LBA"

Figure 4 – Panel boards

Power System Description

- Service to the complex consisted of high voltage feed at 4160V stepped down by several transformers to 120/208V, 3ø, 4-wire, 277/480V, 3ø, 4-wire and 480V, 3ø, 3-wire systems.
    - 300KVA transformer (T5) 4160-120/208V.
    - 300KVA transformer (T6A) 4160-277/480V.
    - 75KVA transformer (T6) 4160-480V.
    - 225A, 480V, 3ø, 3-wire distribution panel "DP-LBA".
    - 800A, 120/208V, 3ø, 4-wire distribution panel "DP-LBB".
    - 400A, 277/480V, 3ø, 4-wire distribution panel "DP-LBC".
- Power distribution for the building consisted of the following:
    - (9) Panel boards: LB-1, LB-2, LB-3, 2A, 2B, 2C, 3A, 3B and (1) 100A panel.
    - (3) Motor control centers (MCC): LB-P1, LB-P2 and LB-P3.
    - 37.5KVA transformer 480-120/208V

Lighting System

- Lighting fixtures are recently retrofitted with high efficiency fixtures by Siemens.
- General lighting consists of fluorescent fixtures with T-8 lamps.
- Exit lights are master/slave pair of overhead and low level exit fixtures with backup power.
- Most exit signs are illuminated.

Fire Alarm System

- Simplex Fire Alarm equipment are installed.
- Fire alarm pull stations are installed at exits.
- Fire alarm horns are installed at lobbies and corridors.
- Not ADA compliant.

02 LIBRARY

Recommendations

- The low voltage distribution equipment are discontinued models from Zinsco and no replacement parts are available. However, these existing equipment are still in good working condition and require regular inspection and maintenance.
- The oil-filled fuse cut-outs are discontinued models from G&W and no replacement parts are available. These equipment are in excess of their life expectancy. At this time, these equipment are still in good working condition and there is no immediate need of replacement. However, if any of the building will require renovations, replacement of all electrical equipment is strongly recommended.
- Periodic inspection of and, if necessary, torque adjustments of wire terminations at panel boards and distribution boards are recommended to eliminate possible loose connections.
- The power, lighting and life safety systems of this facility are adequate for its present requirements. Any future major additions or expansion would require a reassessment of its existing power, lighting and life safety infrastructure for adequacy.
- Exit signage should be reviewed for compliance.

02 LIBRARY

Figure 1 – View of Library building.

Building Identification (see figure 1)

No existing building identification is present for this building.

Option A Recommendation:

Provide new freestanding internally lit concrete sign to match existing signs on campus. Replace acrylic panel with painted aluminum panel with routed out copy so that just the copy illuminates.

Option B Recommendation:

Provide new sign system with freestanding and/or wall mounted signs. Use of a consistent sign color will enable signage to be easily recognized and stand out against building color and landscape.

- Freestanding: Provide new illuminated painted sign cabinet with larger routed illuminated building names and/or departments.
- Wall Mounted: Provide new sign panels or individual letters mounted to building face or low walls. Sign panels/copy size scaled to size of building.

ADA:

Provide sufficient accessibility information and directionals to navigate to an accessible entrance or path.

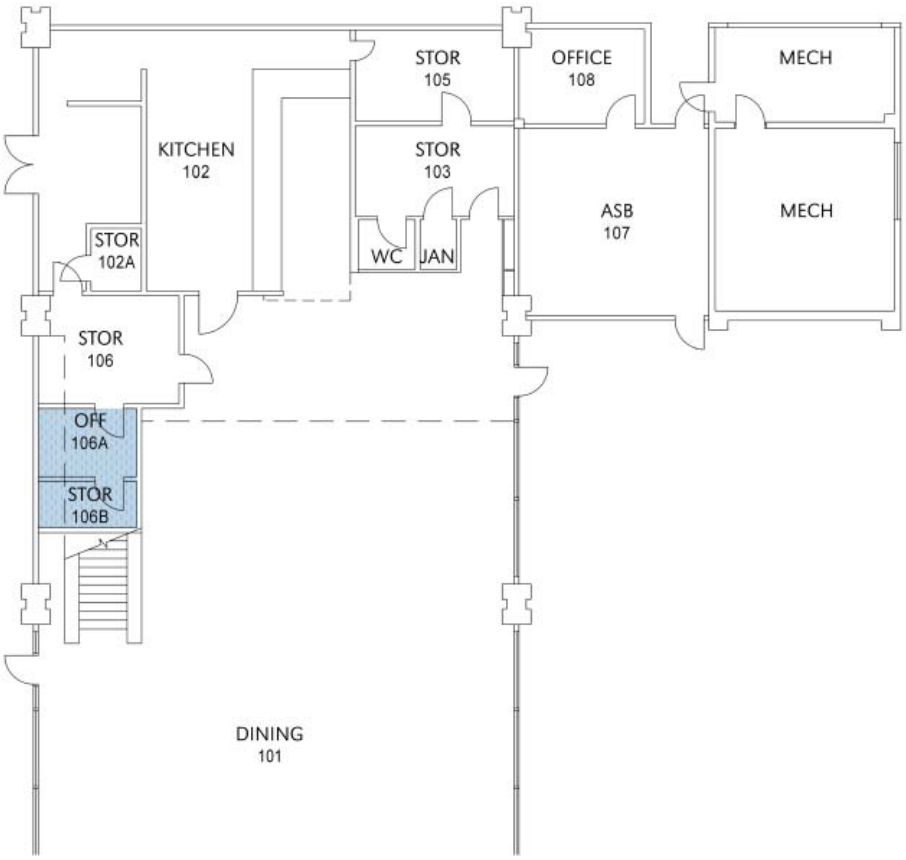
3 | COLLEGE CENTER

03 COLLEGE CENTER

SQUARE FOOTAGE:

	ASF	GSF
FIRST LEVEL	6,005	7,270
SECOND LEVEL	2,325	3,245
TOTAL	8,330	10,515

03 COLLEGE CENTER



FIRST LEVEL (1 of 2)

1" = 20'

Two code-compliant exits required

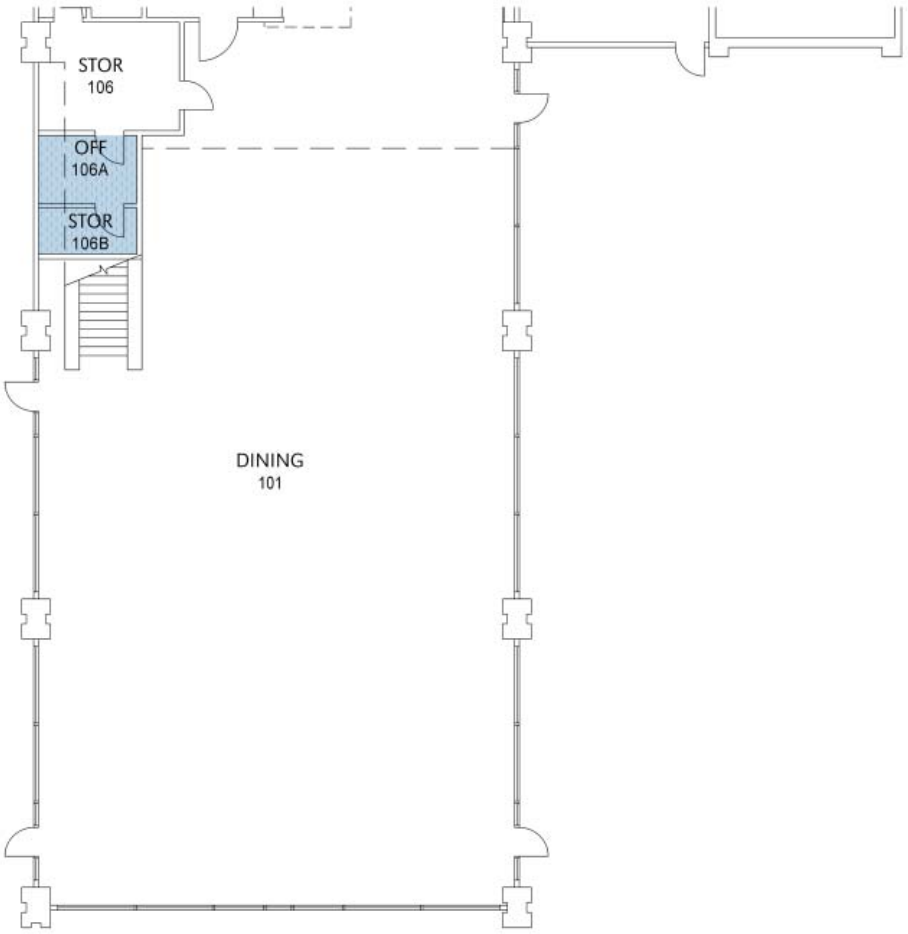
Inaccessible area (non-ADA)

Sprinklered area

More than one intervening room to exit

Non-compliant exit route

03 COLLEGE CENTER



FIRST LEVEL (2 of 2)

1" = 20'

Two code-compliant exits required

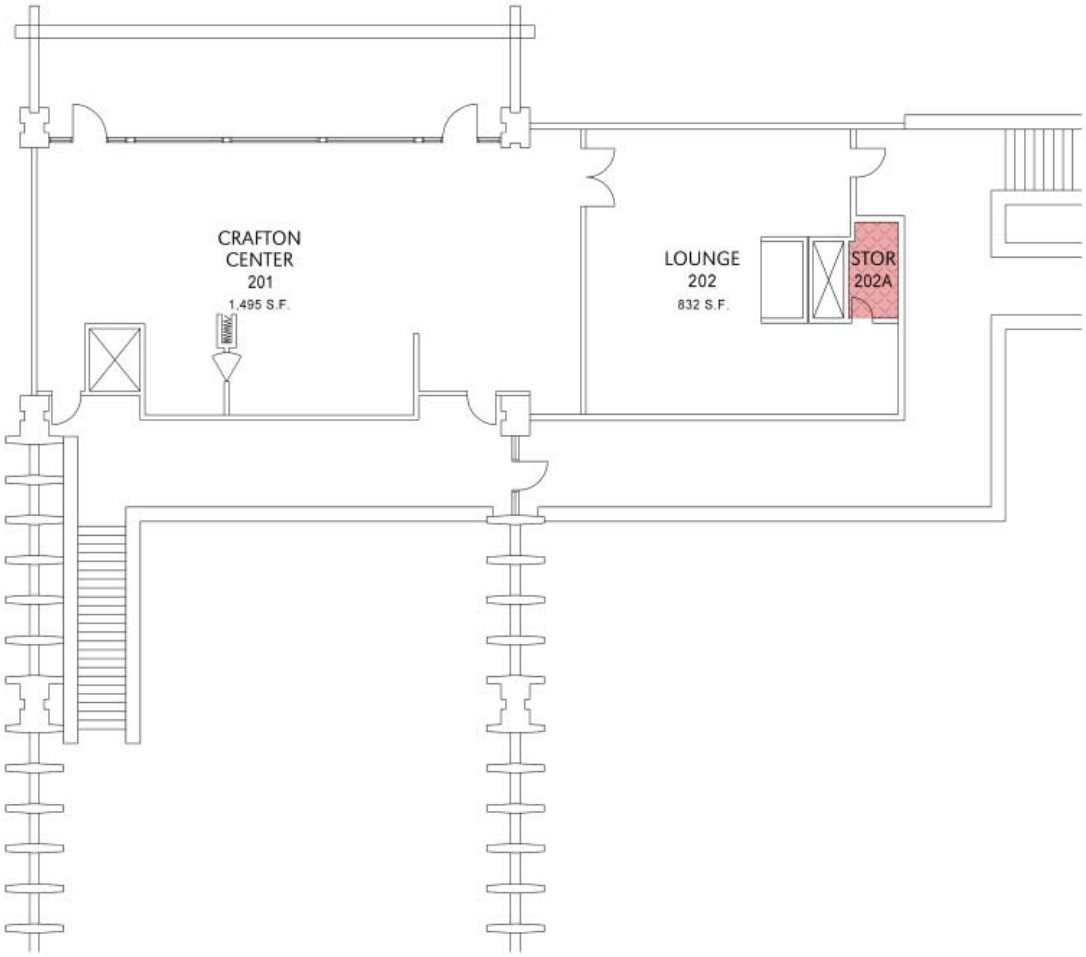
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

03 COLLEGE CENTER



SECOND LEVEL

1" = 20'

Two code-compliant exits required

More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

03 COLLEGE CENTER

Kitchen - Lack of storage means bulky items are kept in pathways.

Stairs - Handrail extensions do not comply with code; top and bottom tread lack contrast warning strip.

Fire & Life Safety

- No fire sprinklers or smoke detectors.
- Exit signs are not properly located.
- Electrical panels are not located in closets.
- Bottom of mechanical shaft at first level is used for storage.
- No GFCI outlets throughout.
- Upgrades to panic hardware required.

ADA

- Some doors do not have proper push/pull side clearances.
- Non-compliant plumbing fixtures.
- Non-compliant handrails and handrail extensions.
- Contrast warning stripes must be added to top and bottom treads at stairs.

03 COLLEGE CENTER

Crafton Center - Carpet stain.

Crafton Center - Exposed electrical panel and floor drain.

Crafton Center - Exposed piping and floor drain.

Maintenance

- Replace adhered ceiling tiles.
- Carpet and VCT needs to be replaced due to stains, gouges, or wear.
- Replace diffuser grills.
- Replace wall base throughout.
- Replace closers on doors at first level.

03 COLLEGE CENTER

Building Description

Site and Building Configuration

The site is generally flat where the building footprint occurs. The building, constructed in 1972, has 8,560 square feet, and consists of a south wing, which does not have a second floor and the north end, which has a second floor. The north wing is two stories high with the second floor being approximately 12 feet high, and the roof being approximately 24 feet high. The south wing is one story high with the roof being approximately 24 feet high.

Structural System

Structural plans were available for this building. The primary gravity system for all levels consists of concrete decks spanning to concrete beams, which span to concrete walls or concrete columns. The foundation system consists of a combination of spread footings and continuous footings. Evidence of settlement was not observed.

The primary lateral system consists of concrete diaphragms spanning to exterior and interior concrete walls.

Overall Seismic Deficiencies and Expected Seismic Performance

At the south wing at the south end, only concrete columns act as lateral load resisting members. The columns appear to be inadequate to resist anticipated lateral loads. . ESI recommends analysis of the lateral load resisting concrete columns to determine if they possess adequate strength to resist seismic loads. Included is figure 1 which shows the location of a proposed new wall. The length and location of the wall is shown for budgeting purposes only and will be revised based on the future analysis. In a seismic event the windows and non-bearing gypboard walls would probably suffer typical damage in the form of broken glass and cracked gypboard walls. The ceiling would probably suffer typical damage in the form of cracked and displaced tiles.

03 COLLEGE CENTER

Figure 1 – Example of vibration isolators that are shot and need to be replaced.

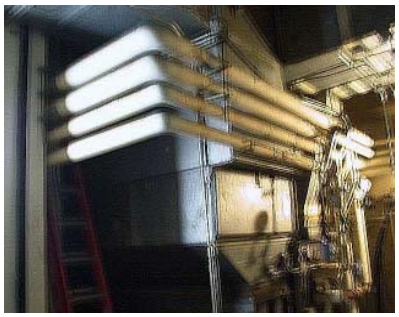


Figure 2 – Example of no seismic bracing on the piping or the duct work.

Figure 3 – Example of door gaskets that need to be replaced.

General Description

The College Center Building was constructed in 1970 and is a two story building. A double deck constant volume multi-zone air handling unit located in the mechanical room serves the building. The heating hot and chilled water for the unit are provided by a secondary boiler and chiller plant located in the Student Services A building. A fume hood is located on the first floor.

Deficiencies

General

- No insulation is provided for the walls and roof.
- Thermostats are mounted at heights noncompliant with the American's with Disabilities Act (ADA).
- No seismic bracing is provided for the piping and the ductwork.

Mechanical Room #125

Contains one multi-zone air handling unit.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.

Recommendations

- Replace the bearings on the fans.
- Replace the fans' sheaves and belts.
- Environmentally clean the air handling unit and ductwork.
- Refurbish the air handling unit.
- Install P-traps on the condensate drain.
- Replace the vibration isolators on the air handling unit.
- Replace the gaskets on the unit's doors.
- Replace the interior liner.
- Install seismic bracing on the piping.
- Install seismic bracing on the ductwork.
- Lower the height of the thermostats to ADA levels.
- Patch any test holes or leaks on the air handling unit.

03 STUDENT CTR/CAFETERIA 'C'
04 STUDENT SERVICES 'B'
05 CLASSROOM BUILDING 'A'

Gas water heater

Gas water heater flue

Overhead piping

Student center

General Description

- The Student Center/Cafeteria buildings are consisting of building 'A', 'B', & 'C'. They were constructed in 1970. Building 'C', Cafeteria portion tenant improvement took place thereafter.

Piping

- Domestic hot and cold water piping are galvanized steel including the Cafeteria piping. Some part of the piping has been rusted out, especially in central plant area level 2294 building 'B'.
- Gas piping system is galvanized steel. Gas pressure regulator outside the building delivers gas at low pressure to the building. Gas piping is in fair condition.
- Waste piping is service weight cast iron.

Fixtures

- Water closets are wall mounted flush valve with new Geberit automatic flush valves. Units are in fair condition.
- Urinals are wall mounted flush valve with new Geberit automatic flush valves. Units are in fair condition.
- Lavatories are wall mounted with newly furnished Geberit automatic faucets. Units are in fair condition.
- Floor drains do not have trap primer; therefore they do not comply with current code.
- Floor sinks in equipment rooms building 'B' do not connect to trap primers, and the room is being used as outside air plenum; therefore they do not comply with the current code.
- Hose bibs in and outside of the building do not have vacuum breakers; therefore they do not comply with current code.
- Wall mounted electric water cooler and drinking fountain outside of toilet room building 'B' are in poor condition.

03 STUDENT CTR/CAFETERIA 'C'
04 STUDENT SERVICES 'B'
05 CLASSROOM BUILDING 'A'

Cafeteria second floor sink

A hose bibb without vacuum breaker, hose connects to hosebibb and drops into floor sink.

Equipment

- An electric water heater without expansion tank is located above ceiling of room A-107 services building 'A'.
- A central gas fired water heater is located in equipment room B-117 services building 'B'. The unit does not have expansion tank and earthquake straps; therefore it does not comply with current code. Unit is in poor condition.
- A gas water heater is located outside, north-west of building 'C' serving Cafeteria. Unit was installed in 1992 and is in fair condition.
- An electric water heater is located in Dressing room C-128 without expansion servicing Nurse's office.
- An electrical water heater is located under the sink on second in floor room C-230 without expansion tan

Fire Protection

- Closets and Custodian rooms building 'A' ,'B', 'C' and equipment room C-117 are covered by automatic fire sprinkler heads. The water supply is connected to (**Junior fire sprinkler system**) domestic water mains inside the building via OS&Y valves, check valves and flow switches.

Utilities Load

- Domestic cold water: 148 FU = **80 GPM**
- Sewer: **5 Fixture Units, building 'A'.**
  149 Fixture Units, building 'B'.
  21 Fixture Units, building 'C'.
- Natural Gas: 4" low pressure gas main via a gas pressure regulator.
- Building 'B' (2) space heating boilers each at 1500 CFH and water heater at 155 CFH.
- Building 'C' water heater at 200 CFH and cooking equipment at 2500 CFH.
- **Total natural gas load 5,855 CFH.**

03 STUDENT CTR/CAFETERIA 'C'
04 STUDENT SERVICES 'B'
05 CLASSROOM BUILDING 'A'

Recommendations

- Re-pipe the whole building complex and replace all galvanized domestic hot and cold water piping with copper piping.
- Provide and install trap primers to all floor drains and floor sinks.
- Provide and install half or ¾ grating over all floor sinks.
- Provide new hose bibs to replace existing, or install vacuum breakers at all existing hose bibs.
- Provide and install appropriate size expansion thank at all domestic gas or electric water heaters.
- Provide and install approved earthquake straps and bracings for all water heaters and circulating pumps.
- Replace gas water heater in equipment room B-117 services building 'B' with a new unit to match existing.
- Provide and install gas earthquake valve upstream of the existing pressure regulator.
- Install a grease interceptor and divert all kitchen grease waste to the interceptor prior connecting to the site sewer.
- Inspect all domestic water pressure reducing valves for proper operation.
- Inspect and test all backflow preventers by a certified agency for proper operation.
- Drain and clean all junior fire sprinkler systems. Test OS&Y valves, check valves and flow switches for proper operation.

03 COLLEGE CENTER

Figure 1 – Distribution panel

Figure 2 – Panel with time clock

Figure 3 – Simplex fire alarm equipments

Power System Description

- Service to the complex consisted of high voltage feed at 4160V stepped down by several transformers to 120/208V, 3ø, 4-wire and 480V, 3ø, 3-wire systems.
    - 30KVA transformer (T-1) 4160-480V with 12A oil-filled fuse cut-outs.
    - 225KVA transformer (T-2) 4160-120/208V with 65A oil-filled fuse cut-outs.
    - 100A, 480V, 3ø, 3-wire distribution panel "DP-DA".
    - 600A, 120/208V, 3ø, 4-wire distribution panel "DP-DB".
- Power distribution for the building consisted of the following:
    - (3) Panel boards: K1, K2 and K3.
    - (1) Motor control center (MCC): AP-4

Lighting System

- Lighting fixtures are recently retrofitted with high efficiency fixtures by Siemens.
- General lighting consists of fluorescent fixtures with T-8 lamps.
- Exit lights are master/slave pair of overhead and low level exit fixtures with backup power.
- Most exit signs are illuminated.

Fire Alarm System

- Simplex Fire Alarm equipment are installed.
- Fire alarm pull stations are installed at exits.
- Fire alarm horns are installed at lobbies and corridors.
- Not ADA compliant.

Recommendations

- The low voltage distribution equipment are discontinued models from Zinsco and no replacement parts are available. However, these existing equipment are still in good working condition and require regular inspection and maintenance.
- The oil-filled fuse cut-outs are discontinued models from G&W and no replacement parts are available. These equipment are in excess of their life expectancy. At this time, these equipment are still in good working condition and there is no immediate need of replacement. However, if any of the building will require renovations, replacement of all electrical equipment is strongly recommended.
- Periodic inspection of and, if necessary, torque adjustments of wire terminations at panel boards and distribution boards are recommended to eliminate possible loose connections.
- The power, lighting and life safety systems of this facility are adequate for its present requirements. Any future major additions or expansion would require a reassessment of its existing power, lighting and life safety infrastructure for adequacy.
- Exit signage should be reviewed for compliance.

03 COLLEGE CENTER

Figure 1 – View of Student Center/Cafeteria building.

Building Identification (see figure 1)

Existing freestanding illuminated concrete sign is showing signs of decay. Scale of the sign and its copy is too small for larger buildings. Concrete sign is not visible as it blends with concrete architecture. Illuminated sign panel is too small to identify buildings with several names, uses or departments. Exposed screws are visible in sign face. Illuminated faces do not provide the best copy visibility.

Existing wall mounted signs have exposed fasteners thru face.

Option A Recommendation:

Repair concrete and sandblast to clean. Retrofit lamping and wiring. Replace acrylic panel with painted aluminum panel with routed out copy so that just the copy illuminates.

Option B Recommendation:

Provide new sign system with freestanding and/or wall mounted signs. Use of a consistent sign color will enable signage to be easily recognized and stand out against building color and landscape.

- Freestanding: Provide new illuminated painted sign cabinet with larger routed illuminated building names and/or departments.
- Wall Mounted: Provide new sign panels or individual letters mounted to building face or low walls. Sign panels/copy size scaled to size of building.

ADA:

Provide sufficient accessibility information and directionals to navigate to an accessible entrance or path.

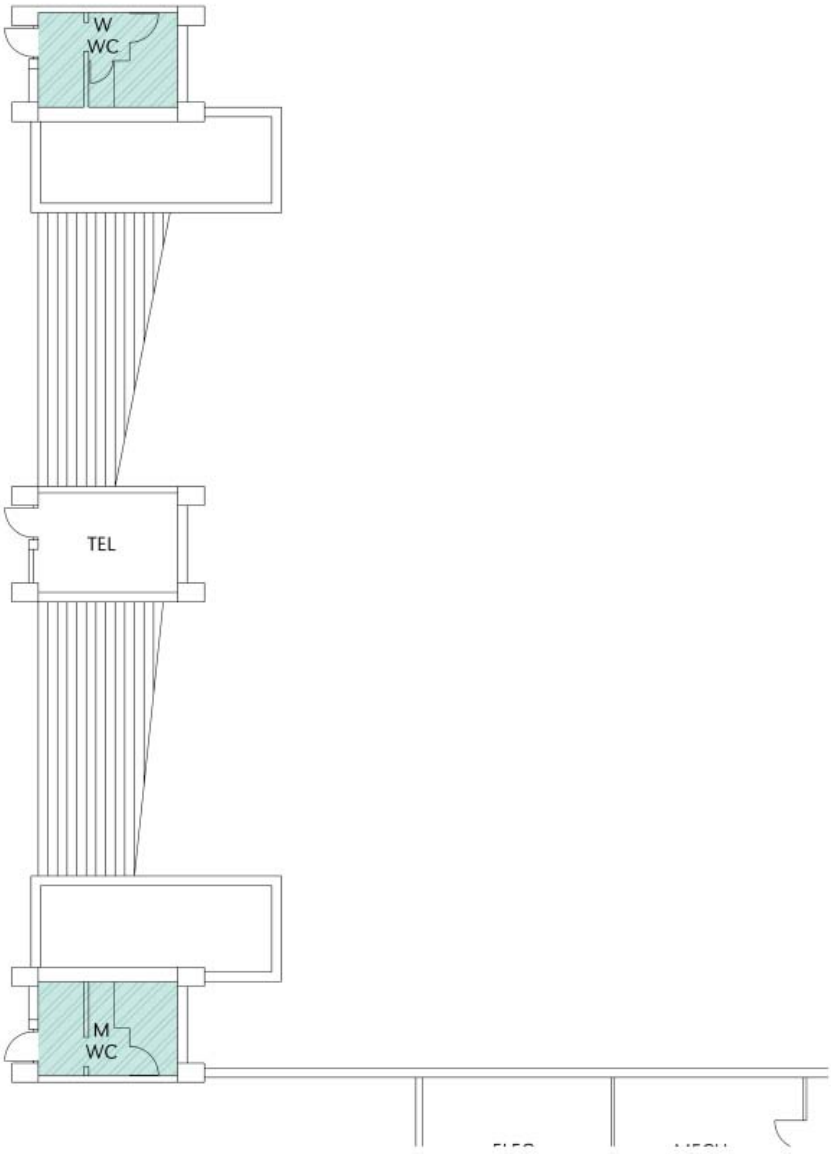
4 | STUDENT SERVICES A

04 STUDENT SERVICES A

SQUARE FOOTAGE:

	ASF	GSF
FIRST LEVEL		2,625
SECOND LEVEL	1,375	2,505
THIRD LEVEL	3,415	5,725
TOTAL	4,790	10,855

04 STUDENT SERVICES A



FIRST LEVEL (1 of 2)

1" = 20'

Two code-compliant exits required

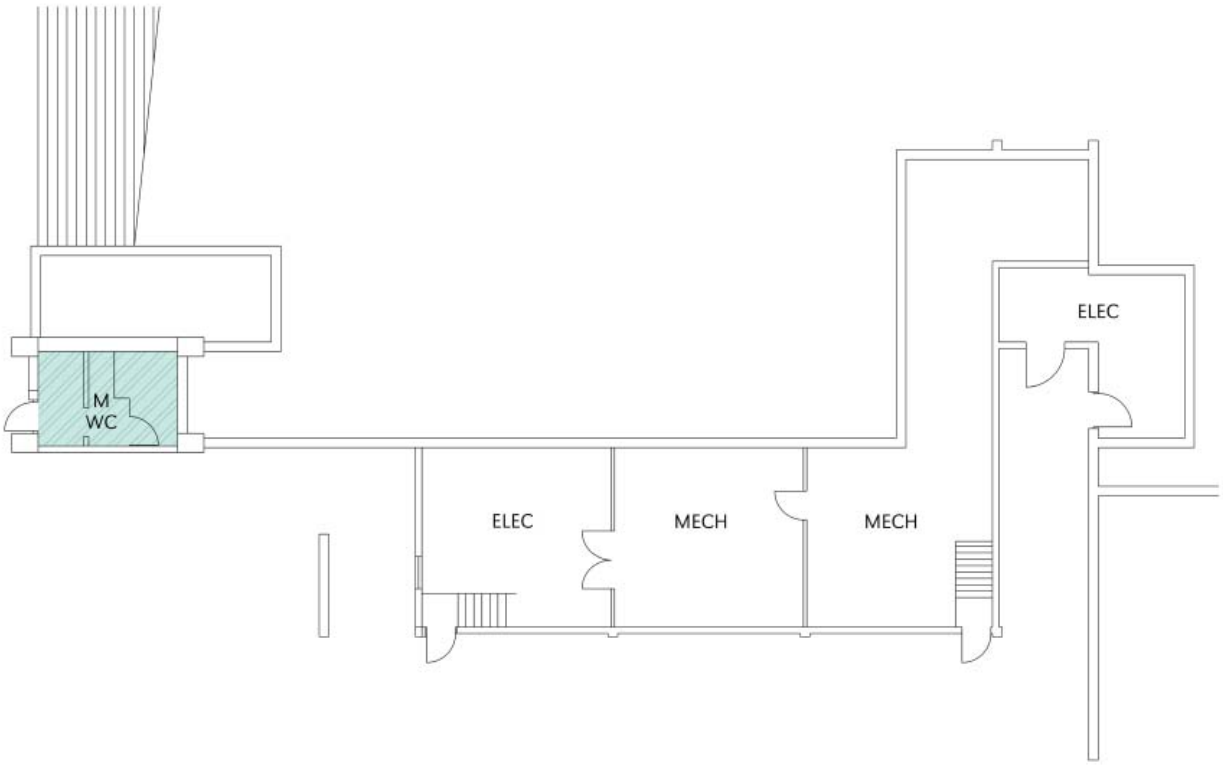
Inaccessible area (non-ADA)

Sprinklered area

More than one intervening room to exit

Non-compliant exit route

04 STUDENT SERVICES A



FIRST LEVEL (2 of 2)

1" = 20'

Two code-compliant exits required

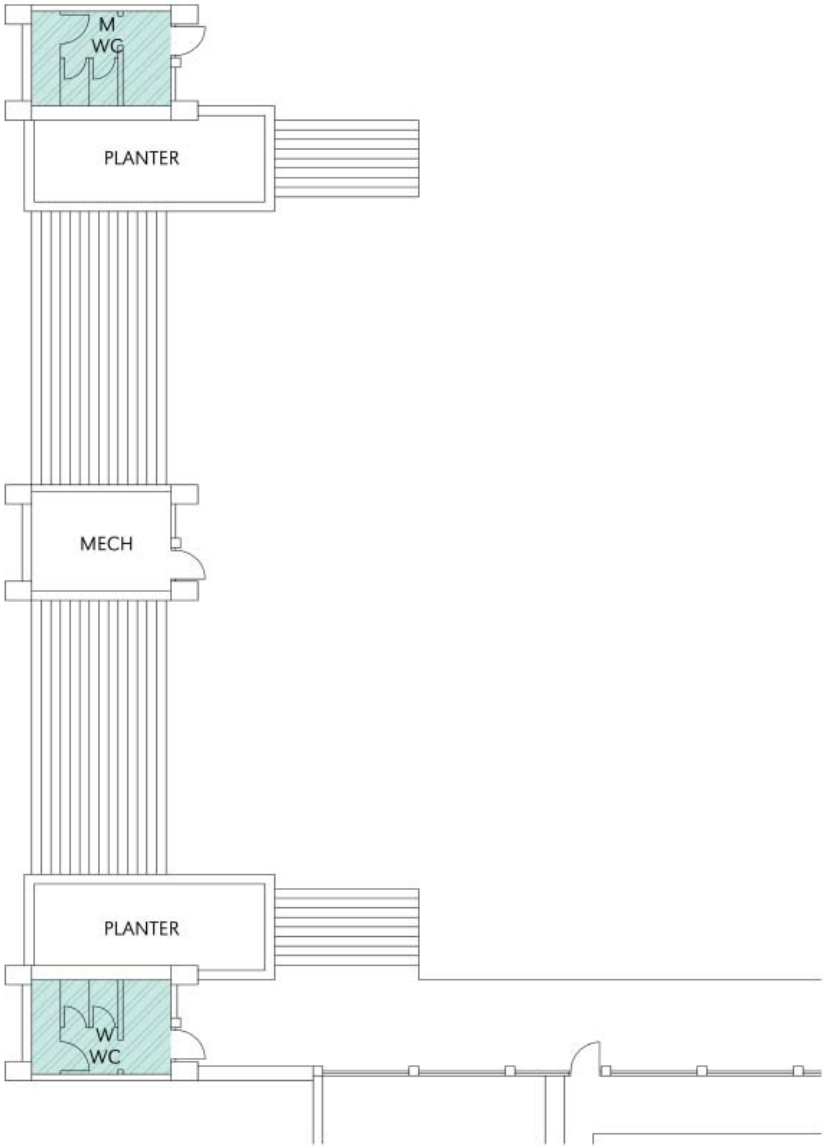
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

04 STUDENT SERVICES A



SECOND LEVEL (1 of 2)

1" = 20'

Two code-compliant exits required

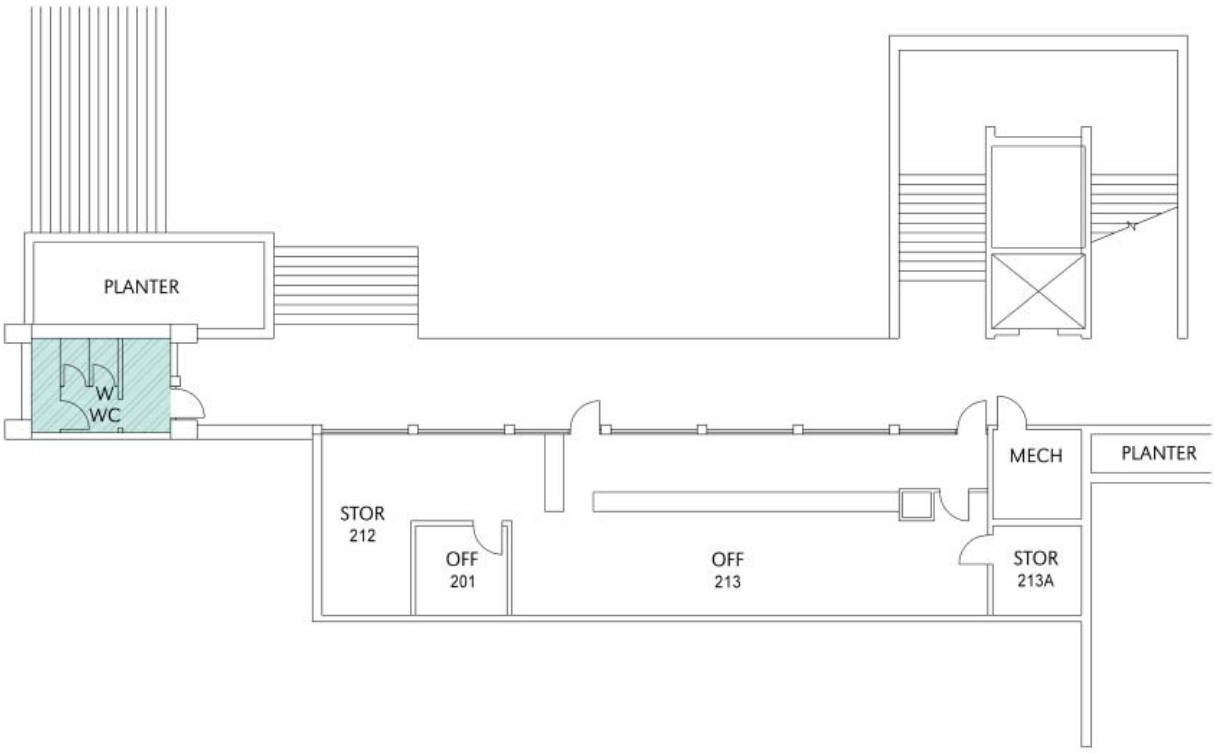
Inaccessible area (non-ADA)

Sprinklered area

More than one intervening room to exit

Non-compliant exit route

04 STUDENT SERVICES A



SECOND LEVEL (2 of 2)

1" = 20'

Two code-compliant exits required

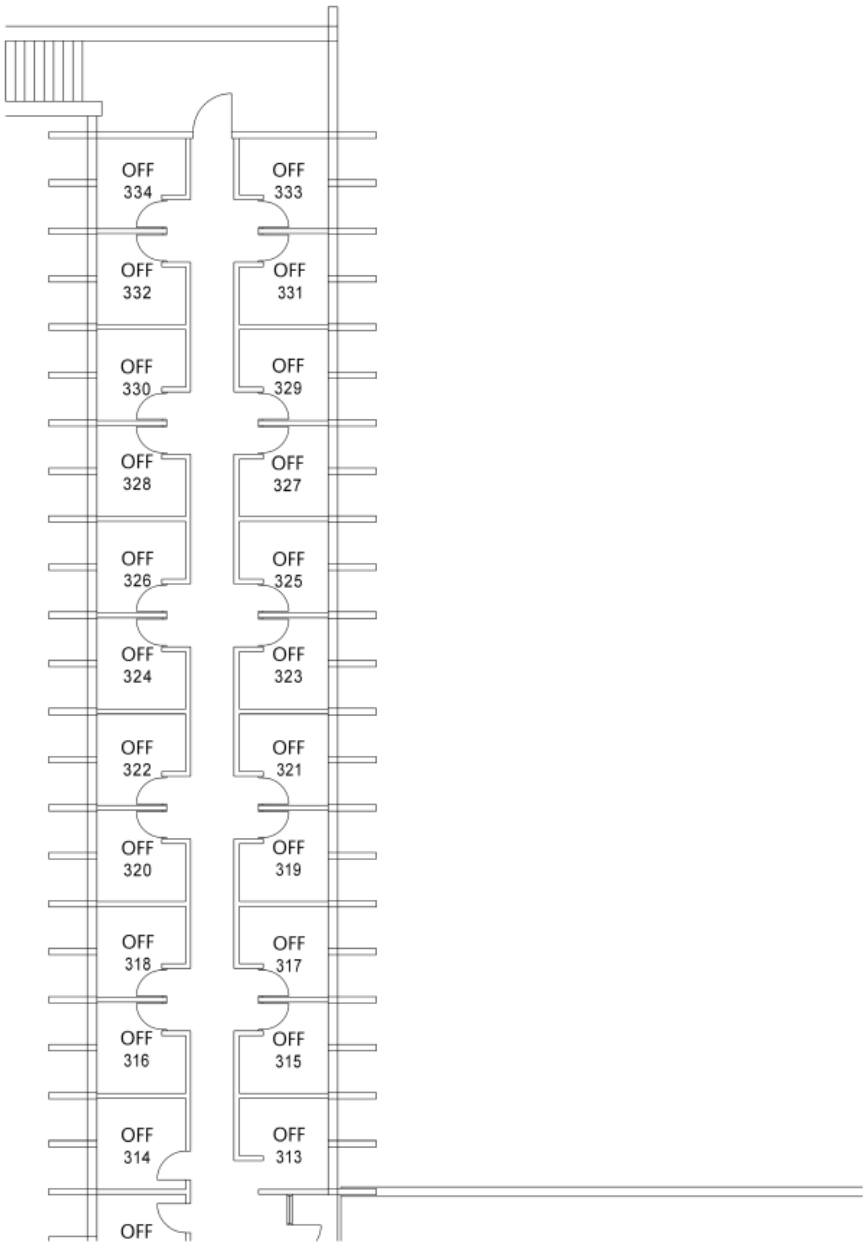
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

04 STUDENT SERVICES A



THIRD LEVEL (1 of 2)

1" = 20'

Two code-compliant exits required

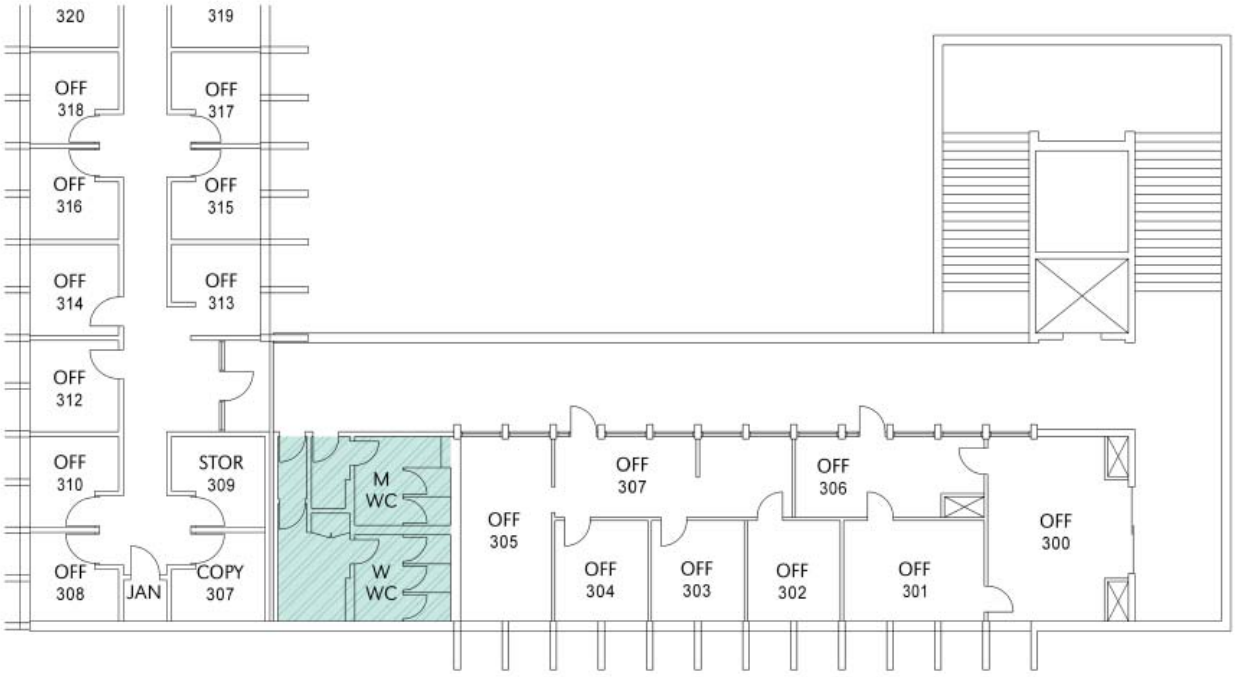
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

04 STUDENT SERVICES A



THIRD LEVEL (2 of 2)

1" = 20'

Two code-compliant exits required

More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

04 STUDENT SERVICES A

Hallway - Exposed and unlocked electrical panels.

Office - Electrical outlet not mounted or secured.

Exterior stair - No handrail.

Student Services A roof - Signs of ponding.

Fire & Life Safety

- No fire sprinklers or smoke detectors.
- Lack of illuminated exit signs.
- Electrical panels are not located in closets.
- No GFCI outlets throughout.
- Upgrades to panic hardware required.

ADA

- Many doors throughout do not have proper push/pull side clearances.
- Lack of compliant door hardware throughout.
- Non-compliant toilet rooms and fixtures.
- Non-compliant handrails and handrail extensions; lack of handrails at some exterior stairs.
- Contrast warning stripes must be added to treads at exterior stairs.

Maintenance

- Replace acoustic and adhered ceiling tiles due to wear.
- Carpet and VCT needs to be replaced due to stains, gouges, or wear.
- Replace diffuser grills.
- Replace wall base throughout.
- Replace closers on doors.
- Existing roof is a built-up roofing system.
- Signs of ponding.
- Blisterings occurs at several locations.
- Building up roofing is dry and cracked.
- Perimeter flashing seems to be in good condition
- Drains need to be cleared
- Flexible flashing at building joint has tears and is delaminating.

04 STUDENT SERVICES A

Building Description

Site and Building Configuration

The site slopes down in the south direction from the second level to the first level at the south wing and slopes down in the west direction from the second level to the first level where the west wing occurs. The building, constructed in 1972, has 9,970 square feet, and consists of a south wing seismically separated from the west wing at the roof and second floor. The south wing is three stories high with the second floor being approximately 12 feet high, the third floor being approximately 24 feet high, and the roof being approximately 36 feet high. There is a clock tower on the east end on the north side of this wing, which is approximately 60 feet high. The west wing is two stories high with the second floor being approximately 24 feet high and the roof being approximately 36 feet high. There is a bridge between the student services building and the student center, which occurs on the north end on the west side of this wing. The bridge is seismically separated from the student center.

Structural System

Structural plans were available for this building. The primary gravity system for all levels consists of concrete decks spanning to concrete beams, which span to concrete walls. The foundation system consists of a combination of spread footings and continuous footings. Evidence of settlement was not observed.

The primary lateral system consists of concrete diaphragms spanning to exterior and interior concrete walls.

Overall Seismic Deficiencies and Expected Seismic Performance

The south wing has lateral load resisting walls from the height of 24 feet to 36 feet, which occur at the southeast corner, which are not continuous to the ground. The west wing at the same level has lateral load resisting walls on the north and south ends which are not continuous to the ground. Also, north south lateral load resisting walls of the first floor of the west wing appear to be inadequate. Therefore ESI recommends analysis of the lateral load resisting concrete walls to determine if they possess adequate strength to resist seismic loads. Included is figure 1 which shows the location of proposed new walls. The length and location of the walls is shown for budgeting purposes only and will be revised based on the future analysis. In a seismic event the windows and non-bearing gypboard walls would probably suffer typical damage in the form of

broken glass and cracked gypboard walls. The ceiling would probably suffer typical damage in the form of cracked and displaced tiles.

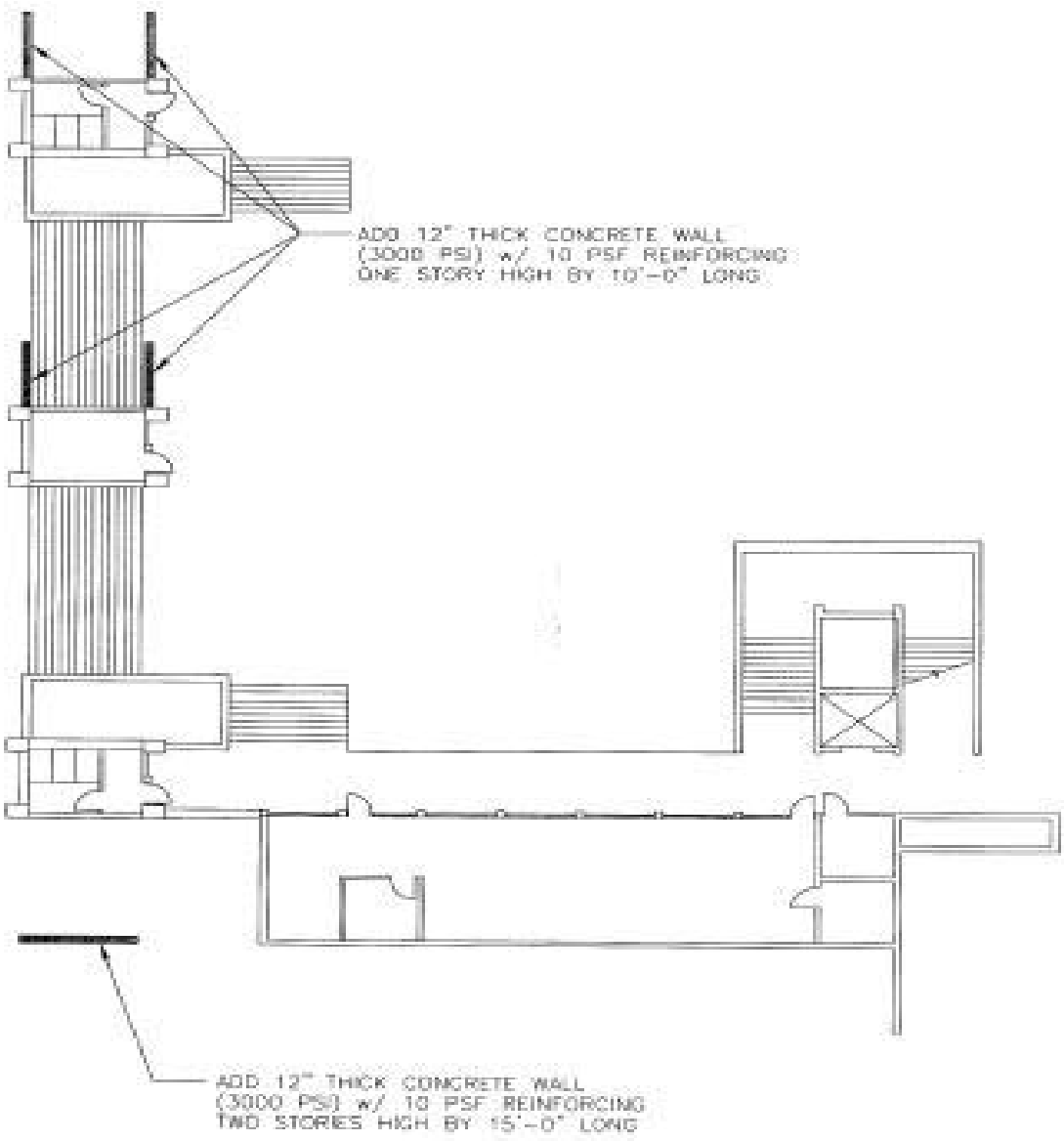


FIGURE 1. PROPOSED ADDITIONAL WALL LOCATION

04 STUDENT SERVICES A

Figure 1 – Example of vibration isolators that are shot and need to be replaced.

Figure 2 – Example of no seismic bracing on the piping or the duct work.

Figure 3 – Example of door gaskets that need to be replaced.

General Description

The student services A building is a two story building and was constructed in 1970. The building contains the secondary campus chiller/boiler plant, located on the first floor. Two constant volume single zone units serve the building. Reheat coils are installed in the supply air duct branches serving each individual office. The air handling units receive the required heating hot and chilled water from the secondary boiler and chiller plants.

Deficiencies

General

- No insulation is provided for the walls and roof.
- Thermostats are mounted at heights noncompliant with the American's with Disabilities Act (ADA).
- No seismic bracing is provided for the piping and the ductwork.

Mechanical Room #211

Contains one single zone air handling unit.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.

Mechanical Room #226

Contains one single zone air handling unit.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.

Secondary Central Plant

- Pumps have no flexible connection.
- Expansion tank has no seismic bracing.
- No seismic bracing on piping and ductwork.
- According to the maintenance building supervisor the underground chilled and heating hot water distribution system has developed numerous leaks and has severely deteriorated. This causes frequent system shutdown for maintenance.

04 STUDENT SERVICES A

Recommendations

- Install flexible connections on the pumps.
- Install seismic bracing on the expansion tank.
- Replace the bearings on the fans.
- Replace the fans' sheaves and belts.
- Environmentally clean the air handling units and ductwork.
- Refurbish the air handling units.
- Install P-traps on condensate drains.
- Replace vibration isolators on the air handling units.
- Replace the gaskets on the unit's doors.
- Replace the interior liner.
- Lower the height of the thermostats to ADA levels.
- Install seismic bracing on the piping.
- Install seismic bracing on the ductwork.
- Patch any test holes or leaks on the air handling units.
- Replace existing underground chilled and heating hot water distribution systems.

03 STUDENT CTR/CAFETERIA 'C'
04 STUDENT SERVICES 'B'
05 CLASSROOM BUILDING 'A'

Gas water heater

Gas water heater flue

Overhead piping

Student center

General Description

- The Student Center/Cafeteria buildings are consisting of building 'A', 'B', & 'C'. They were constructed in 1970. Building 'C', Cafeteria portion tenant improvement took place thereafter.

Piping

- Domestic hot and cold water piping are galvanized steel including the Cafeteria piping. Some part of the piping has been rusted out, especially in central plant area level 2294 building 'B'.
- Gas piping system is galvanized steel. Gas pressure regulator outside the building delivers gas at low pressure to the building. Gas piping is in fair condition.
- Waste piping is service weight cast iron.

Fixtures

- Water closets are wall mounted flush valve with new Geberit automatic flush valves. Units are in fair condition.
- Urinals are wall mounted flush valve with new Geberit automatic flush valves. Units are in fair condition.
- Lavatories are wall mounted with newly furnished Geberit automatic faucets. Units are in fair condition.
- Floor drains do not have trap primer; therefore they do not comply with current code.
- Floor sinks in equipment rooms building 'B' do not connect to trap primers, and the room is being used as outside air plenum; therefore they do not comply with the current code.
- Hose bibs in and outside of the building do not have vacuum breakers; therefore they do not comply with current code.
- Wall mounted electric water cooler and drinking fountain outside of toilet room building 'B' are in poor condition.

03 STUDENT CTR/CAFETERIA 'C'
04 STUDENT SERVICES 'B'
05 CLASSROOM BUILDING 'A'

Cafeteria second floor sink

A hose bibb without vacuum breaker, hose connects to hosebibb and drops into floor sink.

Equipment

- An electric water heater without expansion tank is located above ceiling of room A-107 services building 'A'.
- A central gas fired water heater is located in equipment room B-117 services building 'B'. The unit does not have expansion tank and earthquake straps; therefore it does not comply with current code. Unit is in poor condition.
- A gas water heater is located outside, north-west of building 'C' serving Cafeteria. Unit was installed in 1992 and is in fair condition.
- An electric water heater is located in Dressing room C-128 without expansion servicing Nurse's office.
- An electrical water heater is located under the sink on second in floor room C-230 without expansion tan

Fire Protection

- Closets and Custodian rooms building 'A' ,'B', 'C' and equipment room C-117 are covered by automatic fire sprinkler heads. The water supply is connected to (**Junior fire sprinkler system**) domestic water mains inside the building via OS&Y valves, check valves and flow switches.

Utilities Load

- Domestic cold water: 148 FU = **80 GPM**
- Sewer: **5 Fixture Units, building 'A'.**
  149 Fixture Units, building 'B'.
  21 Fixture Units, building 'C'.
- Natural Gas: 4" low pressure gas main via a gas pressure regulator.
- Building 'B' (2) space heating boilers each at 1500 CFH and water heater at 155 CFH.
- Building 'C' water heater at 200 CFH and cooking equipment at 2500 CFH.
- **Total natural gas load 5,855 CFH.**

03 STUDENT CTR/CAFETERIA 'C'
04 STUDENT SERVICES 'B'
05 CLASSROOM BUILDING 'A'

Recommendations

- Re-pipe the whole building complex and replace all galvanized domestic hot and cold water piping with copper piping.
- Provide and install trap primers to all floor drains and floor sinks.
- Provide and install half or ¾ grating over all floor sinks.
- Provide new hose bibs to replace existing, or install vacuum breakers at all existing hose bibs.
- Provide and install appropriate size expansion thank at all domestic gas or electric water heaters.
- Provide and install approved earthquake straps and bracings for all water heaters and circulating pumps.
- Replace gas water heater in equipment room B-117 services building 'B' with a new unit to match existing.
- Provide and install gas earthquake valve upstream of the existing pressure regulator.
- Install a grease interceptor and divert all kitchen grease waste to the interceptor prior connecting to the site sewer.
- Inspect all domestic water pressure reducing valves for proper operation.
- Inspect and test all backflow preventers by a certified agency for proper operation.
- Drain and clean all junior fire sprinkler systems. Test OS&Y valves, check valves and flow switches for proper operation.

04 STUDENT SERVICES A

Figure 1 – Switchboard

Figure 2 – Motor control center

Figure 3 – Oil-filled fuse cutouts

Figure 4 – Panel board A2-1

Power System Description

- Service to the complex consisted of high voltage feed at 4160V stepped down by several transformers to 120/208V, 3ø, 4-wire and 277/480V, 3ø, 4-wire systems.
    - 300KVA transformer (T-3) 4160-277/480V with 100A oil-filled fuse cut-outs.
    - 300KVA transformer (T-4) 4160-120/208V with 100A oil-filled fuse cut-outs.
    - 400A, 480V, 3ø, 3-wire distribution panel "CA".
    - 800A, 120/208V, 3ø, 4-wire distribution panel "CB".
- Power distribution for the building consisted of the following:
    - (5) Panel boards: A1-1, A1-2, A2-1, A3-1 and A3-2.
    - (4) Motor control center (MCC): ABP, ACP, AP-2 and AP-3.

Lighting System

- Lighting fixtures are recently retrofitted with high efficiency fixtures by Siemens.
- General lighting consists of fluorescent fixtures with T-8 lamps.
- Exit lights are master/slave pair of overhead and low level exit fixtures with backup power.
- Exit signage is deficient. Most exit signs are illuminated.

Fire Alarm System

- Simplex Fire Alarm equipment are installed.
- Fire alarm pull stations are installed at exits.
- Fire alarm horns are installed at lobbies and corridors.
- Not ADA compliant.

04 STUDENT SERVICES A

Figure 5 – Telecom room

Recommendations

- The low voltage distribution equipment are discontinued models from Zinsco and no replacement parts are available. However, these existing equipment are still in good working condition and require regular inspection and maintenance.
- The oil-filled fuse cut-outs are discontinued models from G&W and no replacement parts are available. These equipment are in excess of their life expectancy. At this time, these equipment are still in good working condition and there is no immediate need of replacement. However, if any of the building will require renovations, replacement of all electrical equipment is strongly recommended.
- Periodic inspection of and, if necessary, torque adjustments of wire terminations at panel boards and distribution boards are recommended to eliminate possible loose connections.
- The power, lighting and life safety systems of this facility are adequate for its present requirements. Any future major additions or expansion would require a reassessment of its existing power, lighting and life safety infrastructure for adequacy.
- Exit signage should be reviewed for compliance.

04 STUDENT SERVICES A

Figure 1 – View of freestanding building identification sign.

Figure 2 – View of wall mounted and suspended department identification signs.

Building Identification (see figures 1 & 2)

Existing freestanding illuminated concrete sign is showing signs of decay. Scale of the sign and its copy is too small for larger buildings. Concrete sign is not visible as it blends with concrete architecture. Illuminated sign panel is too small to identify buildings with several names, uses or departments. Exposed screws are visible in sign face. Illuminated faces do not provide the best copy visibility.

Existing wall mounted signs have exposed fasteners thru face.

Option A Recommendation:

Repair concrete and sandblast to clean. Retrofit lamping and wiring. Replace acrylic panel with painted aluminum panel with routed out copy so that just the copy illuminates.

Option B Recommendation:

Provide new sign system with freestanding and/or wall mounted signs. Use of a consistent sign color will enable signage to be easily recognized and stand out against building color and landscape.

- Freestanding: Provide new illuminated painted sign cabinet with larger routed illuminated building names and/or departments.

- Wall Mounted: Provide new sign panels or individual letters mounted to building face or low walls. Sign panels/copy size scaled to size of building.

ADA:

Provide sufficient accessibility information and directionals to navigate to an accessible entrance or path.

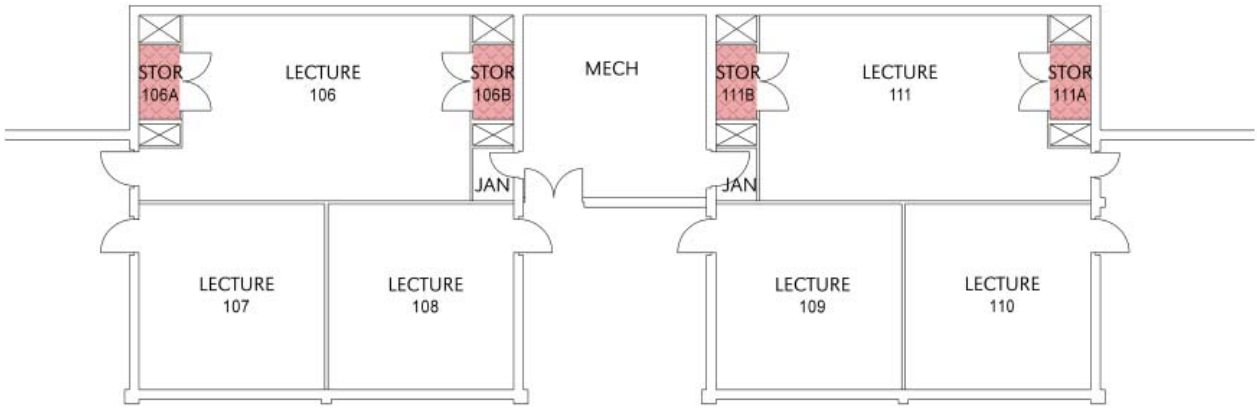
5 | CLASSROOM BUILDING

05 CLASSROOM BUILDING

SQUARE FOOTAGE:

	ASF	GSF
FIRST LEVEL	2,835	3,755
SECOND LEVEL	2,875	3,355
TOTAL	5,710	7,110

05 CLASSROOM BUILDING



FIRST LEVEL

1" = 20'

Two code-compliant exits required

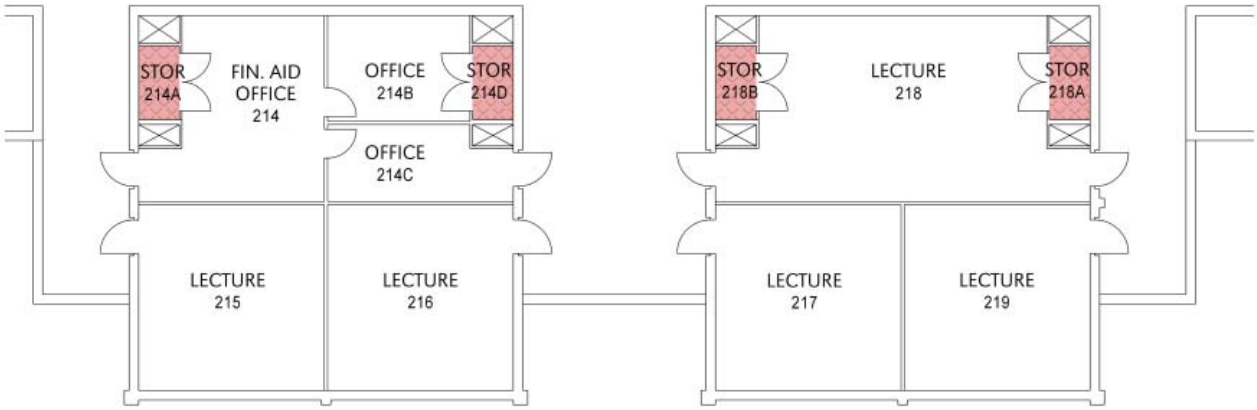
More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

05 CLASSROOM BUILDING



SECOND LEVEL

1" = 20'

Two code-compliant exits required

More than one intervening room to exit

Inaccessible area (non-ADA)

Non-compliant exit route

Sprinklered area

05 CLASSROOM BUILDING

Lecture 216 - Typical classroom.

Fire & Life Safety

- No fire sprinklers only located in storage closets.
- No smoke detectors.
- Lack of illuminated exit signs and/or exit signs missing from some areas.
- No GFCI outlets throughout.
- Addition of panic hardware required.
- Exposed electrical and data conduit throughout.

Water damage at ceiling

Water damage at wall

ADA

- Lack of compliant door hardware throughout.
- Non-compliant handrails and handrail extensions.
- Contrast warning stripes must be added to treads at exterior stairs.
- No accessible seating in classrooms.
- Replace closers at all exterior doors - doors require too much force to open.

Classroom Building - Signs of ponding.

Supply air register - Occupants have partially blocked register as a means of controlling air flow.

Maintenance

- Prevalent water damage to ceilings and walls throughout.
- Replace adhered ceiling tiles due to water damage.
- Carpet needs to be replaced due to stains, gouges, or wear.
- Light levels in some classrooms are insufficient.
- Replace diffuser grills.
- Replace wall base throughout.
- Existing roof is a built-up roofing system.
- Signs of significant ponding
- Heavy blistering throughout.
- Flashing seems to be in reasonable condition

05 CLASSROOM BUILDING

Building Description

Site and Building Configuration

The site is a slope from the north side down one level to the south side. The building, constructed in 1972, has 6800 square feet and is two stories high. The second floor is approximately 12 feet high and the roof, including entry trellis, is approximately 24 feet high.

Structural System

Structural plans were available for this building. The primary roof and second floor gravity system consists of a concrete deck spanning to concrete beams which span to exterior and interior concrete walls. The trellis on the north, east, and west sides consists of concrete beams and columns. The foundation system consists of continuous footings. Evidence of settlement was not observed.

The primary lateral system consists of concrete diaphragms spanning to exterior and interior concrete walls.

Overall Seismic Deficiencies and Expected Seismic Performance

The building has well distributed lateral load resisting concrete walls. In a seismic event the windows and non-bearing gypboard walls would probably suffer typical damage in the form of broken glass and cracked gypboard walls. The ceiling would probably suffer typical damage in the form of cracked and displaced tiles.

05 CLASSROOM BUILDING

Figure 1 – Example of vibration isolators that are shot and need to be replaced.

Figure 2 – Example of no seismic bracing on the piping or the duct work.

Figure 3 – Example of door gaskets that need to be replaced.

General Description

The Classroom Building was constructed in 1970 and is two floors high. A multi-zone air handling unit located in the mechanical room serves the entire building. The air handling unit receives the required heating hot and chilled water from the secondary boiler and chiller plant, located in the Student Services A Building.

Deficiencies

General

- No insulation is provided for the walls and roof.
- Thermostats are mounted at heights noncompliant with the American's with Disabilities Act (ADA).
- No seismic bracing is provided for the piping and the ductwork.

Mechanical Room #106

Contains one multi-zone air handling unit.

- No P-trap is provided on the condensate drain, allowing unit to leak conditioned air through the pipe.
- The air handling unit and ductwork need environmental cleaning.
- The gaskets on the air handling unit's doors need to be replaced.
- The air handling unit's interior liner is in poor condition and needs to be replaced.
- Spring vibration isolators for the air handling unit are shot and need to be replaced.

Recommendations

- Replace the bearings on the fans.
- Replace the fans' sheaves and belts.
- Environmentally clean the air handling unit and ductwork.
- Refurbish the air handling unit.
- Install P-trap on the condensate drain.
- Install seismic bracing on the piping.
- Install seismic bracing on the ductwork.
- Replace vibration isolators on the air handling unit.
- Replace the gaskets on the unit's doors.
- Replace the interior liner.
- Lower the height of the thermostats to ADA levels.
- Patch any test holes or leaks on the air handling unit.