SAN BERNARDINO COUNTY

Crime Science Laboratory

NEEDS ASSESSMENT

20 June 2007
DRAFT

Project Number 07187.00

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1.0 PREFACE

On March 7, 2007, Durrant, in partnership with SmithGroup, both located in Phoenix, Arizona entered into a contract with the County of San Bernardino, California. The scope of work included the necessary research and documentation required to prepare a Needs Assessment for the planned new Forensic Science Laboratory for San Bernardino County. It also specified a Master Plan study with the aim of exploring development options for two proposed project sites: one located at the corner of Rialto Avenue and Lena Road, the other directly adjacent to the existing facility.

The purpose of this report is to provide documentation justifying the need for a new forensic science laboratory facility and developing a design concept for these new facilities. Construction costs and other project development costs have been documented herein. The team was also charged with identifying the space needs into the future targeting the move-in date of 2009 and subsequent ten year projections into the future to the year 2029.

The purpose of this report is to provide documentation justifying the need for a new forensic laboratory and developing a design concept for these new facilities.

The needs assessment effort for this report first involved an examination of the existing crime laboratory. The existing crime lab facility was added to a former county agricultural laboratory and has been remodeled several times. To accommodate growth, CAL Id was relocated to a separate facility approximately a mile away. Two prefabricated, portable office buildings have been added for Firearms and another unit to meet the office needs of Forensic Biology.

Assessment tasks also included an examination of the need for a new ballistics testing firing range for the new facility. The existing laboratory does not have a firing range and relies on an aging water tank for small firearms and the local proficiency firing range for long barrel testing.

Within the justification section, the implications of terrorism on the design of forensic facilities are also examined. It is too early to draw final conclusions regarding the implications of recent events on new facilities because they are still being assessed by members of the forensic community. However, the team has begun to research facility needs pertaining to terrorism by interviewing crime lab directors for their input.

Finally, the need for additional staff for the Forensic Science Laboratory is also examined in this report. Information regarding the anticipated number of staff needed in 2009 (the expected date of project completion) and projections into the future, are made by

the extrapolation of previous and current case workloads, local crime trends and population data.

The Concept Design portion of the report was developed with the understanding that it is the intent of San Bernardino County to co-locate as many facilities as possible into a single facility. This may require phasing the project which is indicated as a part of the final concept prepared for this report. During the needs assessment an existing adjacent county-owned parcel of land was identified by the design team as a possible building location in addition to the parcel identified in the original scope of work which was included in the preliminary site concepts considered for the project.

The Concept Design section includes concept floor plans which show a logical fit of the programmed Forensic Science Laboratory into a new facility. The sizes and quantities of spaces shown in the concept floor plans are based on the programmed spaces documents in the Facility Program Analysis included herein.

Narratives for the scope of the project are also included. The narratives incorporate the scope of work for architectural, mechanical and electrical issues.

The team performed the work in three phases. The first phase was the Data Gathering Phase in which the team completed an evaluation of the existing facilities and interviewed the entire staff of the Scientific Investigations Division of San Bernardino County.

The second phase of the project consisted of a programming effort which included data projecting into the future. The final phase studied several site and floor concept options to meet the established needs of the Scientific Investigations Division on the two different county-owned proposed sites.

1.1 Acknowledgements

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2.0 EXECUTIVE SUMMARY

2.1. Introduction

The Executive Summary provides the reader with a condensed review of the Needs Assessment. This overview includes the following categories:

1. Report Objective
2. Methodology
3. Proposed Staff and Space Needs
4. Existing Facilities Analysis
5. Site Analysis
6. Conceptual Master Plan
7. Scope of Work
8. Conclusions

This summary documents all of the conclusions and supporting information contained herein.

The objective of this Needs Assessment is to provide documentation reviewing and analyzing the existing Forensic Science Laboratory . . .

2.2. Objective

The objective of this Needs Assessment is to provide documentation reviewing and analyzing the existing Forensic Science Laboratory in San Bernardino County, establishing the needs of a new facility and completing a conceptual Master Plan to realize the selected concept.

This Needs Assessment has been prepared, in accordance with San Bernardino Agreement Number 07-159, dated February 27, 2007 by Durrant in association with SmithGroup Inc., both of Phoenix, Arizona.

2.3. Methodology

Durrant/SmithGroup used a traditional three-step research process. These steps included a Data Collection Phase, Data Analysis and Documentation Phase and a Programming Phase. This was followed up with a Conceptual Master Plan Design Phase.

Tasks and techniques used during the data collection phase included:

- Examination of existing documentation including construction documents for the existing forensic crime lab and site documentation for both properties to assist in the Master Plan Design Phase;

- Tours of the existing facilities, both the laboratory facilities on Lena Road and Cal Id located on East Mill in a separate facility to allow the design team to observe and become familiar with the operations and procedures of the Special Investigation Department as well as to observe and document any deficiencies in the facility which might be in conflict with applicable codes, regulations, safety requirements, or accepted industry standards for similar facilities;

- Staff interviews and workshops were held in two parts. All departments were interviewed over a three day period the second week of March 2007. This was followed up with space and staffing workshops the second week of April 2007. Both meetings coincided with the facility tours noted above. The interviews and workshops were held to obtain as much information as possible regarding operations and procedures employed by the Forensic Science Laboratory. The design team also wanted to identify any desire operations or procedures that were not being employed because of existing facility constraints. The workshops were also used as a forum for the exchange of ideas in order to reach solutions designed to optimize space in the new proposed facility;

- Internet research for applicable data was completed to assist in defining the population data and crime trends of the service area. Most of the supporting data for this analysis was obtained from information available on the internet. Wherever such information was used, appropriate citations were given in the text of the report;

- Existing facility evaluations were completed for the existing Forensic Science Laboratory by the design team. The initial tour was completed during the second week of March 2007 with the department interviews which included members of the design team and the staff of each department; and

- Proposed site evaluations were completed during the second workshop in the second week of April 2007 with both the design team and county officials to review the proposed property defined in the original scope of work. During the course of these walks it was established that an additional opportunity existed regarding the property directly adjacent to the existing laboratory which has been included in this report.

Upon the conclusion of the Data Collection Phase, analysis and reports are prepared that form the basis of the Data Analysis and Documentation Phase include two major elements:

- The results of the interviews and workshops are gathered together

and analyzed on a departmental basis to form a Needs Assessment that accounts for both the current gross area and current employee requirements. For this report, the move in date of 2009 formed the baseline database. The spreadsheet format identifies spaces, workstations, equipment or any other elements that will occupy space in the proposed facility. This data is then projected into the future using the data collected in the previous phase;

- Back up data to this spreadsheet is provided that define the actual physical space requirements for different identifies tasks in the form of space standards and equipment requirements;
- The Programming Phase begins during the Documentation Phase with the following four major elements:
- The results of the first two phases inform the final proposed floor plan layout and phasing in practical terms of proper adjacencies and efficient circulation and are illustrated with the use of adjacency diagrams;
- Analysis of the existing facilities, including deficiencies and the operations and procedures taking place within these facilities to evaluate the ability of the existing laboratory to support the proposed spaces identified to be located there during the first phase of the final project;
- Analyze the probably cost of the proposed project to determine the best means of phasing the final project;
- Synthesizing all the data and analyses into a logical and usable format, ultimately forming this Needs Assessment Report.
- The Conceptual Master Plan Phase summarizes the conceptual master plan for the development of the new San Bernardino Forensic Science Laboratory. Included in this section is an overview of the design approach, test fit options for the different identified sites and scope of project narratives, diagrams and design criteria indicating the design team's analysis for this project.

2.4. Proposed Staff and Space Needs

The ultimate objective of the Needs Assessment is to arrive at an accurate estimate of gross area for the building and amount of staff necessary to effectively operate the proposed

new facility. The supporting documentation for this data is located at Section 4.2. This Report identifies the staff and combined space needs for the Forensic Science Laboratory at three target dates: 2009 (move-in), 2019 and 2029.

	2009		2019		2029	
Section	GSF	Staff	GSF	Staff	GSF	Staff
Administration	4,483	15				
Quality Assurance	705	3				
Forensic Biology	11,797	28				
Controlled Substances	3,697	8				
Blood and Breath Alcohol	1,894	4				
Firearms	4,576	6				
Trace Evidence	2,177	4				
Crime Scene Investigations	7,945	17				
Cal Id	7,879	37				
Property and Evidence	22,317	12				
Building Support	19,465	1				
Walls and Circulation	13,040	-				
Total	99,973	135				

2.5. Site Analysis

As noted previously, the original project included only the site adjacent to the existing Coroner's Facility. During the Data Collection and Documentation Phase parcels of land directly adjacent to the existing facility was identified that could be utilized for the new facility thus allowing greater interaction between currently anticipated construction phases of the work

To be included in the final document.

2.6. Conceptual Master Plan

To be included in the final document as foldout.

2.7 Cost Estimate

To be included in the final document.

2.8 Scope of Work

The proposed scope of this project was prepared addressing aspects of the project in terms of its elements of construction. Some of the important issues examined and documented follow. Details of these key issues are outlined in Section 5.

2.8.1 Environmental:

A Phase I ESA in general conformance with ASTM E 1527-05 was performed for both properties. The assessment revealed no evidence of recognized environmental conditions.

2.8.2 GeoTechnical:

The review of geologic literature indicates that the following details regarding both subject sites:

- The subject sites are not located within a designated Alquist-Priolo Earthquake Fault Zone (APEFZ) as defined by the State of California in the Alquist-Priolo Earthquake Fault Zoning Act.
- Anticipated high groundwater levels within the subject sites, in association with the proximity of the sites to active faults and the anticipated subsurface materials, indicate the sites are highly susceptible liquefaction and dynamic settlement event(s).
- According to FEMA, the project site is not located within a designated flood zone.

Based on our geotechnical assessment, both sites are suitable for the proposed developments.

2.8.3 Civil Engineering:

The civil scope of the project reviewed both properties with the following general findings:

- The west property includes a fill material of an unknown origin creating approximately a zero to ten foot high embankment in the middle of the property directly adjacent to the existing vehicle impound lot.
- A Water Quality Management Plan will be required as part of the development of this property. Project development will include the use of on-site retention systems to reduce runoff from the site.

- Rialto Avenue will require the south half to be fully improved should development require access from this road.
- The City of San Bernardino provides water to both sites at approximately 90 psi of static pressure with a twelve inch water line in both East Rialto Avenue and Lena Road.
- The City of San Bernardino provides sewer service to both sites. A ten inch line currently exists along East Rialto Avenue and a twenty-one inch line on the south end for the west property. Use of the ten inch line will require the use of a lift station and force main. An existing eight inch line on South Lena Road may need to be extended 300 feet north to service the southern portions of the project sites if the project is located along the southern edges of the properties. There is also an existing fifteen inch line running east to west south of the adjacent property which may be a viable point of connection with further research.
- Southern California Gas Company is the gas provider for both sites. Location of existing facilities have not been provided.
- Southern California Edison is the electrical service provider for both sites. Overhead lines exist on East Rialto Avenue carrying a 33kV circuit and 12kV circuit is available to serve the sites. It is possible these overhead lines will be removed and converted to an underground service at the expense of the County of San Bernardino.
- AT&T/SBC and Verizon are the telephone providers for this area.

2.8.4 Landscape Architecture:

The City of San Bernardino provides an Industrial zoning overlay on the property to which the County may or may not ----pay attention to. Landscape requirements for the project will therefore necessarily be self-imposed. The County of San Bernardion has indicated that every effort will be made to meet the requirements of the local jurisdiction. These requirements include:

- A minimum of 15% of the net area of all surface parking shall be landscaped with a minimum of one 24 inch box for every four spaces and a five to seven foot landscape strip should be provided between the parking and office portion of the structure.
- Vines on walls are appropriate to mitigate large, blank walls.

- Loading areas shall be screened from view and located at the rear of the property. Mechanical equipment, storage and trash areas shall also be screened.
- Perimeter walls shall not exceed six feet in height.

2.8.5 Architectural:

The architectural scope of the project addresses all aspects of the architectural design requirements of the project including life safety, foundations, walls, windows, doors, finishes, specialites and fixed equipment. Details of these requirements are documented in Section 4.5 of this report.

2.8.6 Mechanical Engineering:

The mechanical scope of the project addresses issues pertaining to plumbing, heating, ventilation and air conditioning, controls and fire protection. Details of these requirements are documented in Section 4.5 of this report.

2.8.7 Electrical Engineering:

The electrical scope addresses electrical work to be incorporated into the project. Such issues as lighting, power, emergency and egress lighting, uninterruptable power supply, fire alarm systems, telephone and data distribution and security systems are addresses. Details of these requirements are documented in Section 4.5 of this report.

2.9 Conclusions

To be included in the final document.

3.0 NEEDS ASSESSMENT

3.1 Introduction

The San Bernardino County Sheriff's Scientific Investigations Division (SID) occupies several buildings in San Bernardino, California, all of which are located on the same piece of property. These buildings are all located at 200 South Lena Road. Cal-ID, a separate unit associated with SID, is located at 880 East Mill Street approximately a mile away.

3.2 Objectives

This section of the Needs Assessment analyzes the conditions of the existing buildings in which the Scientific Investigations Division's laboratories and administrative spaces are currently located. It includes a description and evaluation of the existing buildings, addressing both exterior and interior features. The buildings' structural, mechanical and electrical systems will also be reviewed as well as the sites on which each building is located. Two different sites will then be evaluated in terms of their suitability to support the new forensic laboratory.

Additionally, various issues are explored as they relate to the physical condition of these existing facilities. The laboratories, as well as their support spaces, are evaluated with regard to their impact on such critical issues as life safety, evidence control, space efficiency, and flexibility. The three categories of deficiencies that are explored include: (1) Overcrowded Conditions, (2) Safety Issues, and (3) Chain-of-Custody Issues.

Finally, this section of the Needs Assessment will conclude with statements regarding conclusions and recommendations, in which conclusions to the analysis are documented, followed by a section on recommendations that are applicable to future development of facilities for the Scientific Investigations Division.

3.3 Existing Facility Analysis

In assessing the existing facility, this section of the Needs Assessment will address issues pertaiing to the architectural elements of the existing building. It will also assess the condition of the mechanical, plumbing and electrical systems that support the existing facility. In addition, the existing facility will be assessed with regard to its impact on such critical issues as life safety, evidence control, space efficiency and flexibility.

3.3.1 Site

Environmental

A Phase I ESA in general conformance with ASTM E 1527-05 was performed for the proposed sites which surrounds the existing property the Forensic Science Laboratory currently occupies. As a part of this study it was noted that both the Coroner's Facility and the existing laboratory generate small quantity hazardous waste which is transferred off site for disposal. The existing Coroner's facility has an active air quality permit for a diesel-powered emergency generator. No information exists indicating that a release occurred from either facility or that an environmental condition exists. These listings are not indicative of an environmental concern.

Natural Gas Service

Geotechnical Engineering

The existing property is comparable to the rest of southern California. The nearest potentially active fault is the San Jacinto Fault – San Bernardino segment, located approximately 3 to 4 miles (5 to 6 km) from the site. The San Andreas Fault – San Bernardino segment is also in the near vicinity of the existing facility and is considered to be a principal element of the overall San Andreas Fault system. The region does experience frequent strong ground motions related to earthquakes, and any alterations or upgrades to the existing facility should be designed in accordance with the California Building Code (CBC) for Seismic Zone 4.

Civil Engineering

The existing site is bounded on all sides with property owned by The County of San Bernardino. The existing facility is adjacent to a proposed expansion site on the west. This property also appears to be satisfying some storm water retention requirements for the surrounding buildings but no documentation regarding this could be found. Some general observations regarding the property include:

- The site is generally flat and appears to fall gradually, and uniformly southwesterly in direction.

- No Water Quality Management Plan was found for the existing property.
- Water and Sewer utilities are provided by the City of San Bernardino and appear adequate for the use.
- Southern California Edison is the electrical provider for the property.
- AT&T/SBC and Verizon are the telephone providers for the property.

Landscape Architecture

The existing landscape area is limited to two areas. The first is adjacent to Lena Road and is comprised of an irrigated turf area contiguous with an adjacent county owned parcel on the north and south. The second area is directly outside the main entrance to the existing laboratory.

Evaluation

The existing vegetation against the building consists of mature, low-maintenance, irrigated hedge. No trees are provided in the parking area which is not in keeping with zoning requirements.

Site

The existing site is located in the Southwest region of the Counties property. The current lab lies next to the San Bernardino County facility management, across from several large general services facilities. Adjacent to the existing lab is a secured staging yard and another secured impound yard. Currently, the facility is accessed primarily from the East via South Lena Road, with a smaller percentage coming from the North on East Rialto Avenue.

The current facility is expanding faster than can be accommodated. The forensic garage has sequestered some parking spaces in the unsecured lot for performing testing. There are two portable buildings serving as an extension of the lab residing in the parking lot. Storage items have been placed in the vehicle examination garage, thereby restricting the ready access to the latent fingerprint equipment. Since property and evidence storage has reached capacity, sea containers are used in the parking area for storage of evidence.

Current parking configurations seem to be reaching their limit with the occupant load of the existing laboratory and surrounding uses. With an ever expanding need to grow as a facility, compounded with the fact that storage is spilling

out into parking areas, it is apparent that the current parking requirements will reach their limit quickly.

Evaluation

The existing site was reviewed during the second week of April. The following constraints were identified at that time:

- The existing facility is bound on all sides with county facilities thus limiting growth potential to the existing structure.
- The general public and employees utilize the same general parking area.
- Staging for the existing forensic garage occurs in the parking area.

3.3.2 Facility

Architectural - Main Facility

The Scientific Investigations Division, located at 200 South Lena Road, was completed in 1986 for its present use as an addition to an existing agricultural lab facility attached to the Public Works Administration Building. Several renovations have occurred between then and now including the addition of several portable buildings in the parking area. It is a one-story building of approximately 26,926 square feet.

The main building contains spaces for Administration, Forensic Biology, Controlled Substances, Breath and Blood Alcohol, Trace Evidence, Firearms Examinations, Crime Scene Investigations and shared conference, mechanical and electrical utility spaces. The Property and Evidence Warehouse is attached to the main structure as an addition to the main facility.

Most of the mechanical equipment is located on the roof. In addition, the building utilizes an upper portion of the warehouse for mechanical and storage use.

The building and its off-street parking are located within a County complex of buildings. The main building is bound on the north by the shared parking area and the County's Public Works Warehouse. It is separated from Facilities Managment with a 5 foot exit corridor to the south. Lena Road is on the east side and a large unoccupied county-owned parcel is located on the west.

The building is a steel frame structure with a slab-on-grade foundation system. Exterior cladding alternates between tilt-concrete and metal siding. Exterior door and window frames are anodized aluminum. Windows are spandrel glass in an anodized aluminum storefront system. The roof is comprised of a built-up composition roof system with gravel finish.

Interior doors and frames are hollow metal. Interior partitions are painted gypsum wallboard on metal studs. Ceilings are suspended acoustical on metal grids, and flooring consists of vinyl composition tile in the laboratory spaces, and carpet in the administrative spaces.

Evaluation

The main building was built in the 1960's and renovated in 1976 and should be expected to continue for several additional years. With care, maintenance, and upgrading, its useful life could be extended beyond that.

Architecturally, the building appears satisfactory for its intended use as a crime laboratory. Exterior finishes are sturdy, and appear to provide the necessary secure perimeter desirable for a forensic facility.

The types of doors, windows, and frames throughout the building appear to be consistent with their intended use. With one exception, the building's interior finishes appear to be satisfactory. This is discussed below.

Architectural - Modular Structures

Firearms and the office space for Forensic Biology occurs in the modular buildings. The three modular structures are each around 1,100 square feet in area were built off-site and installed on a raised wood foundation. The pre-engineered wood and metal structures have vinyl-coated metal siding, and a built-up membrane roof with asphalt and gravel finish. Mechanical equipment consists of wall-mounted units.

The buildings were originally designed for their present use, but it appears the design was undertaken without adequate laboratory design expertise.

Interior partitions generally consist of painted gypsum wallboard on metal studs. Ceiling finishes vary, and include suspended acoustical tile, adhesive applied acoustical tile, and painted gypsum board. Floor finishes vary, and include vinyl composition tile and carpet. Doors and frames throughout

the building vary in type and material and include hollow metal doors and frames, wood doors and frames and aluminum framed storefront and aluminum framed windows.

Evaluation

The buildings were completed recently in 200x, and have structural deficiencies that are addressed below regarding foundations, settling and floor warping.

Architectural - Cal ID

Cal ID, located at 880 East Mill Road is located in a complex leased by San Bernardino County for this purpose and is comprised of a total of 8,268 square feet. No evaluation was completed for the building envelope of the facility.

The complex of three one-story buildings contains spaces for Latent Prints and 10-Prints, both are units of Cal ID.

The buildings and its off-street parking are located within a secured yard off Mill Street.

Evaluation

The tenant improvements for this section were completed in 2002 and appear to be satisfactory for the intended use. Exterior finishes are sturdy, and with the addition of the secured yard, appear to meet the needed security.

Structural Engineering

The original structures, completed in the mid-1970's appear to be of masonry construction. The addition in 1986 was constructed utilizing the 1985 Uniform Building Code which utilized weaker seismic requirements than those required today. The structures are not considered to be an 'essential' facility as determined by local jurisdiction.

The modular structures, completed in 20xx are built above grade. The floor framing in both structures appear to be settling and showing signs of structural stress which could result in future safety problems.

Evaluation

Recent code upgrades do not allow some of the connections utilized in the current facility. These connections would need to be upgraded if the facility is proposed for reuse. The modular structures need further structural evaluation to determine a solution.

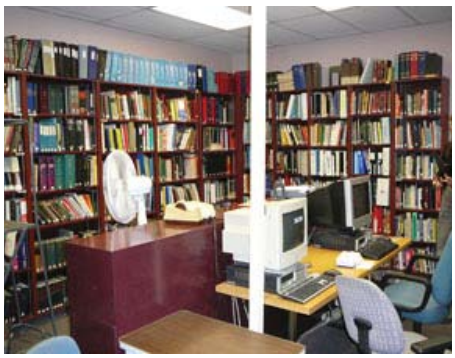


Figure 1.


Figure 2.


Figure 3.

Laboratory

The interior spaces of the laboratory, administrative, and storage areas of this facility are characterized by several categories of deficiencies. Despite these deficiencies, it appears that the laboratory management and staff have been able to successfully and effectively carry out their forensic mission. However, it is highly likely that these facility deficiencies are very instrumental in causing significant laboratory and administrative procedural inefficiencies. Mitigation of these deficiencies in the design of new facilities will undoubtedly result in a significant increase in efficiency from the standpoint of evidence processing, procedural throughput, and personal circulation.

Figure 1- In the library all available book shelf space is taken up with no room for expansion, and computer stations and files are centered in the room with minimal circulation space.

Figure 2- Office workstations are well below the recommended industry standards, and are substantially below the San Bernardino County Office Space Standards. In addition, the space between these rows of workstations is a passageway, which further limits the office work space.

The categories of deficiencies identified in the process of this Needs Assessment include the following:

1. Overcrowding
2. Equipment Space Deficiencies
3. Potential Safety Issues
4. Circulation Inefficiencies
5. Inadequate Storage
6. Work space deficiencies

1. Overcrowding

This deficiency is chronic throughout the facility, resulting in spaces that are well below the accepted industry standards for forensic laboratories. Overcrowded conditions are evident in laboratory and office workstations, instrument and equipment benches, personnel circulation spaces, and storage. The efficiency of many spaces is hindered due to the lack of adequate storage space and items are stored in offices, conference rooms, laboratory spaces, and other work areas.

Figure 3- The overcrowded LiveScan work space for Cal ID includes an office area, maintenance bench, and storage, all

Figure 4.

Figure 5.

Figure 6.

Figure 7.

Figure 8.

located within a small office.

2. Equipment Space Deficiencies

Due to the overall lack of adequate space throughout the facility, many items of laboratory and administrative equipment are installed without required circulation space, access space, or adjacent work space.

Figure 4- Typically throughout the laboratory, biological safety cabinets and fume hoods are installed with little or no space between equipment items for notes, set-up, or sorting.

Figure 5- Lack of adequate bench space is resulting in laboratory equipment of all types to be installed without any required space between equipment items.

Figure 6- Administrative equipment is experiencing the problems of inadequate space similar to laboratory equipment

Figure 7- Computer workstations in Cal ID are not properly spaced apart, and the equipment beneath the bench prevents efficient knee space for the operator

Figure 8- Space restraints has resulted in some instrumentation being installed on benches without required access to the rear of the instrument.

3. Potential Safety Issues

Being an ASCLD-LAB Accredited Laboratory, no conditions were discovered in the facility that pose an imminent threat to the safety of personnel. However, there were some conditions noted that might be considered a potential safety issue, and which should be addressed in the design of a new facility. These conditions include (1) inadequate passage space at laboratory benches where wet chemistry procedures are being conducted, (2) the use of fume cabinets in lieu of fume hoods, and (3) laboratory spaces with inappropriate floor and wall finishes.

An additional issue related to safety is the lack of air-lock vestibules separating the "dirty" laboratory spaces from the "clean" corridors and administrative spaces. Although air-lock vestibules are not specifically mandated, their inclusion in the design of wet chemistry and biological sciences laboratories has become an industry standard as an additional safeguard to prevent the migration from the laboratory spaces of airborne contaminants.

Figure 9.

Figure 10.

4. Circulation Inefficiencies

Among the most obvious circulation inefficiencies is the fact that personnel must pass through one or more laboratory sections in order to get to another laboratory section. The design of a modern forensic laboratory allows for each laboratory section to be accessible from a main circulation corridor. In addition to being a circulation inefficiency, this condition poses a safety risk with the increase of personnel using a laboratory space as a passageway.

Figure 9- Vinyl composition floor tiles and plywood wall panels are not appropriate laboratory finishes where airborne chemical and biological contaminants might accumulate and absorb into the finish materials.

Figure 10- Although recirculating fume cabinets are generally accepted as safe for many chemical procedures, an exhausting fume hood is more appropriate and offers protection for a wider range of chemical procedures.

An additional circulation inefficiency in this facility includes laboratory sections where the laboratory workstations are in one building and the corresponding

Figure 11.

Figure 12.

Figure 13.

Figure 14.

office workstations are in another building across the parking lot. Studies have shown that upwards of 40 percent of a laboratory scientist's tasks can be conducted in an office environment outside of the relatively hazardous laboratory environment (Gibson, "Today's Chemist," 1994). Therefore, the longer the travel distance between lab and office, the greater the inefficiency.

Figure 11- As an optimum, back-to-back laboratory workstations should be designed with a minimum of 6-feet of between laboratory benches. This figure shows a passage of less than 4-feet, which is not only inefficient, but could pose a safety problem.

Figure 12- Similar to the laboratory workstations, many office workstations are, not only sized well below accepted standards, but include a less than adequate passage space.

Related to circulation inefficiency is the fact that the firearms section does not include a firing range for distance determinations, test firing, and ejection measurements. In order to conduct these procedures the firearms analyst must gather the required weapon, ammunition, materials and paperwork and drive to a remote firing range.

5. Workspace Deficiencies

Several deficient workspaces have already been addressed above. Figures 2 and 12 show office workstations whose area falls far below the County standard of 64 square feet. Figure 3 shows a work area where multiple functions that should have separate spaces are being conducted in a single office. In figure 11 the space allotted for each laboratory workstation is not in compliance with accepted standards (NCJ 168106, April 1998).

Figure 13- This firearms/toolmarks workspace consists of an office desk. An optimal design should include a minimum of 10 lineal feet of laboratory bench with compressed air gas cocks.

Figure 14- Workspace for firearms processing in Property and Evidence is crowded into a small office.

Figure 15.

Figure 15- A typical design for an evidence examination room in Forensic Biology should include an examination table with access on all four sides.

Figure 16.

Figure 16- Like many other laboratory analyst's workstations in this facility, the space provided for workstations in Controlled Substances are far below the accepted standards. In addition, the recirculating fume cabinets in these workstations may constitute a safety issue due to the limited chemical procedures that can be conducted in these cabinets.

Figure 17.

Figure 17- This facility includes a single forensic garage in the CSI Section that is insufficient to handle their vehicle processing caseload. In addition, it is too small in both directions to effectively process a vehicle and does not include a vehicle lift.

Additional workspace deficiencies were noted in the Firearms Section, Property and Evidence, Forensic Biology, Controlled Substances, and Vehicle Examination.

6. Inadequate Storage

Insufficient storage space is a critical deficiency throughout the facility, not only in the laboratory sections, but also in the administration spaces and the Property and Evidence Section. Most of the storage spaces throughout the facility are either filled to capacity, or nearly so.

One factor that contributes to the lack of storage space is the lack of laboratory casework. As shown in the figures adjacent and below, much of the laboratory workstations and equipment spaces consist of tables in lieu of laboratory casework base cabinets. The inclusion of base casework with a selection of cabinet doors and drawers would substantially alleviate some of the storage problems.

Figure 18.

Figure 18- Conference room used for storage in Cal ID.

Figure 19.

Figure 19- Forensic supervisor's office used for storage.

Figure 20.

Figure 20- Blood Alcohol and Admin archives are stored in this mechanical room.

Figure 21.

Figure 21- Storage items are placed in the vehicle examination garage, restricting ready access to the latent fingerprint equipment.

Figure 22.

Figure 22- Since Property and Evidence storage has reached capacity, sea containers are used in the parking area for storage of evidence.

Figure 23.

Figure 23- Storage space for crime scene equipment has far exceeded its capacity.

Figure 24.

Figure 24- Weapons reference storage space for the Firearms Section is so limited that they are unable to maintain a complete reference collection.

Additional Deficiencies were identified as follows:

- Lack of Designated Shipping and Receiving. Currently, the Property and Evidence section is providing the shipping and receiving services for the Crime Lab at the Property and Evidence service counter where evidence transfer functions are being conducted. It is more desirable situation for evidence transfer functions to be conducted in a more secure manner, with shipping and receiving as a separate function is a less secure area.
- Commingling of Evidence and Stores. The current facility houses evidence and stores supplies in the same warehouse. Granted, the Property and Evidence staff have done well to keep evidence and stores separate. However, a more desirable condition would be to have stores as part of shipping and receiving, and physically separated from property and evidence storage.
- Lack of Bio-Vestibules. For each laboratory section that deals with biological evidence, typical forensic laboratory design standards include a bio-vestibule between the "clean" circulation corridors leading to the "dirty" laboratory spaces. There are no bio-vestibules in the existing facility.
- Multiple Buildings. In order to deal with the lack of adequate space crisis in the existing facility, several modular buildings have been located in the parking area. Although this has temporarily solved the space crisis, it has created an inefficiency and inconvenience for staff who must spend much time traversing from building to building.

Conclusion

Six categories of deficiencies in this facility have been identified above. They include (1) overcrowding, (2) equipment space deficiencies, (3) potential safety issues, (4) circulation inefficiencies, (5) inadequate storage, and (6) work space deficiencies. If a forensic laboratory is characterized by any two or three of these deficiencies, serious consideration should be given to developing new facilities. The San Bernardino County Forensic Laboratory is characterized by all six of these deficiencies, and not is a minor way, but in a manner that has approaching crisis level.

In addition to the six categories of deficiencies, additional deficiencies have been identified related to desired space organization and separation of spaces.

The total area of the existing facility consists of approximately 31,126 square feet in which a total staff of 120 persons are working on a daily basis. This equates to 259 square feet per staff, which is substantially below the accepted industry standard of 700 to 1,000 gross square feet per staff.

From a forensic laboratory design standpoint, the San Bernardino County Forensic Laboratory is currently in desperate need of complete new facilities that will include all laboratory sections.

40 ton compressor unit

Mechanical

The primary source for building air conditioning is air cooled direct expansion refrigeration. A 40-ton dual circuit compressor unit provides cooling to an air handling unit located on a mezzanine mechanical room to serve the main lobby, clerical, CSI, Trace, Photo Laboratory and Property Administration portions of the building.The remaining portions of the laboratory building Forensic Biology, Blood Alcohol, and Controlled Substance are served from (6)packaged roof-top units and (1) split system air conditioning unit.

The primary source for building heating is natural gas. A hydronic boiler 250,000 btuh capacity provides heating hot water to heating coils at zone terminal units served by the mezzanine air handling unit. The packaged roof mounted air conditioning units are equipped with gas furnaces.

The laboratory exhaust ventilation system includes (4)roof mounted exhaust fans serving four chemical fume hoods.

Boiler Room

Evaluation

Crime laboratory operations require the building mechanical systems to provide a level of safety, flexibility, reliability, and functional features that the existing mechanical systems are not able to meet. The mechanical systems consist of a series of rooftop packaged AC equipment and air distribution systems that are not well suited for wet chemistry or biological science functions.

Laboratory Roof Fume hood Exhaust and Air Conditioning Systems

Deficiencies

Building mechanical system deficiencies are listed below:

1. *Recirculating Air Systems. Laboratory spaces such as Forensic Biology, Blood Alcohol, and Controlled Substance have a recirculating air systems which have insufficient cooling capacity and are not designed for recommended minimum ventilation airflow rates required for satisfactory control of contaminants generated in a wet lab environment. The building's outside air is currently introduced through outside air dampers at each A/C unit. The amount of air introduced through these dampers is not adequate for meeting occupant ventilation and make-up air requirements. This condition compromises indoor air quality.*
2. *Air Filtration. The existing packaged rooftop units*

Laboratory Fume hood Unfiltered Make-up Aire Intake Slots.

Bio-safety Cabinets for BNA extractions are Class II Type A HEPA filtered recirculated room air cabinets. Class II B3 HEPA filtered exhausted to outdoor cabinets are preferred.

have low air filtration efficiency, on the order of 30% ASHRAE dust spot. Minimum recommended filter efficiency would be 85% ASHRAE dust spot.

3. *Fume Hood Make-up Air. The make-up air for exhausted fume hoods located in Controlled Substance Laboratory comes through hooded roof intakes which deliver unconditioned and unfiltered outside air to ceiling linear slots located above the fume hoods. This condition compromises indoor air quality introducing unfiltered contaminants into the laboratory space and instability in thermal environment.*
4. *Fume Hood Exhaust Effluent. The manner in which laboratory exhaust air is conveyed to the outdoors could poses an additional environmental contamination concern. The rooftop package air conditioning units and the exhaust fans serving fume hoods are in close proximity to each other on the building roof. Although the exhaust systems have duct extensions to raise the discharge level above the roof, the relative low discharge velocity of exhaust effluent could potentially get recirculated within the building wake. Such a condition provides the possibility that this exhaust may find its way back inside the building through the building's AC units fresh air intake.*
5. *Fume Hoods Location. Fume hoods are currently located on the traffic path within the laboratory. People walking pass fume hoods can disrupt the airflow currents entering the hood resulting in poor contaminant capture.*
6. *DNA Extractions. Laminar flow recirculating bio-safety cabinets are currently being used for DNA extractions. For increased containment of biological material exhausted cabinets or fume hoods should be used.*
7. *Point Source Exhaust. A number of laboratory functions and equipment require point source exhaust for contaminant and heat source capture example titration functions, Gas Chromatographs, controlled substance spot testing workstations, and Thermocycler equipment.*
8. *Laboratory Space Pressure Control. The laboratory spaces do not have an active space pressure control system.*
9. *Property Warehouse Environmental Control. No climate control system is provided*

in the property warehouse outside of evaporative coolers and spot radiant heaters.

10. *Emergency Power Back-up. None of the building HVAC systems have emergency power back-up. At a minimum exhaust fans supporting containment devices which include fume hoods and bio-safety cabinets and associated make-up air systems should be on emergency power back-up.*

Plumbing

The utilities serving the building consist of domestic water service two inch pipe size, natural gas medium pressure service one inch pipe size, sanitary waste four inch pipe size and fire sprinkler system serving the main building (trailers A&B are not protected with a fire sprinkler system).

Laboratory gases for helium, nitrogen, and instrument grade air are piped to the laboratory equipment from localized gas cylinders. A cylinder storage room stocks replacement cylinders. Local vacuum pumps are provided were required.

Natural Gas Hot Water Heater installed in Electrical Closet

Emergency Safety Equipment Converted Shower

Evaluation

Building has insufficient provisions for toilet rooms. Laboratory gas fired hot water heaters are installed inside a confined space and electrical closet in violation of building codes. Laboratory sections have insufficient provisions for emergency safety equipment.

Deficiencies

1. *Toilet Rooms. The building has an insufficient quantity of toilet rooms. There are four toilet groups containing one water closet each serving*

Laboratory Gases Manifold

Laboratory Gases Cylinder Storage

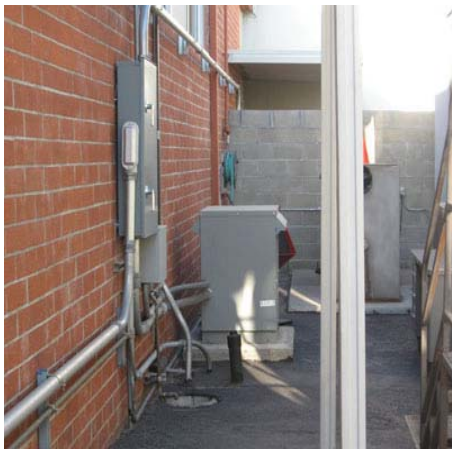
Fire Sprinkler Riser

the building. The main lobby and administration areas are served by one toilet group. Forensic Biology, Blood Alcohol, and Controlled Substance are served by one toilet group. CSI, Trace, and Photo Laboratory are served by one toilet group. Property Storage is served by one toilet group.

2. *Laboratory Hot Water Heaters. Gas fired hot water heaters are located in confined space and electrical closet in violation of Building Code.*
3. *Emergency Safety Equipment. Additional locations for eye wash and safety showers, recommended to be installed at all laboratory sections.*
4. *Laboratory Sinks. Laboratory sections have insufficient provisions for laboratory sinks.*

Electrical Power

The facility is served by Pacific Gas and Electric. The west portion of the building (Property Storage, CSI, Trace and Photo Lab, i.e., the 1987 addition) is served from the Main Electrical Room located in the Property Storage Lobby area. The east portion of the building (Lobby, Clerical, Conference Room, DNA, Narcotics, Alcohol) is served from the electrical service at the Facility Management Building. This is a code violation and a safety issue. A permanent plaque and/or directory should be installed at each electrical service identifying the areas served by each respective service in accordance with the National Electrical Code (NEC) 2005, article 230.2(E) or the corresponding article in the edition of the NEC being enforced at this location. It is not known if there is any equipment in the facility that is "crossfed" from the other service. If so, there is a potential life safety concern and the services need to be bonded together. There is no standby power source (generator) at this facility.



Main Electrical Room, west portion of building: The Service Entrance Equipment located in the Property Storage Lobby area Electrical equipment Room was installed in 1987. The equipment is manufactured by Challenger and is rated at 600A-277/480V-3ph-4w. The Switchboard consists of an underground pull section and a meter section with a main breaker. The adjacent distribution section consists of fused switch feeder mains. The Main Electrical equipment Room is a long narrow room. The clearance in front of the Switchboard is less than 36" and is in violation of NEC 110.26(1). The space in front of the Service equipment and switchboard is used for storage and further decreases the clearance.

East portion of building: The Electrical Service feeding this portion of the building is located in the Facility Management building. This service is a "four wire delta connected system". There are several panelboards located in the Lab area fed from this service. These panelboards are rated at 120/240V-1ph-3w and 240V-3ph-3w respectively. These panelboards have exceeded their normal life expectancy and should be replaced. Assuming there is capacity in the Service at the west end of the building, consideration should be given to modifying the distribution to feed this equipment from the west service.

In general, most of the circuits in the panelboards are utilized. In most cases, where additional branch circuits are required, additional panelboards will need to be added. There is a shortage of receptacles in the lab areas. Plug strips are being

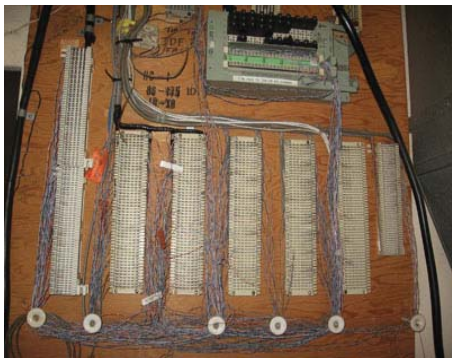
used to supplement lack of receptacles. This condition should be evaluated to ensure that equipment is safely utilized.

Lighting Systems

In general, a majority of the lighting fixtures in the building are 2X4 fluorescent troffers with acrylic lenses, T12 lamps and magnetic ballasts. Lighting controls consist primarily of single pole toggle switches. This technology is energy deficient and should be replaced with energy saving lamp sources, energy efficient ballasts and lighting controls that comply with current Title 24 standards.

There are a limited number of self contained emergency battery pack units and exit signs throughout the facility, many of which are in need of replacement. The present emergency lighting distribution should be evaluated to ensure that the minimum egress lighting levels are met.

There are several different types of exterior lighting fixtures including HID pole mounted "shoe box" type fixtures in the parking lot, HID flood lights on the roof and HID "wall pack units at various exterior wall locations.



Telecommunications Cabling Systems

The main Telecommunications Room is located in the CSI area. The telecommunications equipment and termination board shares space with electrical panelboards and a 225KVA transformer. The telecom cabling is CAT5, 4pr, UTP and is outdated. There is a data equipment rack in this area adjacent to the 225KVA transformer. The proximity of the equipment with the transformer is subject to "electromagnetic interference" which will affect the quality of data transmission. The Telecom equipment and Electrical power distribution equipment should be separated and comply with EIA/TIA standards.

The long term IT needs of the facility should be evaluated and the telecommunications cabling infrastructure should be upgraded to a minimum CAT6 solution or CAT6 augmented alternative.

Fire Alarm

The original system, installed in 1987, was a 4 zone, hard wired system manufactured by Simplex. Most of the devices are original. The functionality of the system is questionable. In general, heat detectors are installed in lab areas with a few smoke detectors. Manual pull stations are located at most exits. AV devices have been installed in some areas but the coverage

is not in compliance with current codes.

In 2005, the fire alarm panel was upgraded to a Simplex 4010 panel to accommodate the duct detectors in the HVAC equipment. The existing system is subfed from the new system. The original system needs to be replaced/upgraded.

Security System

The existing Alarm system is a Fire Burglar Instruments Panel with a DCS-Maxys XL4 card reader system. The system includes card readers and keypads at selected doors and some motion detection devices in lab areas. There is a black and white CCTV camera located at the main entrance with intercom. The camera is monitored at the reception area. Some components of this system use outdated technology. The security needs of the facility should be evaluated and the system should be replaced with current technology.

3.4 Existing Constraints

3.4.1 Financial

To be included in the final document.

3.4.2 Personnel

To be included in the final document.

3.4.3 Location

To be included in the final document.

3.5 Trends and Influences

3.5.1 Introduction

For the past two decades the forensic science community has experienced an era of intense facility development, both throughout the United States and abroad. During this period new forensic laboratories have been developed in nearly every state in the United States, and countless countries abroad.

Crime Laboratories have been experiencing an era of intense development throughout the United States and abroad over the past two decades.

There are a number of factors that have contributed to this trend. For example, computer technology applications to instruments, data bases, and management systems has had a tremendous impact on how the crime lab operates. New techniques, procedures and equipment, such as those pertaining to DNA, seem to be continually evolutionizing forensic science. Also, the loss of such high-profile cases as the Simpson case and the popularity of numerous forensic programs on television have tended to put forensic science itself and its facilities under the public microscope. These factors and more have highlighted the inadequacies of many of the nation's crime labs, and have caused administrators to closely examine their policies and procedures and their facilities.

An additional factor influencing the need for modern forensic laboratories is the increasing demand for scientifically examined evidence. Judges, jurors, police officers, prosecutors, and defense attorneys all agree that physical evidence is increasingly the most important factor in criminal investigations and prosecution. This trend has fostered an increasing reliance on the nation's forensic laboratories. It has also had a dramatic influence on increasing laboratory caseloads, despite the fact that in many communities population and crime trends are remaining constant, or even decreasing.

Laboratory developers should be aware of the "build it and they will come" phenomenon.

Forensic laboratory planners should be warned that basing the staff quantity and facility size of a new laboratory on current and historical caseload statistics could be a mistake. New crime labs will generally experience the "build it and they will come" phenomenon. Statistics have shown that where labs are overcrowded and understaffed, investigators will frequently not submit some evidence. However, when a new and modern forensic laboratory is constructed to replace the old one, investigators tend to submit more evidence for examination than they would have in the past.

A careful analysis of historical, current, and projected laboratory caseload is a critical step in accurately and

realistically projecting staff needs and space requirements. This analysis must take into account other influences, such as population demographics, crime trends, and other influences. These are some of the general trends and influences of which the administrators and staff of the San Bernardino County Sheriff's Forensic Laboratory should be aware.

3.5.2 Objective

This Needs Assessment will examine the facility space needs for an anticipated move-in year of 2009, in addition to two future milestones of 2019 and 2029. The objective of this Trends and Influences analysis is to compile and analyze sufficient data to enable future needs projections to be made.

A proper and accurate assessment of the current and future space needs for the forensic laboratory is a three step process. First, the laboratory caseload for each laboratory section must be estimated. Second, the amount of staff and equipment required to manage the proposed caseload must be determined. Finally, the amount of space required to house the proposed staff and equipment must be established.

Current and future needs projections require an analysis of laboratory caseload, population demographics, and crime trends.

Trends Analysis. It will be the objective of this section of the Needs Assessment to identify and analyze the population demographics, crime trends, and laboratory caseload data that are applicable in determining staff, equipment, and space needs in 2019 and 2029 for a forensic laboratory in San Bernardino County.

1. Population Demographics. Projected trends in population growth for San Bernardino County will be assessed. This will include an assessment of, not only overall population growth, but also the projected growth of various age, race, and ethnic groups within the population, and their tendency to commit certain types of crimes.

2. Crime Trends. This section of the Needs Assessment will analyze crime trend statistics in San Bernardino County. This will include historical crime statistics pertaining to violent crimes, property crimes, larceny theft, arson and white collar crimes. This analysis will include an attempt to accurately project future crime trends based on historical data.

3. Laboratory Caseload Statistics. Historical caseload statistics provided by the San Bernardino Forensic Laboratory, as categorized in the Scientific Investigation Divisions annual reports, will be analyzed. In this analysis the historical data

will be used to establish a logical projection of future caseloads.

3.5.3 Population Demographics

Total Population

According to studies published by the Southern California Association of Governments and the Superior Court of California, the population in San Bernardino County has been increasing dramatically since 1994, and is expected to continue doing so. The table below illustrates historical and projected population growth in San Bernardino County.

Table 1

Total Population Increase; Actual and Projected

Year	Population in Thousands	% Increase Since 1994
1994	1,559	NA
2000	1,720	10
2010	2,133	37
2020	2,456	58
2030	2,762	77
2040	3,030	94
2050	3,289	111

These population projections indicate a clear increase in population within the service area for at least the next 30 years. However, this is a declining increase, with the rate of increase decreasing each decade. Table 2 shows the projected declining increase in San Bernardino's population each decade to 2050.

Table 2

Declining Population Increases by Decades

Year	Population in Thousands	% Increase From Previous Decade
1994	1.559	NA
2000	1.720	10
2010	2.133	24
2020	2.456	15
2030	2.762	12
2040	3.030	10
2050	3.289	10

Population by Race and Ethnic Origin

An analysis of the county's population data projected through 2050 by race and ethnic origin shows no significant changes in the population make up of most race and ethnic groups. All race and ethnic groups are expected to increase significantly within the county in the coming years, but the rate of increase for the Asian, Pacific Islander, Black, American Indian, and Multi-racial groups is expected to remain relatively constant.

However, a significant deviation in the rate of population increase is projected for the white and Hispanic groups. By 2050 the white population is expected to decrease from 44.14 to 23.29 percent of the county's total population, while the Hispanic population will increase from 32.56 to 53.65 percent of the total population.

These population projections are shown in Tables 3 and 4. Table 3 shows the race and ethnic group population projections for San Bernardino County, while Table 4 shows for comparison the similar projections for the entire state of California.

		Total	White	Hispanic	Asian	Pacific Islander	Black	American Indian	Multi-racial
2000	number	1,720	845	536	112	7	179	12	29
	percent	100%	49.12%	31.14%	6.51%	0.43%	10.41%	0.71%	1.68%
2010	number	2,133	944	775	139	9	216	15	36
	percent	100%	44.26%	36.32%	6.50%	0.43%	10.11%	0.70%	1.68%
2020	number	2,456	948	1,025	159	11	256	17	41
	percent	100%	38.58%	41.72%	6.48%	0.43%	10.42%	0.70%	1.67%
2030	number	2,762	957	1,266	179	12	283	19	46
	percent	100%	34.66%	45.82%	6.49%	0.42%	10.24%	0.69%	1.68%
2040	number	3,030	971	1,467	197	13	311	21	51
	percent	100%	32.05%	48.42%	6.51%	0.42%	10.25%	0.68%	1.67%
2050	number	3,289	955	1,691	214	13	338	22	55
	percent	100%	29.04%	51.42%	6.52%	0.41%	10.27%	0.66%	1.68%

Table 3

Population Projections by Race and Ethnic Groups *(population numbers x 1000)*
San Bernardino County

		Total	White	Hispanic	Asian	Pacific Islander	Black	American Indian	Multi-racial
2000	number	34,043	16,048	11,083	3,746	111	2,223	193	639
	percent	100%	47.14%	32.56%	11.00%	0.33%	6.53%	0.57%	1.88%
2010	number	39,247	15,378	15,182	4,714	151	2,629	398	795
	percent	100%	39.18%	38.68%	12.01%	0.38%	6.70%	1.01%	2.03%
2020	number	43,852	14,757	18,878	5,566	184	2,936	615	916
	percent	100%	33.65%	43.05%	12.69%	0.42%	6.70%	1.40%	2.09%
2030	number	48,111	14,182	22,521	6,159	210	3,193	815	1,031
	percent	100%	29.48%	46.81%	12.80%	0.44%	6.64%	1.69%	2.14%
2040	number	51,538	13,435	25,960	6,464	226	3,363	982	1,108
	percent	100%	26.07%	50.37%	12.54%	0.44%	6.53%	1.91%	2.15%
2050	number	54,777	12,755	29,387	6,618	237	3,500	1,131	1,149
	percent	100%	23.29%	53.65%	12.08%	0.43%	6.39%	2.06%	2.10%

Table 4

Population Projections by Race and Ethnic Groups *(population numbers x 1000)*
State of California

Population by Age Groups

In order to help assist in determining the total staff required to operate the proposed new forensic laboratory, it is necessary to examine some specific age groups within the service area. Statistics have shown that different age groups become involved in different types of crimes.

For example, generally the highest percentage of the population involved in violent crimes such as homicides, assaults, rape, and violent drug related crimes are in the relatively young age groups from 20 to 35 years of age. As criminals become advanced in age, such as those in the age groups from 50 to 65, with failing health and decreasing physical stamina, they tend to become less involved in violent crimes. It is with these older age groups that statistics show a higher incidents of white collar crimes, such as wire fraud, mail fraud, forgery, embezzling, and computer crimes.

Since different age groups are known to commit different types of crimes, it is essential to examine population trends related to age groups in order to determine the types of laboratory services and spaces that might be logically included in a new

crime lab in 10 and 20 years in the future.

Age groups that appear to have the most diverse effect on crime statistics and the types of crimes committed are those groups noted above, from 20 to 35, and from 50 to 65. These age groups, although not totally predictable, are somewhat more predictable than the in-between age groups of 35 to 50. Those within the 35 to 50 group appear to consist of an equal number of the tough and violent, and the weak and not so violent, and all variations in between, thereby representing a broad spectrum of all types of criminal activity. This section of the Needs Assessment, therefore, will concentrate on analyzing the 20 to 35 and the 50 to 65 age groups.

Available statistical projections show that over the life of the proposed new forensic laboratory, it is projected that the 20 to 35 age group will increase 16 percent. During that same period projections show the 50 to 65 age group increasing its population by an amazing 114 percent.

These figures have significant implications on the type of services and staff that should be included in the San Bernardino County Crime Lab. The following table graphically shows the above figures.

Table 5

Population Changes by Age Groups (In Thousands)

Age Group	1990 Pop	2000 Pop	Chg	2010 Pop	Chg	2020 Pop	Chg	2030 Pop	Chg	Increase fm 1990
20-35	288	251	-13%	304	+21%	333	+10%	335	+0.6%	+33%
50-65	129	221	+71%	310	+40%	302	-3%	276	-9%	+114%

3.5.4 Crime Trends

Crime Categories

For this Needs Assessment a study was conducted of historical data for four categories of crimes occurring within San Bernardino County. The source of these categories and their associated data are the from the California Department of Justice website. These categories included the following:

Violent Crimes, including

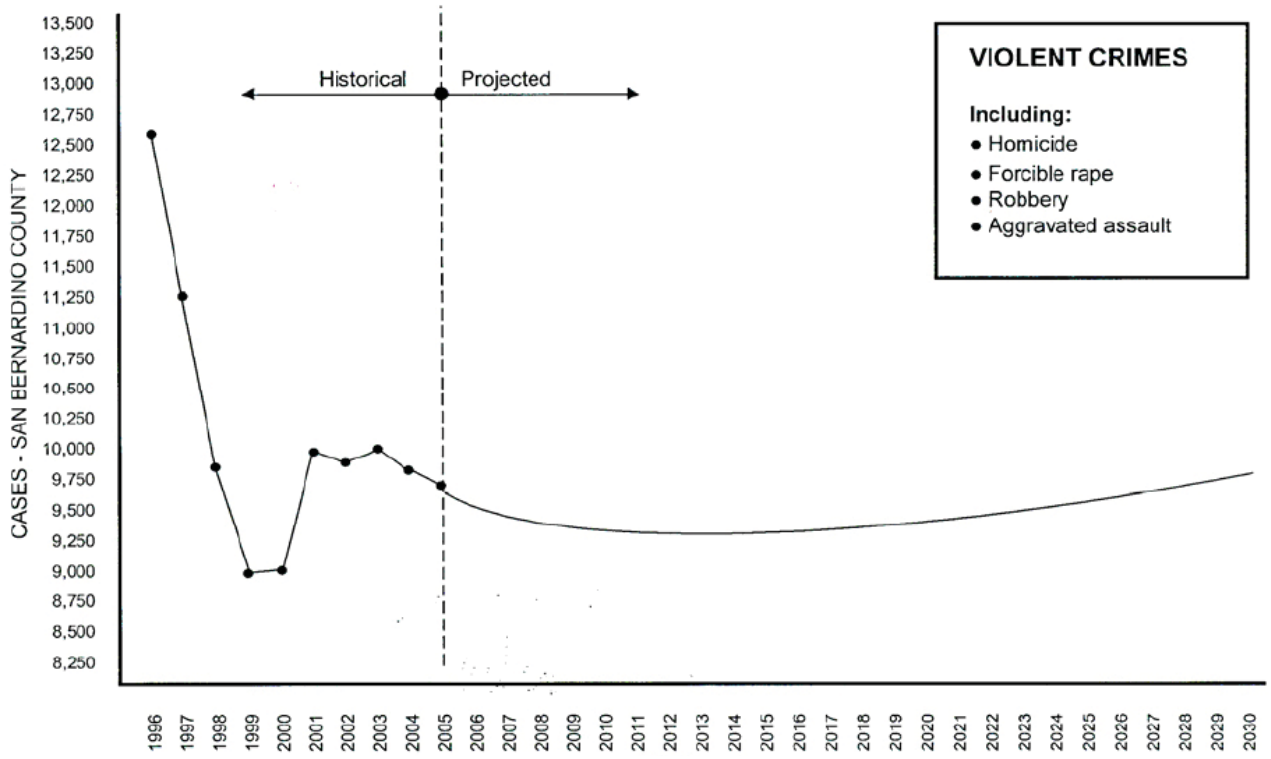
- Homicide
- Forcible rape
- Robbery
- Aggravated assault

Property Crimes, including
- Burglary
- Motor vehicle theft
- Larceny - theft over $400

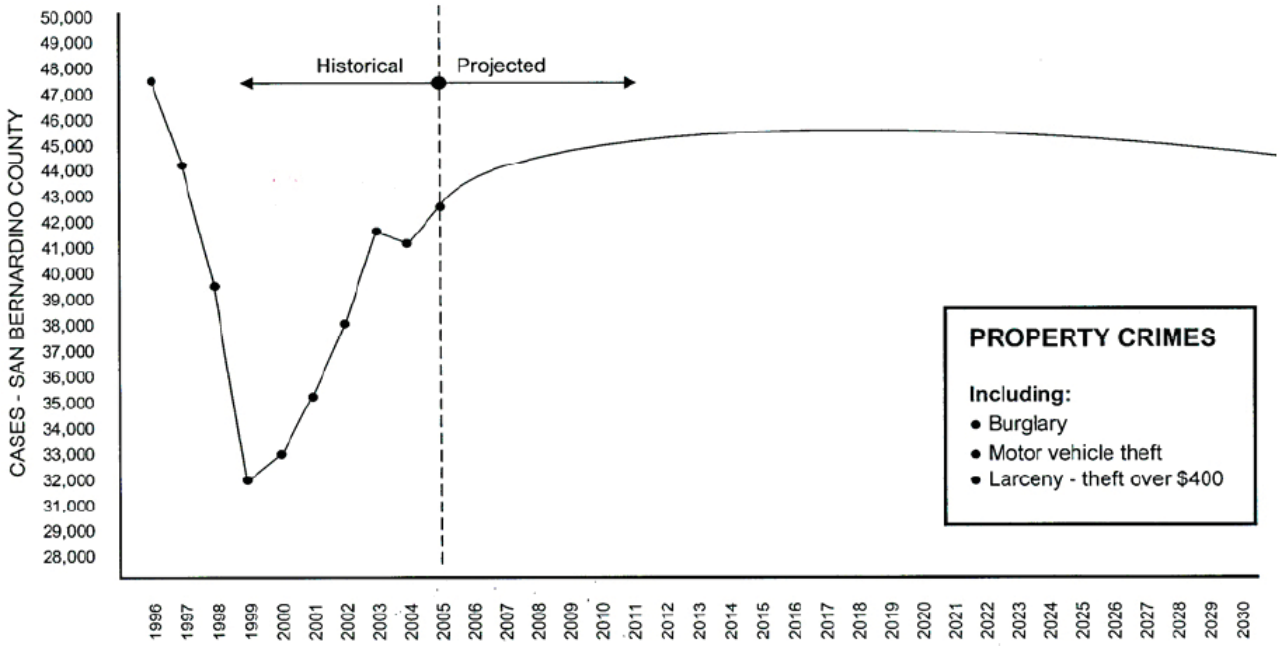
Total Larceny - Theft, including
- Over $400
- $400 and under

Arson

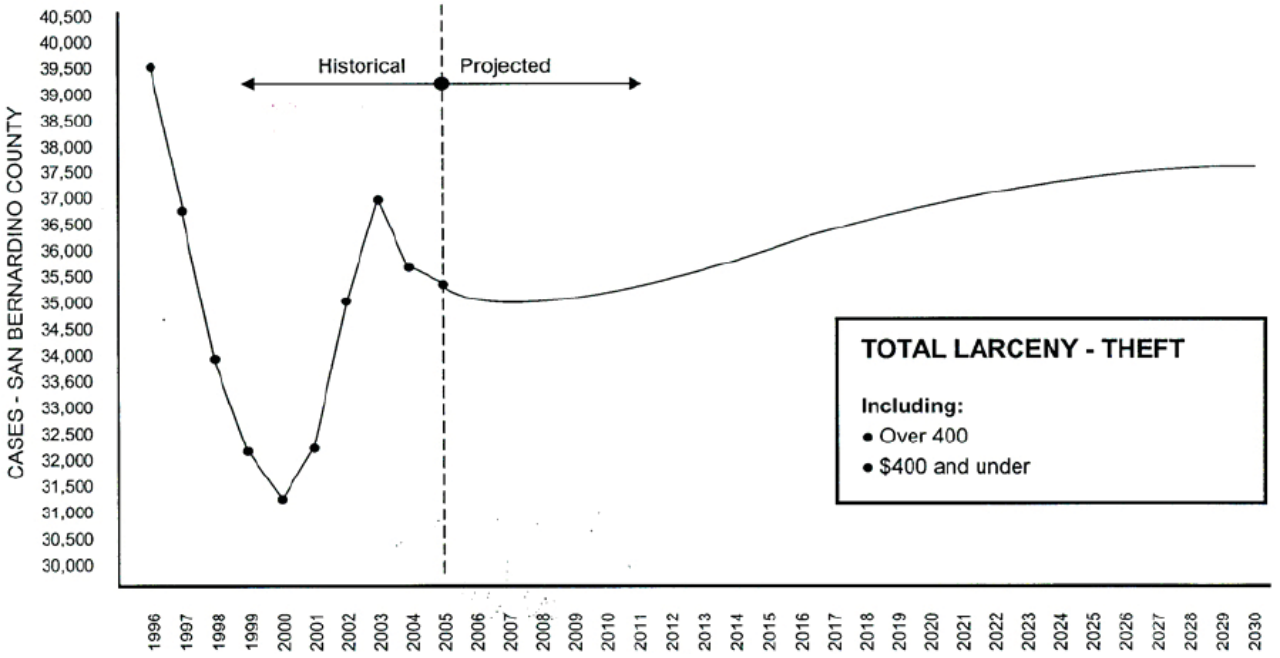
The following graphs show the historical and projected trends for each of these four categories of crimes.



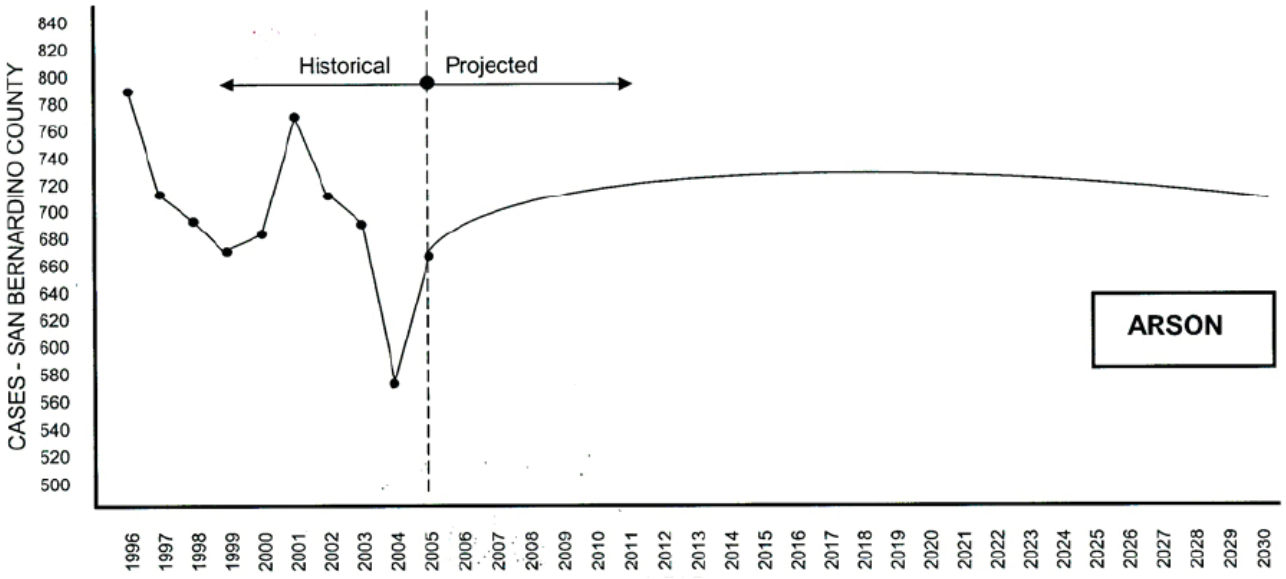
Graph 6 - Violent Crimes in San Bernardino County



Graph 7 - Property Crimes in San Bernardino County



Graph 8 - Total Larceny - Theft in San Bernardino County



Graph 9 - Arson in San Bernardino County

White-Collar Crime

The Federal Bureau of Investigation, in their National Incident-Based Reporting System (NIBRS) lists 58 offences that are classified as white-collar crimes. However, the FBI acknowledges in their publication, "The Measurement of White-Collar Crime Using Uniform Crime Reporting (UCR) Data," that only a limited amount of information is available on white-collar crimes. Crime trend statistics and projections for white-collar crimes were not found to be available through the sources listed in the bibliography for this report. Additional research for other sources on this subject failed to produce satisfactory results.

White-collar crimes are expected to increase nationwide at a rate of five percent per year over the next decade.

The only researched information found on white-collar crimes that is applicable to the crime trends study in this Needs Assessment was found in the FBI's Uniform Crime Reports (UCR). UCR data on white-collar crimes indicate that these types of crimes are expected to increase at a rate of five percent per year nationwide through the coming decade, after which it will decline as the "baby-boomer" population decreases giving way to an increase in younger population groups.

3.5.5 Caseload Projections

Historical Caseload Study

Historical caseload statistics back to 1995 for the San Bernardino County Forensic Laboratory were provided by the County and examined as part of the laboratory caseload analysis of this Needs Assessment. An initial analysis immediately revealed a paradox regarding forensic laboratory caseloads that has been experienced by crime labs all over the country. Over the period studied for this Needs Assessment, there has been no dramatic or significant increase in the County's crime rate, and the County's population, though increasing steadily, has not seen an alarming increase. However, most of the lab sections in the crime lab are experiencing caseload increases that are not commensurate with the population and crime trends.

Members of the forensic community have examined a number of reasons for this phenomenon. Generally, it appears to be simply due to the fact that the criminal courts are increasingly relying on and demanding more scientifically examined evidence. According to Frank Dolejsi, Director of the Minnesota State Crime Laboratory, "The public is more aware of forensic science then ever before. The Discovery Channel has regular programs on forensic science, and the Simpson case was an education for everyone on how not to handle evidence. Also, confessions and eye-witness testimony are starting to be successfully challenged by the defense. Where else to turn, but forensic evidence?"

The graphs on the following pages illustrate historical and projected caseloads for various sections within the San Bernardino County Forensic Laboratory. .....to be completed in final report

3.5.6 Conclusions

General Influences.

Analysis of all of the data presented in this section, including population trends, crime trends, and laboratory caseload statistics provide a clear indication of the need to increase the future staff and facility spaces at the San Bernardino County Crime Lab in 2019 and 2029.

There are some general influences that may be factors in the need for growth. Among them are the courts' increasing demand for scientifically examined forensic evidence. This is a factor that has been evident for the past several years, and

will likely continue to be so in the near future. However, the increase in laboratory caseload as a result of this factor may be leveled out by 2019.

The "build it and they will come" phenomenon will also be factor in increased caseload. For whatever reason investigators from other agencies might no be submitting all of their evidence. But whenever a new crime lab is built, investigators from submitting agencies seem to want to be part of this new facility, so their evidence submissions will likely increase, just so they can come to the new crime lab and be part of it. This fascination, however, will not last. It will be a factor in increased laboratory caseload for a few years after the new lab is built, but will likely subside.

There are other uncontrollable factors which will influence laboratory caseloads, such as natural disasters which might lead to lawlessness and periods of poor economic conditions which tend to result in increased crime rates. Conditions such as these are unpredictable and are, therefore, not considered in this trends analysis.

Population Influences

The most significant influence affecting the need for increased staff and space will be the projected population increase in San Bernardino County over the following decades. No dramatic or unusual increases in crime trends or laboratory caseload are predicted, other than increases that will be expected with to coincide with the increase in population.

General Population.

Projections show that from the expected move-in year of 2009 for the new facility, the County's population will increase by approximately 16 percent in 2019, the first projection milestone. By the second milestone of 2029 the County's population will increase by 31 percent over the 2009 move in population. (See Tables 1 and 2.) Over the 20 year period of the two milestones, it is anticipated that laboratory caseloads will increase commensurate with the increase in population.

Race and Ethnic Population.

It is evident from the available population projections for race and ethnic origin in San Bernardino County (see Table 3) that the increases in population for most groups will be constant over the next 20 years. The two significant differences are the white and Hispanic populations, where the rate of increase of the white population will decrease over the decades, while the

rate of increase for the Hispanic population will increase over the decades. It is not anticipated that these differences in the white and Hispanic populations will have a significant effect on the crime lab's caseload.

Age Group Populations.
The age demographic statistics show that from the 2009 move-in year to the second milestone in 2029 the 20-35 age group will increase 18.6 percent. During that same period the 50-65 age group will decrease by 8.0 percent. It is anticipated that the "baby-boom" population will peak between 2011 and 2016, after which it will decline. This indicates that there can be an expected decrease in the rate of increase of non-violent white-collar crimes, and an increase in the rate of increase for violent crimes.

Crime Trends Influences
Projections of crime trend data in San Bernardino County do not indicate a significant increase or decrease in any particular types of crimes over the coming decades. It is expected that crime rates will increase commensurate with the anticipated increase in population, but these increases should be gradual, with all types of crime increasing at approximately the same rate.

Historical Laboratory Caseloads

To be included in final report

3.6 Recommendations

Based on the conclusions drawn from the trends and influences analyses in this section of the Needs Assessment, it appears that most of the laboratory sections will receive some impact in terms of services, caseload and staff composition. Therefore, the recommendations in this section of the Needs Assessment will address each laboratory section individually.

Table 20 below provides a summary of the recommended staff needs for move-in 2009 and projected staff needs for 2019 and 2029. This table addresses both technical and support staff. Since the quantity of staff drives space needs, the following summary will address both laboratory sections and individual positions as required.

Immediately following this summary each laboratory section is addressed with the justification for each staff increase based on the Trends and Influences study in this section of the Needs Assessment.

Administration.
The five year historical increase in caseload for the Drug Unit was nine percent, and a significant 43 percent for the .....to be completed in final report

Forensic Biology.
Projected population and caseload data impact the laboratory units in this section similar to the effect on the .....to be completed in final report

Controlled Substances.
Lab aides provide services for the Criminalistics and Drugs/ Toxicology/Alcohol Sections. Because of .....to be completed in final report

Breath and Blood Alcohol.
Undoubtedly, the historical caseload increase of 272 percent over the past five years justifies additional staff for this unit. Therefore, it is recommended that the staff of dedicated crime scene investigators be increased from two to three.

Firearms.
This is the only section of the laboratory whose five-year historical caseload has declined. In view of this decline, it is not .....to be completed in final report

Trace Evidence.
This section currently does not exist at this laboratory, although there is a demand for document examinations. . . . . .to be completed in final report

Crime Scene Investigations.
Although this is one of the fastest growing disciplines in crime labs across the country, this section is . . . . .to be completed in final report

Cal ID.
Certain critical services that are common at most forensic laboratories of a similar size and staff complement are missing from . . . . .to be completed in final report

Property and Evidence.
The above recommendations account for 16 new technical and support positions in the new facility. This staff . . . . .to be completed in final report

Photography Lab.
. . . . .to be completed in final report

4.0 FACILITY PROGRAM

4.1. Building and Facility Code Review

4.1.1. Building Code and Facility Review

- International Building Code, 2006 Edition
- International Mechanical Code, 2006 Edition
- International Fire Code, 2006 Edition
- International Plumbing Code, 2006 Edition
- International Building Code Standards, 2006 Edition
- NFPA Standards
- OSHA Standards
- National Electric Code (NFPA 70), 2004 Edition
- NFPA 101 Life Safety, 2003 Edition
- NFPA 30, 31, 50 and 318 Special Systems Design, 2003 Edition
- NFPA 497m Hazardous Locations Classifications, 2004 Edition
- NFPA 72 Fire Alarm and Signaling, 2004 Edition
- FMLA Standards for Loss Prevention, Current Edition
- ASHRAE 90.1 Energy Code, 1994 Edition (to be verified)
- ASHRAE Guidelines
- US Clean Water Act; c1992
- AWWA Standards
- Federal Water Quality Standards
- UPDES Permits (NOI and SWPPP) Requirements (Notice of Intent and Storm Water Pollution Prevention Plan)
- Ground Water Discharge Permit

4.1.2. Local Zoning Review

The applicable code for this project is the City of San Bernardino Zoning Code. Requirements for the project are summarized as follows:

Use:
Laboratory/ Office/ Storage

Primary Occupancy:
IL (Industrial Light) District

Development Standards:

Total Area:	850,000 sqft or 490,000 sqft
Front Setback:	10 ft
Rear Setback:	10 ft
Side Setback (each):	10 ft
Side Setback (street):	10 ft
Lot Coverage (Max):	75 percent
Structure Height:	2 stories - 50 ft

Perimeter Structures:

- Perimeter fences, or walls, shall not exceed 6 feet in height.
- When security fencing is require, it should be a combination of solid pillars or short solid wall segments and wrought iron grill work.

Screening:

- Mechanical equipment, storage, trash areas, and utilities.
- The method of screening shall be architecturally compatible in terms of color, materials, shape and size.
- To alleviate the unsightly appearance of loading facilities for industrial uses, these areas should not be located at the front of buildings where it is difficult to adequately screen them from view.

Storage:

- Fences shall not exceed a height of 12'-0".
- There shall be no visible storage of motor vehicles, trailers, airplanes, boats, or their composite parts.

Hazardous Materials:
Government Code 65850.2
Health and Safety Code 25505, Article 80-Uniform Fire Code

Transportation Control:
Bicycle parking racks or secured lockers shall be provided at a rate of 1 per 30 parking spaces with a minimum of a three-bike rack.

Parking:

- 1 space for every 350 sqft
- 5 Handicapped Spaces Required
- All parking areas shall provide 25% permanent shading for parked vehicles.

Driveways:
Driveways providing ingress and egress to off-street parking spaces shall be a minimum width of 15 feet for one-way traffic and 24 feet for two-way.

Landscaping:

- A minimum of 15% of the net area of all surface parking shall be landscaped as follows:
- Include at least one 24 inch box tree for every 4 spaces.

- A minimum 5 to 7 foot landscape strip should be provided between parking areas and the office portion of a structure.
- The use of vines on walls is appropriate in industrial areas because such walls often tend to be large and blank.

4.1.3. Accreditation Standards

There are two accrediting agencies that are applicable to forensic laboratories. The American Society of Crime Laboratory Directors-Laboratory Accreditation Board (ASCLD-LAB) is the original accrediting agency with accreditation requirements specifically for forensic laboratories. The second one is the International Organization for Standardization (ISO) [not "IOS" despite the fact that it seems like it should be]. ISO has accreditation requirements for all types of laboratories, and the one that is applicable to forensic laboratories is ISO-17025:2005.

The ASCLD-LAB accreditation process is administered by their own people who are composed of crime lab directors from around the country. ISO accreditation is administered by an independent organization, Forensic Quality Services International, who are the longest established organization in the country that provides ISO accreditation services to forensic laboratories.

Neither ASCLD-LAB nor ISO specifically address architectural or engineering design requirements in any definitive manner. They might say something like, "Each workstation for each forensic analyst shall be large enough to allow the analyst to execute their laboratory tasks in an efficient manner," something vague and general like that. Accreditation standards for both organizations primarily address items pertaining to laboratory administration, laboratory procedures, and security.

Even though the accreditation requirements do not specifically address the physical plant, we as architects and engineers can say that our knowledge of the forensic laboratory accreditation requirements will allow us to design a facility that will readily facilitate accreditation.

4.1.4. Health and Safety Review

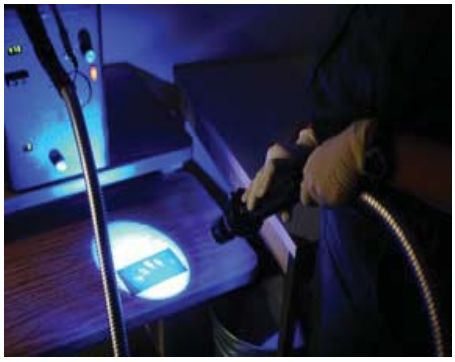
To be included in the final document.

4.2. Analysis

4.2.1. Site Space Needs Analysis

To be included in the final document.

4.2.2. Facility Space and Staff Analysis



Introduction

This section of the Needs Assessment provides area and staff tabulations in spreadsheet format for each individual laboratory section, as well as a final tabulation of the building's gross area. These spreadsheet pages constitute back-up documentation for the proposed amount of space and staff needed for the San Bernardino County Forensic Laboratory. The first spreadsheet page of this Space and Staff Needs Analysis is the Summary page. This Summary tabulates the total area and staff requirements for each laboratory section. The Summary sheet is followed by individual spreadsheet pages for each individual laboratory section, describing in detail the space and staff needs for that section.

In the first column of the Summary page each laboratory section is listed. These sections consist of:

Administration
Quality Assurance
Forensic Biology
Controlled Substances
Blood and Breath Alcohol
Firearms
Trace Evidence
Crime Scene Investigations
Cal ID
Property and Evidence
Building Support

The second and third columns list the departmental gross area space needs and staff for each laboratory section at the anticipated move-in year of 2009. These space and staff numbers have been forwarded from the subsequent spreadsheet pages for each respective laboratory section. The fourth through seventh columns provide similar anticipated space and staff needs for 2019 and 2029. The final column of the Summary sheet consist of miscellaneous comments.

Total departmental gross square feet, building gross factors, total facility gross square feet, and total staff figures are provided at the bottom of the summary page. Building gross factors include space for:

- Mechanical, electrical, telecommunications, and janitor spaces
- Structure and walls
- General circulation (main corridors, stairways, elevators)

The remaining pages of the Space and Staff Needs Analysis describe the space and staff needs for each laboratory section. The space needs are presented in columns that identify each space and equipment item, and address the net area required for each space and equipment item ("Unit Area"). (See "Space Standards" in section III.B.5 of this Needs Assessment for a clarification of unit area needs.) The next column ("Space Quan") identifies the required quantity of each space and equipment item. The next column, "Space Need," is the product of the Unit Area and the Space Quan. Figures in the Space Needs column are then extended to the "Room Area" column in one of two ways. If the Space Need refers to a simple room, such as a private office or an evidence drying room, for example, the Space Need figure is simply extended to the Room Area column. However, if a large and complex room is identified in the Space Need column, such as Main Laboratory or an Open Office Area, all of the space and equipment components that are contained within that room are quantified in the Space Need column, a Room Circulation factor is included, and the area sum of all of the spaces is extended to the Room Area column. The required staff for each laboratory section is included in the "Staff Quan" column.

The above space and staff quantification exercise has been calculated for the anticipated move-in year of 2009, in addition to projected space and staff needs for 2019 and 2029. The "Space Standard" column includes a designator which relates to the Space Standards in section III.B.5 of this Needs Assessment, and which provides a graphic representation of the individual spaces identified in this Space Analysis. The "Comments" column is provided to provide clarification to particularly space and equipment items, particularly any clarification that relates to construction cost.

Finally, the spreadsheet page or pages for each laboratory section includes a "Departmental Net Area," which is the

sum of the Room Area column. To that is added an "Internal Circulation Factor," which accounts for the space required to circulate from room to room within the laboratory section. The "Departmental Gross Area" is then provided as the sum of the Departmental Net Area and the Internal Circulation Factor, and the required Staff is provided as the sum of the Staff Quan column. These two final totals for Departmental Gross Area and Staff are then extended to their respective sections in the Summary page of the spreadsheet.

SUMMARY

SECTION	2009 Departmental Gross Area	2009 Staff	2019 Departmental Gross Area	2019 Staff	2029 Departmental Gross Area	2029 Staff
Administration	4,483	15				
Quality Assurance	705	3				
Forensic Biology	11,797	28				
Controlled Substances	3,697	8				
Blood and Breath Alcohol	1,894	4				
Firearms	4,576	6				
Trace Evidence	2,177	4				
Crime Scene Investigations	7,945	17				
Cal ID	7,879	37				
Property and Evidence	22,317	12				
Building Support	19,465	1				
Total Departmental Net Square Feet	86,933		0		0	
Building Gross Factors						
Mech/Elec/Telecom Support 3%	2,608		0		0	
Structure and Walls 7%	6,085		0		0	
General Building Circulation 5%	4,347		0		0	
TOTAL CRIME LAB GROSS SQUARE FEET / STAFF	99,973	135	0	0	0	0
		120				
		Staff				

ADMINISTRATION

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Administration Offices															
Captain	325	1	325	325	1										
Lab Director	275	1	275	275	1										
Assistant Director	225	1	225	225	1										
Supervisor	160	1	160	160	1										
Executive Secretary	160	1	160	160	1										
Executive Waiting	120	1	120	120											Secretary workstation plus seating for 4
Open Office Area				1,243											
Secure Service Counter	78	1	78											E-3	12 LF service counter
CCTV Monitor	12	1	12											A-2	3 LF counter space
Clerical Workstation	64	10	640		10									A-1	
Printer	12	3	36											A-2	3 LF counter space
Mail Station	45	1	45												10 LF sorting counter, 100 mail slots above
Coffee Bar	32	1	32											E-1	
Shared Counter Space	58	1	58											A-3	12 LF for miscellaneous clerical items
Case Files	180	1	180												600 LF HD files plus 10 5-dwr file cabinets
Room Circulation 15%			162												
Case Review Room	170	1	170	170											4 workstations,36 SF each, plus circulation
Library	600	1	600	600											40% HD, 60% stacks, table for 6, 3 carrels
Workroom	220	1	220	220											Copy, shred, fax, sorting, references
Supplies Storage	120	1	120	120											
Secure Storage	120	1	120	120											Locked Area
Executive Conference Room	160	1	160	160											Seating for 8
Archived Files	0	0	0												See Building Support

Which office standards apply?

Departmental Gross Area				3,898				0				0			
Internal Circulation Factor	15%			585				0				0			
Departmental Gross Area and Staff - Administration				**4,483**	**15**			**0**	**0**			**0**	**0**		

QUALITY ASSURANCE

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Supervisor Office	160	1	160	160	1										
Open Office Area				337											
Staff Open Office Workstations	64	2	128		2									A-1	
Files	7	6	41											A-4	5-drawer cabinets
Reference Shelving	18	1	18											E-2	6 LF shelving
Large Project Work Area	70	1	70											E-4	3x8 centered table
Scanner/Printer Work Area	24	1	24											A-2	6 LF counter for 1 printer, 1 scanner
Room Circulation 20%			56												
LIMS / IT Room	80	1	80	80											
Workstation	64	1	64	64										A-1	
Departmental Gross Area				641				0				0			
Internal Circulation Factor 10%				64				0				0			
Departmental Gross Area and Staff - Quality Assurance				**705**	**3**			**0**	**0**			**0**	**0**		

FORENSIC BIOLOGY

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Biovestibule	80	1	80	80										D-1	From corridor, access to lab and offices
Open Office Area				2,779											
Analysts Office Workstation	64	25	1,600		25									A-1	
DNA Technical Leader	80	1	80		1										
Files	7	26	176											A-4	
Interaction Space	100	2	200												Table with seating for 6
Reference Shelving	30	2	60											E-2	10 LF shelving (7' High)
CODIS Room	100	2	200												2 CODIS workstations, server, references
Room Circulation 20%			463												
Supervisor Office	160	2	320	320	2										
Main Laboratory				4,585											
DNA Analysts Lab Workstation	90	22	1,980											C-1	U/C freezer each workstation
Evidence Processing Workstation	36	4	144												8 LF of straight Bench Space
Shared Bench Space	45	26	1,170											C-7	10 LF per lab workstation
4-ft Biological Safety Cabinet	27	5	135											C-10	
Lab Sink	18	4	72												4 LF bench
Bench Centrifuge	14	8	108											C-6	3 LF bench each
Microscopy Station	14	5	68											C-6	3 LF bench each
Oven	14	1	14											C-6	3 LF bench each
Lab Refrigerator/Freezer	14	2	27											C-9	3 LF floor space
Lab Freezer	14	2	27											C-9	3 LF floor space
Flammable Liquids Cabinet	18	1	18											C-9	4 LF floor space
4' fume hood	27	1	27											C-10	For decomposed body parts
Safety Station	18	2	36											C-11	Shower, eyewash, spill kit, first aid kit
Computer Station	18	4	72											C-6	4 LF bench
Robotics Bench	45	2	90											C-6	10 LF bench
Room Circulation 15%			598												

FORENSIC BIOLOGY (CONT.)

Space/Equipment		Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Reagent Prep Room		150	1	150	150											Autoclave, 4-ft fume hood, plus (Note 1)
Test / Exam Room, Large		220	2	440	440											5 LF bench, 6X10 table, light control (Note 2)
Test / Exam Room, Small		145	3	435	435											3 LF bench, 3x8 table, light control (Note 2)
Photo Room		80	1	80	80											Two MP-4 photo stand. Light control
PCR Prep Room		180	1	180	180											4 PCR workstations, ref/frz, lab sink
Supplies Storage Room		100	1	100	100											
Biovestibule		80	1	80	80											From Main Lab to STR and Amp. Rooms
STR Lab					398											
310 DNA Sequencer		33	4	130											C-8	5 LF with rear access
3130 DNA Sequencer		33	3	98											C-8	5 LF with rear access
Shared Bench Space		68	1	68											C-7	15 LF bench
Lab Sink		18	2	36												4 LF bench
Type 1 Water		15	1	15												
Room Circulation	15%			52												

Notes:

1. Dbl sink, glass stor, ref/frz, type 1 water
2. Movable partition between rooms, articulating microscopes at each table

FORENSIC BIOLOGY (CONT.)			2009				2019				2029					
Space/Equipment		Unit Area	Space Quan	Space Need	Room Area	Staff Quan	Space Quan	Space Need	Room Area	Staff Quan	Space Quan	Space Need	Room Area	Staff Quan	Space Standard	Comments
Amplification Lab					631											
9700 Thermal Cycler		9	8	72											C-6	2 LF bench
480 Thermal Cycler		14	4	54											C-6	3 LF bench
PCR Workstation		23	2	45											C-6	5 LF bench with U/C refrigerator
Shared Bench Space		68	1	68											C-7	15 LF bench
Minus 80 Freezer		18	1	18											C-9	4 LF floor space
Minus 20 Freezer		14	1	14											C-9	3 LF floor space
Lab Refrigerator/Freezer		14	2	27											C-9	3 LF floor space
Real Time PCR		36	4	144											C-6	8 LF bench
4-ft Fume Hood		27	2	54											C-10	
Lab Sink		18	2	36												4 LF bench
Safety Station		18	1	18											C-11	Shower, eyewash, spill kit, first aid kit
Room Circulation	15%			82												

Departmental Gross Area				10,258				0				0		
Internal Circulation Factor	15%			1,539				0				0		
Departmental Gross Area and Staff - Forensic Biology				**11,797**		**28**		**0**		**0**		**0**		**0**

CONTROLLED SUBSTANCES

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Biovestibule	80	1	80	80										D-1	From corridor, access to lab and offices
Open Office Area				689											
Analysts Office Workstation	64	7	448		7									A-1	
Files	7	7	47											A-4	
Interaction Space	80	1	80												Table with seating for 4
Reference Shelving	24	1	24											E-2	8 LF shelving
Room Circulation 15%			90												
Supervisor Office	160	1	160	160	1										
Main Laboratory				1,325											
Analysts Lab Workstation	90	7	630											C-2	4-ft fume hood in each workstation
Shared Bench Space	45	7	315											C-7	10 LF per lab workstation
Reagent Prep Workstation	90	1	90												(Note 1)
Lab Sink	18	2	36												4 LF bench
Computer Station	18	2	36											C-6	4 LF bench
Safety Station	18	1	18											C-11	Shower, eyewash, spill kit, first aid kit
Floor Scale	14	1	14											C-9	3 LF floor space
Oven	14	1	14											C-6	3 LF bench
Room Circulation 15%			173												
Drug Evidence Vault	80	1	80	80											Includes drug standards and U/C refrigerator
Walk-In Refrigerator	80	1	80	80											Clan lab evidence storage
Supplies Storage Room	80	1	80	80											
Clan Lab/Bulk Case Room	120	1	120	120											8-ft fume hood, lab sink
Chemical Storage Room	60	1	60	60											With flammable storage refrigerator

Notes:

1. 4-ft fume hood, dbl sink, glass storage lab refrigerator/freezer, glasswasher

CONTROLLED SUBS. (CONT.)

Space/Equipment		Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Instrumentation Room					541											
Instrumentation Units		52	8	416											C-8	8 LF bench per unit, rear access (Note 1)
Gas Generator Bench		36	1	36											C-6	8 LF bench
Lab Sink		18	1	18												4 LF bench
Room Circulation	15%			71												
Clan Lab Response		0	0	0												(Note 2)
Departmental Gross Area				3,214				0				0				
Internal Circulation Factor	15%			482				0				0				
Departmental Gross Area & Staff - Controlled Subs				**3,697**	**8**			**0**	**0**			**0**	**0**			

Notes:

1. 4 GCMS's, 1 FTIR, 1 FTIR Mic., 1 UV/VIS, 1 EDX, 1 LC
2. See "Crime Scene Response Area" in Building Support

BREATH & BLOOD ALCOHOL

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Biovestibule	80	1	80	80										D-1	From corridor, access to lab
Office Area				368											
Analysts Office Workstation	64	3	192		3									A-1	
Files	7	3	20											A-4	
Interaction Space	60	1	60												Table with seating for 4
Blood Paperwork Storage	24	1	24											E-2	8 LF shelving
Reference Shelving	24	1	24											E-2	8 LF shelving
Room Circulation 15%			48												
Supervisor Office	160	1	160	160	1										
Breath Alcohol Area				270											
Calibration Bench	90	1	90											C-7	20 LF bench for solutions, simulators, etc.
Lab Sink	18	1	18												4 LF bench
Parts and Tools Storage	23	1	23											C-7	5 LF tool storage and parts bins
Draeger Alcotest Storage	0	0	0												12 units stored below calibration bench
Cooler Space	15	1	15												Accommodate large coolers part of WIC
Computer Station	18	2	35											C-6	4 LF bench
Files	7	6	41											A-4	
Shredder	14	1	14											A-5	3 LF floor space
Room Circulation 15%			35												
Blood Alcohol Area				251											
Receiving Bench	65	1	65											E-3	10 LF bench access two sides
Titration Bench	54	1	54											C-7	12 LF bench, 2 snorkels, glasswasher
Oven	18	1	18											C-6	4 LF bench
4-ft Fume Hood	27	1	27											C-10	
Lab Sink	18	1	18												4 LF bench
Safety Station	18	1	18											C-11	Shower, eyewash, spill kit, first aid kit
Computer Station	18	1	18											C-6	4 LF bench
Room Circulation 15%			33												

BREATH / BLOOD ALC. (CONT.)

Space/Equipment		Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Walk-In Cooler		60	1	60	60											
Supplies Storage		64	1	64	64											
Instrumentation Room					394											
Blood Pipetting Stations		27	4	108											C-7	6 LF bench
Instrumentation Units		52	4	208											C-8	8 LF bench with rear access; 4 GC's
Gas Generator		9	3	27											C-6	2 LF bench each
Room Circulation	15%				51											
Archived Files		0	0	0												See Building Support
Training Spaces		0	0	0												See Building Support
Departmental Gross Area					1,647				0				0			
Internal Circulation Factor	15%				247				0				0			
Departmental Gross Area and Staff - Breath / Blood Alc					1,894	4			0	0			0	0		

FIREARMS

Space/Equipment		Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Biovestibule		80	1	80	80										D-1	From corridor, access to lab and offices
Open Office Area					576											
Analysts Office Workstation		64	5	320		5									A-1	
Files		7	6	41											A-4	4 drawer high file cabinets
Interaction Space		80	1	80												Table with seating for 4
Reference Shelving		60	1	60											E-2	20 LF shelving
Room Circulation	15%			75												
Supervisor Office		160	1	160	160	1										
Main Laboratory					845											
Analysts Lab Workstation		90	4	360											C-3	5 lf wood work surface with vice (Note 1)
Shared Bench Space		45	4	180											C-7	10 LF per lab workstation (Note 2)
6-ft Fume Hood		36	1	36											C-10	
Armorer's Bench		54	1	54											C-7	12 LF bench with compressed air
Lab Sink		18	1	18												4 LF bench
Reference Shelving		24	1	24											E-2	8 LF shelving
MP-4 Photo Stand		27	1	27											C-6	6 LF bench
Safety Station		18	1	18											C-11	Shower, eyewash, spill kit, first aid kit
Computer Station		18	1	18											C-6	4 LF bench
Room Circulation	15%			110												

Notes:

1. Overhead mounting for articulating mic.
2. Map drawers for ammo standards; two articulating microscopes

FIREARMS

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Exam Room	145	1	145	145											3 LF bench, 3x8 table, light control (Note 1)
IBIS Room	225	1	225	225											1 IBIS system with match set workstation
Microscopy Room	180	1	180	180											4 comparison mics., light control
Weapons Reference Collection	200	1	200	200											500 long guns, 1000 handguns (Note 2)
Ammunition Storage	64	1	64	64											
Firing Range	1,200	1	1,200	1,200											25 yd range, 12 ft wide, bench with sink
Bullet Recovery Tank	200	1	200	200											
Evidence Storage Room	40	1	40	40											
Supplies Storage Room	64	1	64	64											

Departmental Gross Area				3,979				0				0			
Internal Circulation Factor	15%			597				0				0			
Departmental Gross Area and Staff - Firearms				**4,576**	**6**			**0**	**0**			**0**	**0**		

Notes:

1. Boom mtd above for articulating mic
2. Design floor for future HD mobile storage

TRACE EVIDENCE

Space/Equipment		Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Biovestibule		80	1	80	80											From corridor, access to lab and offices
Open Office Area					359											
Analysts Office Workstation		64	3	192		3									A-1	
Files		7.5	3	23											A-4	
Interaction Space		80	1	80												Table with seating for 4
Reference Shelving		18	1	18											E-2	6 LF shelving
Room Circulation	15%			47												
Supervisor Office		160	1	160	160	1										
Main Laboratory					565											
Analysts Lab Workstation		90	3	270											C-4	
Shared Exam Table		100	1	100											E-4	6x8 table, articulating microscope
4-ft Fume Hood		27	2	54											C-10	
Lab Sink		18	1	18												4 LF bench
Oven		14	1	14											C-6	3 LF bench
Safety Station		18	1	18											C-11	Shower, eyewash, spill kit, first aid kit
Computer Station		18	1	18											C-6	4 LF bench
Room Circulation	15%			74												
Microscopy Room		150	1	150	150											2 comp, 2 stereo, 2 polar, snorkels
Instrumentation Room					301											
Instrumentation Units		52	4	208											C-8	8 LF bench per unit, rear access (Note 1)
Gas Generator Bench		36	1	36											C-6	8 LF bench
Lab Sink		18	1	18												4 LF bench
Room Circulation	15%			39												

Notes:

1. GCMS, GC-FID, 2 FTIR's

TRACE EVIDENCE (CONT.)

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Scanning Electron Microscope Room				141											
Microscope	80	1	100												Access on 4 sides
Layout Bench	23	1	23											C-7	5 LF bench
Room Circulation 15%			18												
Liquid Nitrogen Tank Room	16	1	16	16											
Evidence Storage Room	64	1	64	64											
Supplies Storage Room	56	1	56	56											
Departmental Gross Area				1,893				0				0			
Internal Circulation Factor 15%				284				0				0			
Departmental Gross Area and Staff - Trace Evidence				**2,177**	**4**			**0**	**0**			**0**	**0**		

CRIME SCENE INVESTIGATION

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Biovestibule	80	1	80	80										D-1	From corridor, access to lab and offices
Open Office Area				1,598											
Specialists Office Workstation	64	16	1,024		16									A-1	
Files	7	16	108											A-4	
Digital Download Station	23	1	23											C-6	5 LF bench
Interaction Space	160	1	160												Table with seating for 8
Reference Shelving	30	1	30											E-2	10 LF shelving
Work Space	45	1	45											C-7	10 LF for Mail, copy, shred, forms
Room Circulation 15%			208												
Supervisor Office	160	1	160	160	1										
Latent Print Laboratory				1,233											
Specialists Workstation	100	6	600											C-5	Stand up, light control each workstation
Intake Workstation	36	1	36											C-7	8 LF bench
Shared Bench Space	45	6	270											C-7	10 LF per lab workstation
Cyanoacrylate Cabinets	90	1	90											C-9	20 LF multi-chambered cabinets
Vacuum Superglue Unit	23	1	23											C-9	5 LF floor space with access one side
Safety Station	18	1	18											C-11	Shower, eyewash, spill kit, first aid kit
Computer Station	18	2	36											C-6	4 LF bench
Evidence Storage Cages	0	0	0											C-9	See Crime Scene Response Room
Room Circulation 15%			161												
ALS / Photo Room	100	2	200	200											MP-4 photo stand, computer, ALS unit
Scanner Room	80	2	160	160											
Evidence Storage Room	80	1	80	80											
Equipment Storage Room	80	1	80	80											
Supplies Storage Room	80	1	80	80											

CRIME SCENE INVEST. (CONT.)

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Forensic Garage				2,681											
Vehicle Bay	288	5	1,440												12x24 with scissor gate security (Note 1)
Large Vehicle Bay	600	1	600												
Mobile Lift Storage	30	1	30												
Tool Carts	9	5	45											C-9	2 LF floor space
Automotive Work Bench	180	1	180												40 LF bench
Shop Sink	18	2	36												4 LF floor space
Room Circulation 15%			350												
Tools and Equipment Storage	100	1	100	100											
Cyanoacrylate Room	48	1	48	48											
Triage Room				523											
Layout Table	56	4	224											E-4	3x6 tables, access 4 sides
Layout Bench	45	1	45											C-7	10 LF bench
LIMS Computer	18	3	54											C-6	4 LF bench
Evidence Storage Lockers	100	1	100												22 LF lockers, various sizes, 30" D (Note 2)
Refrigerator/Freezer	14	1	14											C-9	3 lf floor space
Lab Sink	18	1	18												4 LF bench
Room Circulation 15%			68												
Drying Room	200	1	200	200											Eight 30-in drying cabinets, plus hang rod
Crime Scene Kit Room	0	0	0	0											See Building Support
Mock Crime Scene Room	0	0	0	0											See Building Support
Departmental Gross Area				7,223				0				0			
Internal Circulation Factor 10%				722				0				0			
Departmental Gross Area & Staff - Crime Scene Invest.				**7,945**	**17**			**0**	**0**			**0**	**0**		

Notes:

1. One bay equipped with 2-post lift and rack for storage of superglue tent
2. Approx. 1/4 lockers ref/frz

CAL ID

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Offices															
Lieutenant	225	1	225	225	1										
Secretary	160	1	160	160	1										
Supervisor	160	2	320	320	2										
Systems Analysts	160	2	320	320	2										
Open Office Area				2,856											
Latent Examiner Workstation	64	12	768		12									A-1	
10 Print Examiner Workstation	64	14	896		14									A-1	
Clerical Workstation	64	5	320		5									A-1	
Latent Shared work surface	144	1	144											A-3	32 LF for printers & scanners
10 Prints Shared work surface	288	1	288											A-3	64 LF for printers & scanners
Miscellaneous Files	7	10	68											A-4	Lateral files
Room Circulation 15%			373												
Work Room	240	1	240	240											Copy, fax, sort, mail
Latent Waiting	150	1	150	150											Seating for 6, service counter
Latent Reception	160	1	160	160											
10 Print Waiting	150	1	150	150											Seating for 6, service counter
10 Print Reception	240	1	240	240											
Comparison Room	48	4	192	192											Light control
Systems Analysts Workroom	160	1	160	160											Storage for 20 Live Scan units, work area
Office Storage	240	1	240	240											Supplies and equipment
Interaction Spaces	150	2	300	300											Seating for 8
Latent File Room	400	1	400	400											High Density Files
10 Print Large Storage Room	800	1	800	800											10-print cards and other files (Note 1)
Server Room	150	1	150	150											
Evidence Storage	100	1	100	100											

Departmental Gross Area		7,163			0			0		
Internal Circulation Factor	10%	716			0			0		
Departmental Gross Area and Staff - Cal ID		**7,879**	**37**		**0**	**0**		**0**	**0**	

Notes

1. Lektriever system

PROPERTY AND EVIDENCE

Space/Equipment		Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Open Office Area					1,142											
Forensic Specialist		64	2	128		2									A-1	
Service Specialist		64	4	256		4									A-1	
Office Assistant		64	1	64		1									A-1	
Lab Aide		64	1	64		1									A-1	
Shared Counter Space		80	1	80											A-3	20 LF counter for misc. office equipment
Files		7	12	81											A-4	
Interaction Space		150	1	150												Seating for 8, not visible from service counter
Service Counter		130	1	130											E-3	20 LF, 4 computers, part of Recep/Wait
Security Monitoring		40	1	40											A-2	10 LF for CCTV, door status, motion, etc.
Room Circulation	15%			149												
Supervisor Office		160	1	160	160	1										
Evidence Pick-Up Lockers		45	1	45	45											10 LF, minimum 15 lockers various sizes
Reception/Waiting		200	1	200	200											Seating for 4, includes repackaging area
Workroom		150	1	150	150											Copy, fax, shred, mail, sorting
Office Supplies		120	1	120	120											
Weapon Processing		200	1	200	200	1										Includes office workstation for For. Spec.
Evidence Viewing		120	2	240	240											3x6 SS table, 10 LF SS bench with sink
Kit Making / Issuing		120	1	120	120											12 LF bench, kit supplies, computer
Stores Issuing		240	1	240	240											60 LF shelving, 24" deep

PROPERTY/EVIDENCE (CONT.)			2009				2019				2029					
Space/Equipment		Unit Area	Space Quan	Space Need	Room Area	Staff Quan	Space Quan	Space Need	Room Area	Staff Quan	Space Quan	Space Need	Room Area	Staff Quan	Space Standard	Comments
Photography Lab					731											
Office Workstation		64	2	128		2									A-1	For Forensic Specialist photographer
Film Processor		42	1	42												Access four sides
Print Processor		96	1	96												Access four sides
Miscellaneous Equipment Bench		90	1	90											C-6	20 LF bench
Photo / Exhibit Finishing		90	1	90											C-7	20 LF bench
Intake Processing		60	1	60											A-2	12 LF bench, computer, bar code, sorting
Large Scale Printer		40	1	40											A-2	10 LF of equipment space
Film and Print Files Storage		72	1	72											E-2	24 LF shelving
Film Archives		0	0	0												See Building Support
Lab Sink		18	1	18												4 LF bench
Room Circulation	15%			95												
Image Download Room		120	1	120	120											3 computer workstations
Photo Darkroom		100	1	100	100											Includes 5 lf bench, large sink for rack maint.
Photo Storage		100	1	100	100											
Server Room		80	1	80	80											
Toilet Room		75	2	150	150											
Evidence Storage																
Handgun Storage		600	1	600	600											HD mobile storage system, book style
Long Gun Storage		850	1	850	850											Book style shelving
Miscellaneous Guns		200	1	200	200											
Burn Guns		100	1	100	100											
Cash Storage		100	1	100	100											Level 4 security
Cash Counting Room		80	1	80	80											Level 4 security
Drug Storage		900	1	900	900											Level 4 security
Walk-In Freezer		620	1	620	620											HD mobile storage system
Walk-In Cooler		100	1	100	100											
Temporary Storage Cages		160	1	160	160											Eight 4-ft wide cages
Homicide Evidence, Boxes		3,000	1	3,000	3,000											20-ft high bay with mobile lift
Homicide Evidence, Pallets		280	1	280	280											Stacked 3-high
General Evidence, Boxes		3,500	1	3,500	3,500											20-ft high bay with mobile lift
General Evidence, Pallets		1,000	1	1,000	1,000											Stacked 3-high
Clandestine Lab		200	1	200	200											
Bicycles		1,200	1	1,200	1,200											
Evidence Disposal Cage		300	1	300	300											
Drug Disposal Cage		300	1	300	300											
Coroner Storage		600	1	600	600											
General Stores		1,000	1	1,000	1,000											20-ft high bay with mobile lift
Staging		1,300	1	1,300	1,300											
Departmental Gross Area					20,286				0				0			
Internal Circulation Factor	10%				2,029				0				0			
Departmental Gross Area and Staff - Prop & Evidence					**22,317**	**12**			**0**	**0**			**0**	**0**		

BUILDING SUPPORT

Space/Equipment		Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Building Reception/Waiting					234											
Reception Counter		0	0	0												Accounted for in Administration
Seating		90	1	90												Seating for 6 persons
Display Cabinets		90	1	90												20 LF of display cabinets
Room Circulation	30%			54												
Classroom		900	2	1,800	1,800											35 students. With removable partition
Multi-Purpose Room		3,500	1	3,500	3,500											Seating for 150, movable partitions
Mock Crime Scene Room		150	2	300	300											Finish one for blood spatter
Mock Crime Scene Prop Storage		150	1	150	150											
Remote Clerical		120	1	120	120											Copy, printer, sorting, shred, supplies
Male Visitor Toilet		60	1	60	60											
Female Visitor Toilet		60	1	60	60											
Staff Men's Toilet/Lockers/Shower		675	1	675	675											4 fixtures, 2 sinks, 50 lockers, 2 showers
Staff Women's Toilet/Lockers/ Shower		750	1	750	750											5 fixtures, 2 sinks, 75 lockers, 2 showers
Cot Room, Male		100	1	100	100											2 cots, 2 night stands
Cot Room, Female		100	1	100	100											2 cots, 2 night stands
Central Interaction Space		900	1	900	900											Seats for 20, break, lunch, vending, kitchen
Archived Files																
Administration		200	1	200	200											HD mobile filing system
Blood Alcohol		200	1	200	200											HD mobile filing system
Photography Lab		400	1	400	400											HD mobile filing system
Coffee Bar		40	4	160	160										E-1	Placed throughout the facility
Janitor's Closets																
Primary JC		40	1	40	40											
Secondary JC		25	5	125	125											

BUILDING SUPPORT (CONT.)

Space/Equipment	Unit Area	2009 Space Quan	2009 Space Need	2009 Room Area	2009 Staff Quan	2019 Space Quan	2019 Space Need	2019 Room Area	2019 Staff Quan	2029 Space Quan	2029 Space Need	2029 Room Area	2029 Staff Quan	Space Standard	Comments
Shipping and Receiving				645											
Staging	200	1	200												
Shipping and Receiving Clerk	64	1	64		1									A-1	
Receiving Desk/Forms Counter	30	1	30												6 LF desk
Tall Refrigerator	14	1	14											C-9	3 LF floor space
Tall Freezer	14	1	14											C-9	3 LF floor space
Chemical Waste Storage	80	1	80												Include shower and eye wash
Biological Waste Storage	80	1	80												
Recycle Storage	80	1	80												
Room Circulation 15%			84												
Crime Scene Response Area															
Clan Lab Response				1,507											
CSI Gear Storage	15	16	240												3w x 3d x 4h
Clan Lab Gear Storage	15	30	450												3w x 3d x 3h
Showers, Toilets, Men	150	1	150												Shared between CSI and Clan Lab
Showers, Toilets, Women	150	1	150												Shared between CSI and Clan Lab
Laundry, Men	60	1	60												1 washers, 1 dryers, 6 LF folding bench
Laundry, Women	60	1	60												1 washers, 1 dryers, 6 LF folding bench
Clan Lab Kit Supply Storage	100	1	100												12 LF storage shelving
Crime Scene Kit Room	100	1	100												Kit storage, supplies, 12 LF bench
Room Circulation 15%			197												
IT / Server / Security Room	200	1	200	200											
Helium Cylinder Closet	12	1	12	12											Accessible to main corridor
Mechanical Room	4,500	1	4,500	4,500											
Electrical Room	1,600	1	1,600	1,600											
Telecom/Security Room	200	1	200	200											
Departmental Gross Area				18,536				0				0			
Internal Circulation Factor 5%				927				0				0			
Departmental Gross Area & Staff - Building Support				**19,465**	1			**0**	0			**0**	0		

4.3. Adjacency Diagrams

This section addresses the adjacency relationships of rooms, or spaces, within the building. In order to function properly and efficiently it is necessary to locate a certain space or area adjacent to another space or area.

There are many reasons why specific adjacency relationships are required. For example, two or more spaces might need to be adjacent to each other because they share common support spaces. Another reason is that certain spaces need to be next to each other in order to accommodate a required sequence of operations or procedures that take place in these spaces. Specific adjacencies are required for any number of other reasons, including reasons related to safety, security, flow of evidence and flow of personnel.

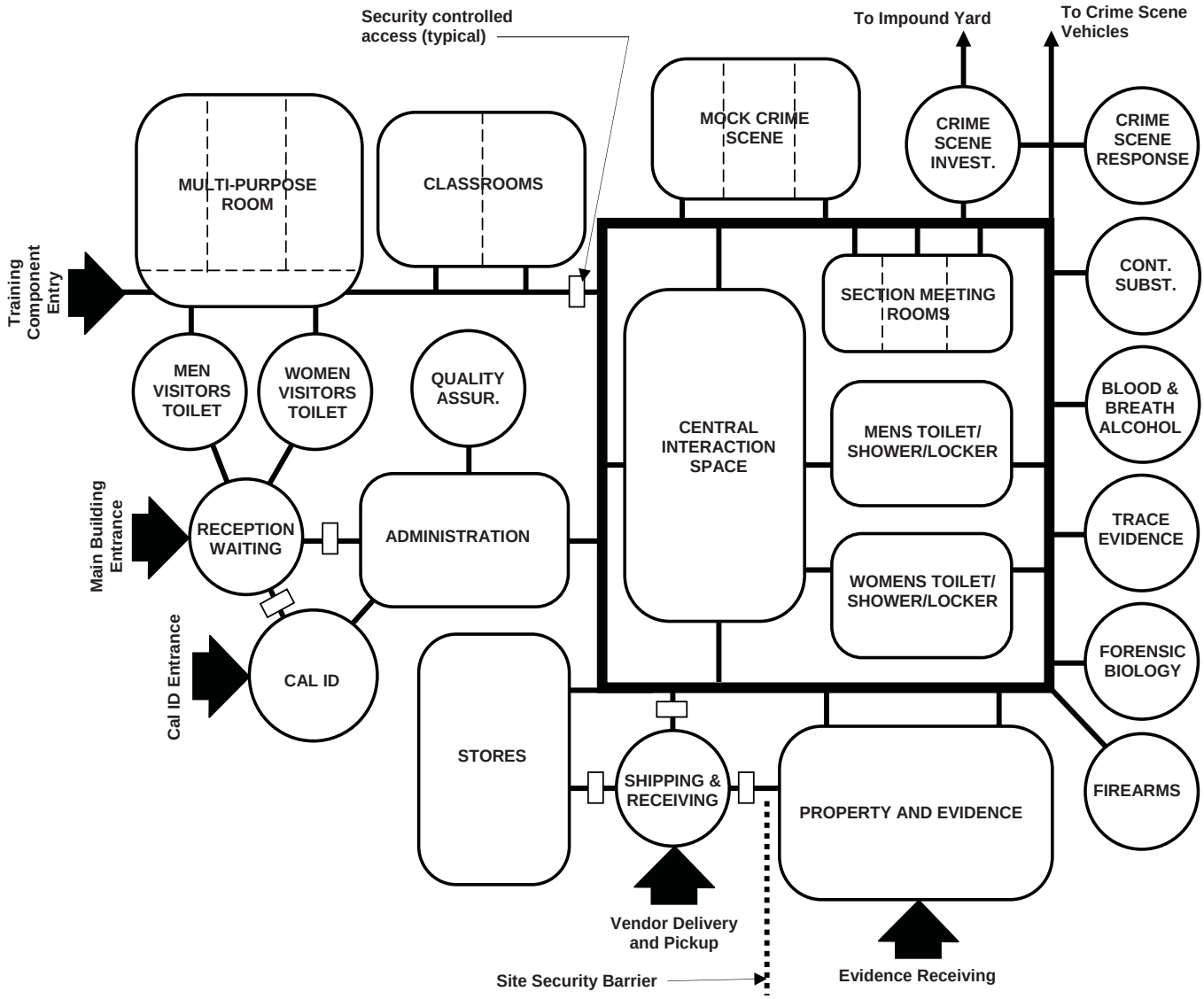
Regardless of the reasons that specific adjacencies are required, they are generally shown graphically on an "adjacency diagram." The following pages show: an adjacency diagram for the whole building, and additional adjacency diagrams for sections or units of space within the building. The diagrams consist of round or rectangular "bubbles" in which spaces, sections, units or rooms within the building are identified. The bubbles are then connected with solid black lines to show personnel circulation among the spaces. Adjacency diagrams are frequently referred to as "bubble diagrams."

In order to fully appreciate an adjacency diagram it is necessary to understand some of the rules pertaining to such diagrams. Some of these rules are:

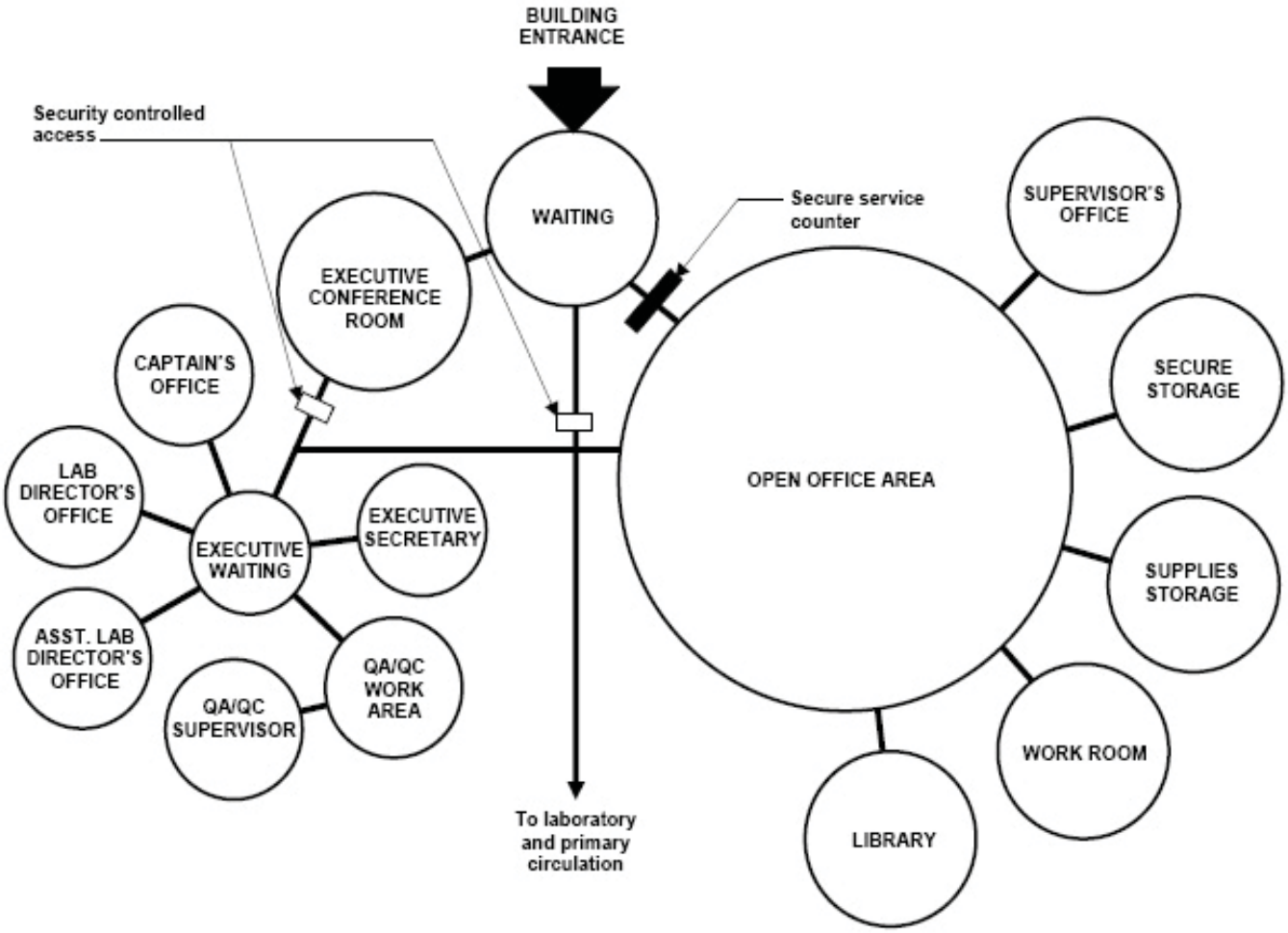
1. It is not a floor plan. The adjacency diagram should not in any way be construed to consist of a floor plan or anything related to a floor plan. The diagram is intended simply to show proximity relationships between spaces.
2. It is not proportional. Although the bubbles vary in size with the smaller spaces shown in small bubbles, and larger spaces shown in larger bubbles, the diagram is not intended to show a proportional representation of the spaces. The bubbles are shown in various sizes merely as a convenient way to incorporate the bubbles on a single page and in an orderly fashion.
3. No utility spaces. The adjacency diagrams show only those spaces programmed in the Space and Staff Needs Analysis of this report. Utility spaces such as mechanical rooms,

electrical rooms, and telecommunications rooms are not shown on the adjacency diagrams. These spaces will be developed during the Schematic Design Phase from the Building Gross Factors in the Summary of the Space and Staff Needs Analysis.

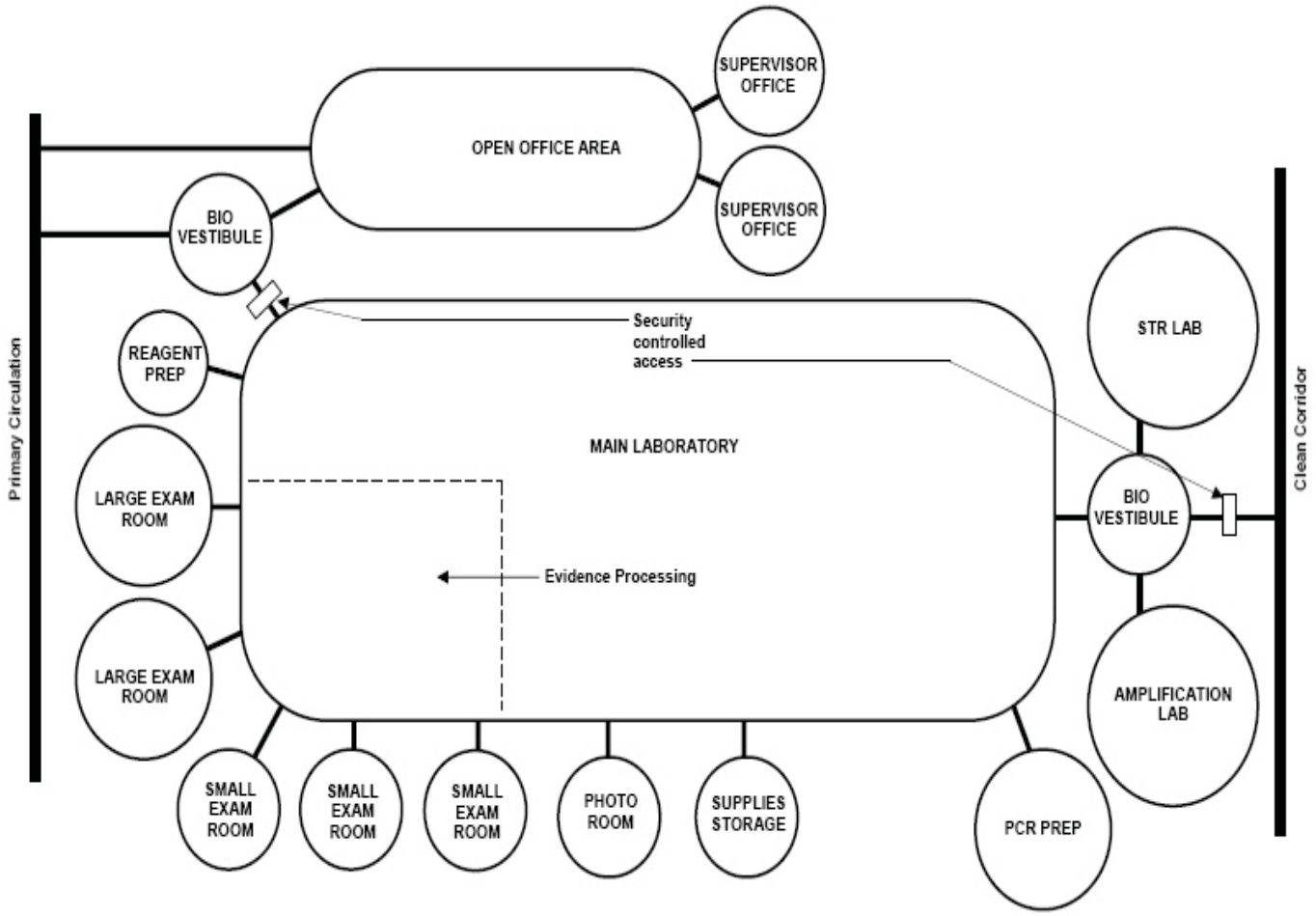
Building


Security controlled access (typical)
To Impound Yard
To Crime Scene Vehicles
MULTI-PURPOSE ROOM
CLASSROOMS
MOCK CRIME SCENE
CRIME SCENE INVEST.
CRIME SCENE RESPONSE
Training Component Entry
SECTION MEETING ROOMS
CONT. SUBST.
MEN VISITORS TOILET
WOMEN VISITORS TOILET
QUALITY ASSUR.
CENTRAL INTERACTION SPACE
MENS TOILET/ SHOWER/LOCKER
BLOOD & BREATH ALCOHOL
Main Building Entrance
RECEPTION WAITING
ADMINISTRATION
TRACE EVIDENCE
WOMENS TOILET/ SHOWER/LOCKER
Cal ID Entrance
CAL ID
FORENSIC BIOLOGY
STORES
SHIPPING & RECEIVING
PROPERTY AND EVIDENCE
FIREARMS
Vendor Delivery and Pickup
Site Security Barrier
Evidence Receiving

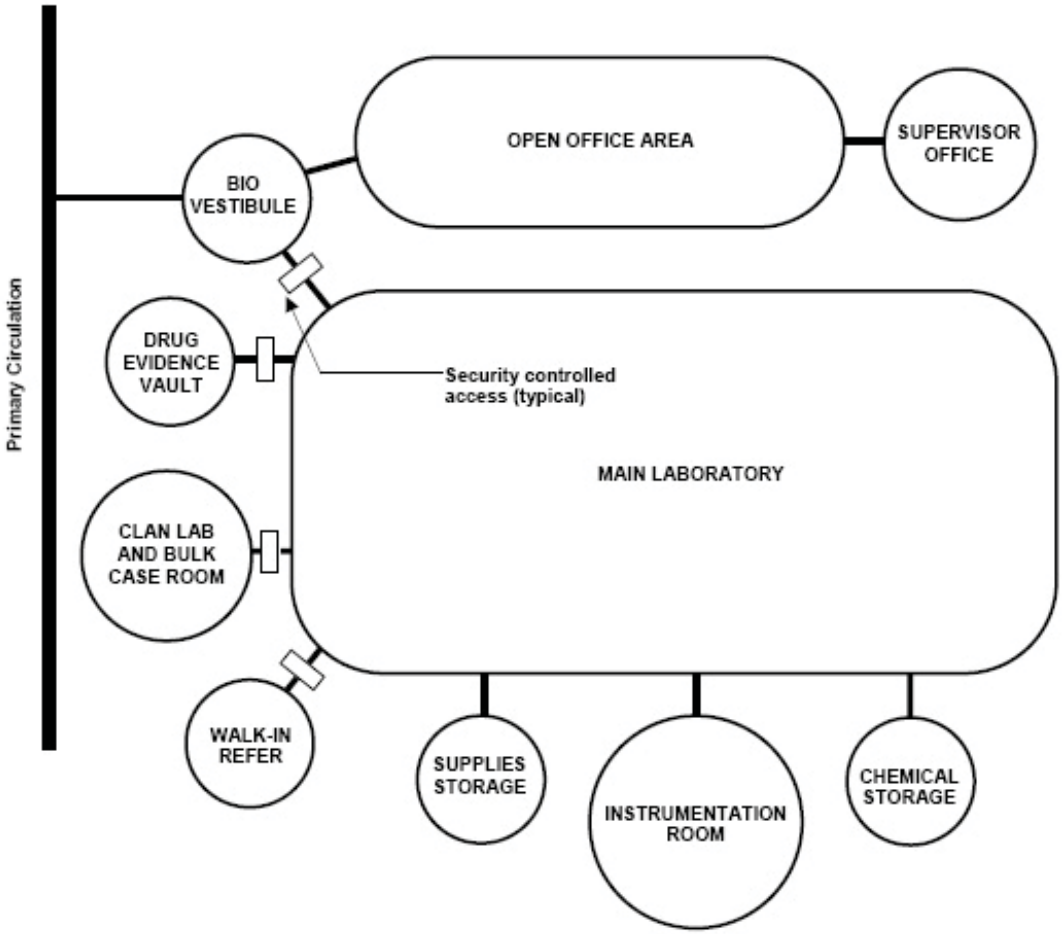
Administration / Quality Assurance



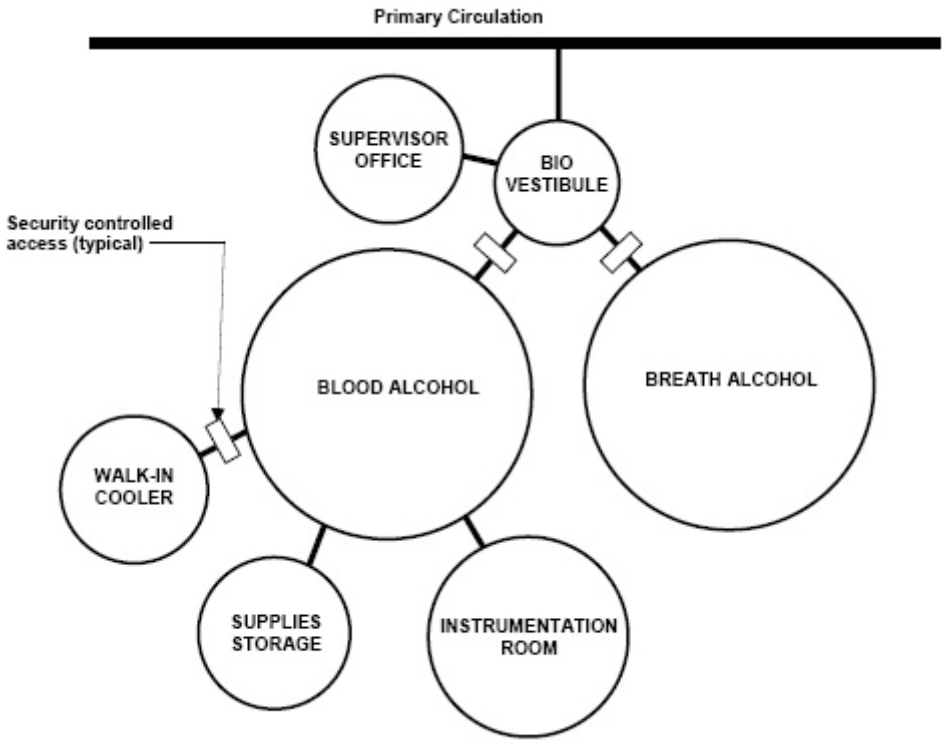
Forensic Biology



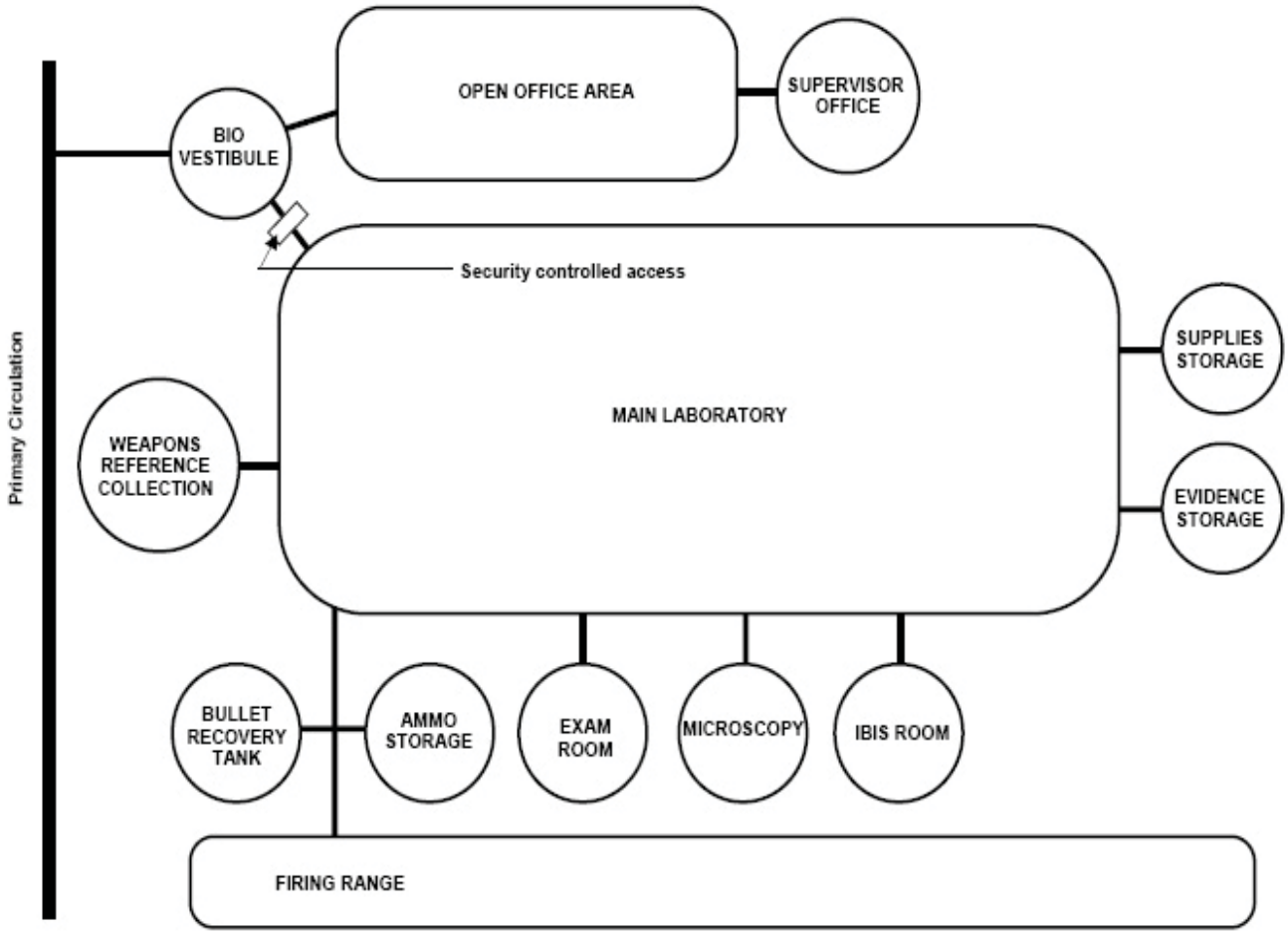
Controlled Substances



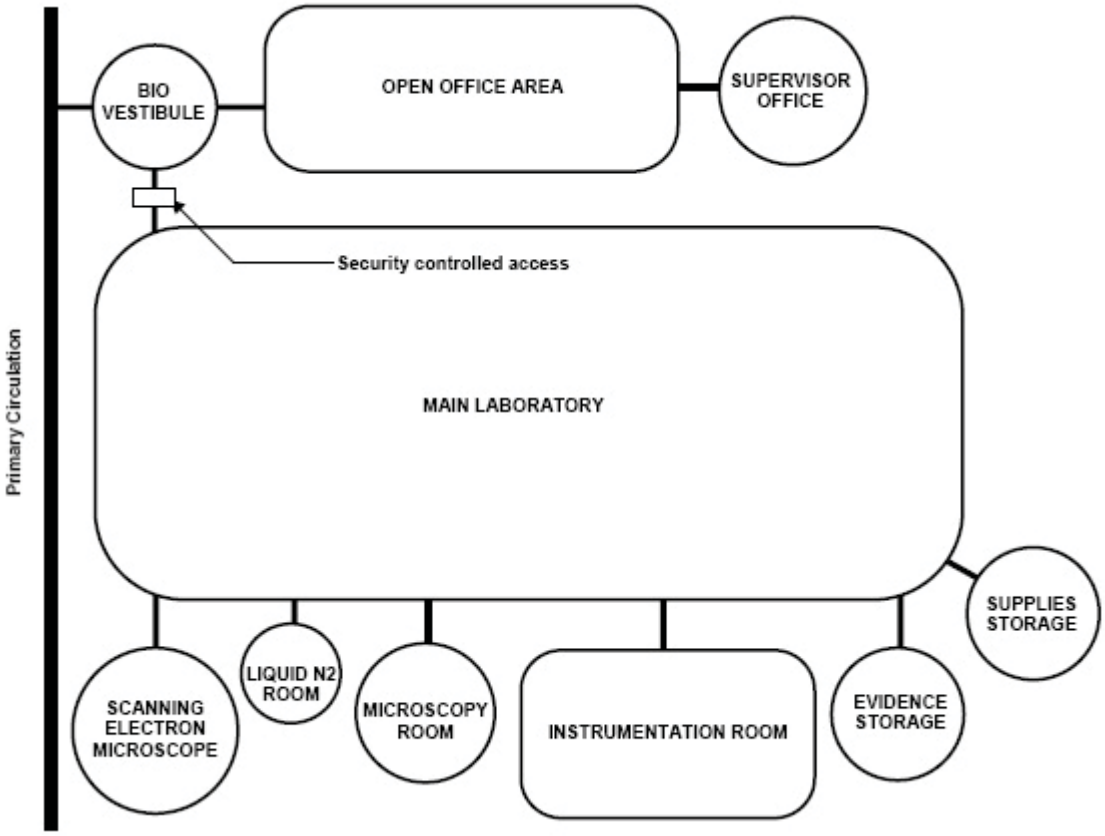
Breath and Blood Alcohol



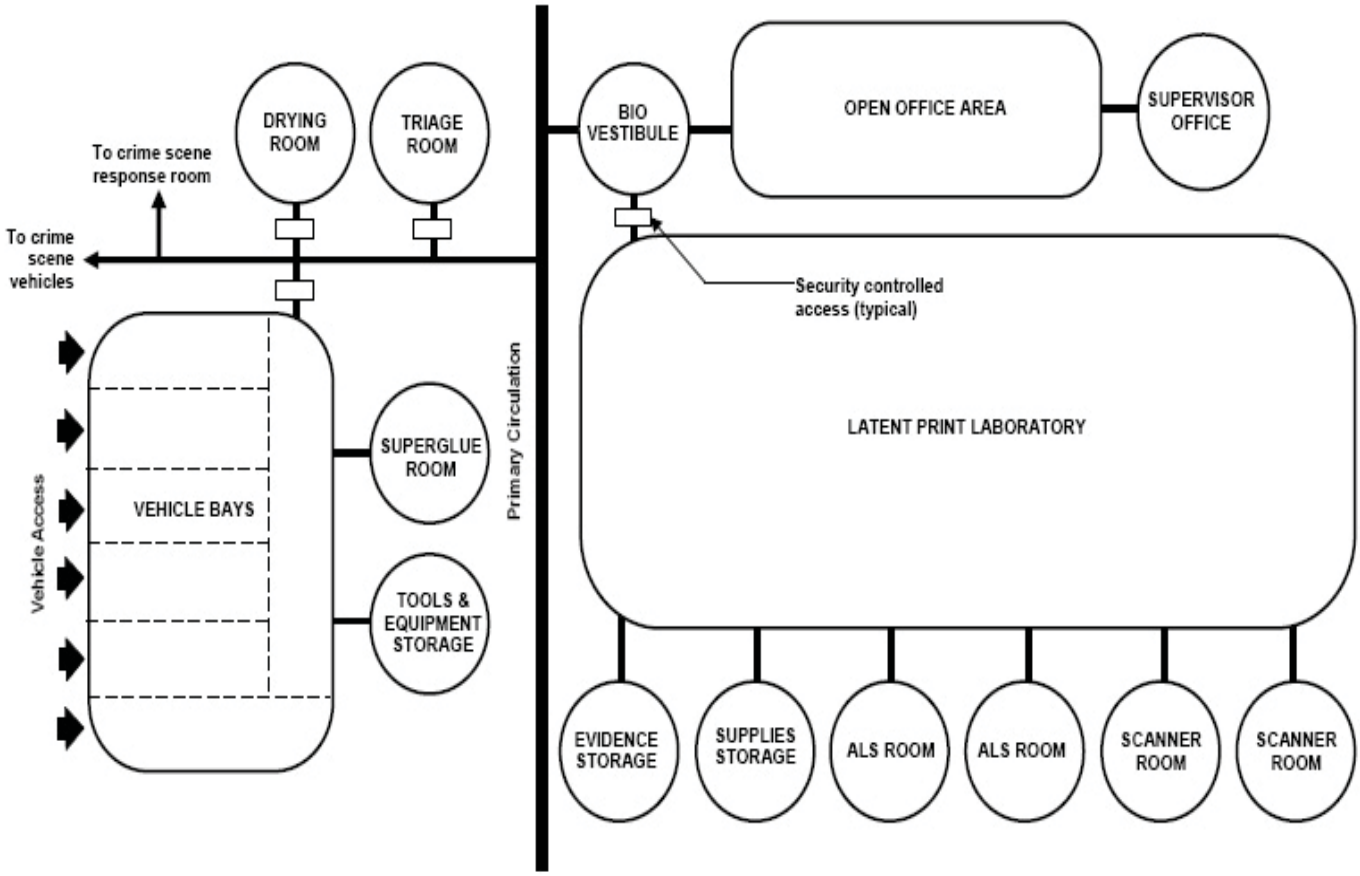
Firearms


Primary Circulation
BIO VESTIBULE
OPEN OFFICE AREA
SUPERVISOR OFFICE
Security controlled access
MAIN LABORATORY
SUPPLIES STORAGE
EVIDENCE STORAGE
WEAPONS REFERENCE COLLECTION
BULLET RECOVERY TANK
AMMO STORAGE
EXAM ROOM
MICROSCOPY
IBIS ROOM
FIRING RANGE

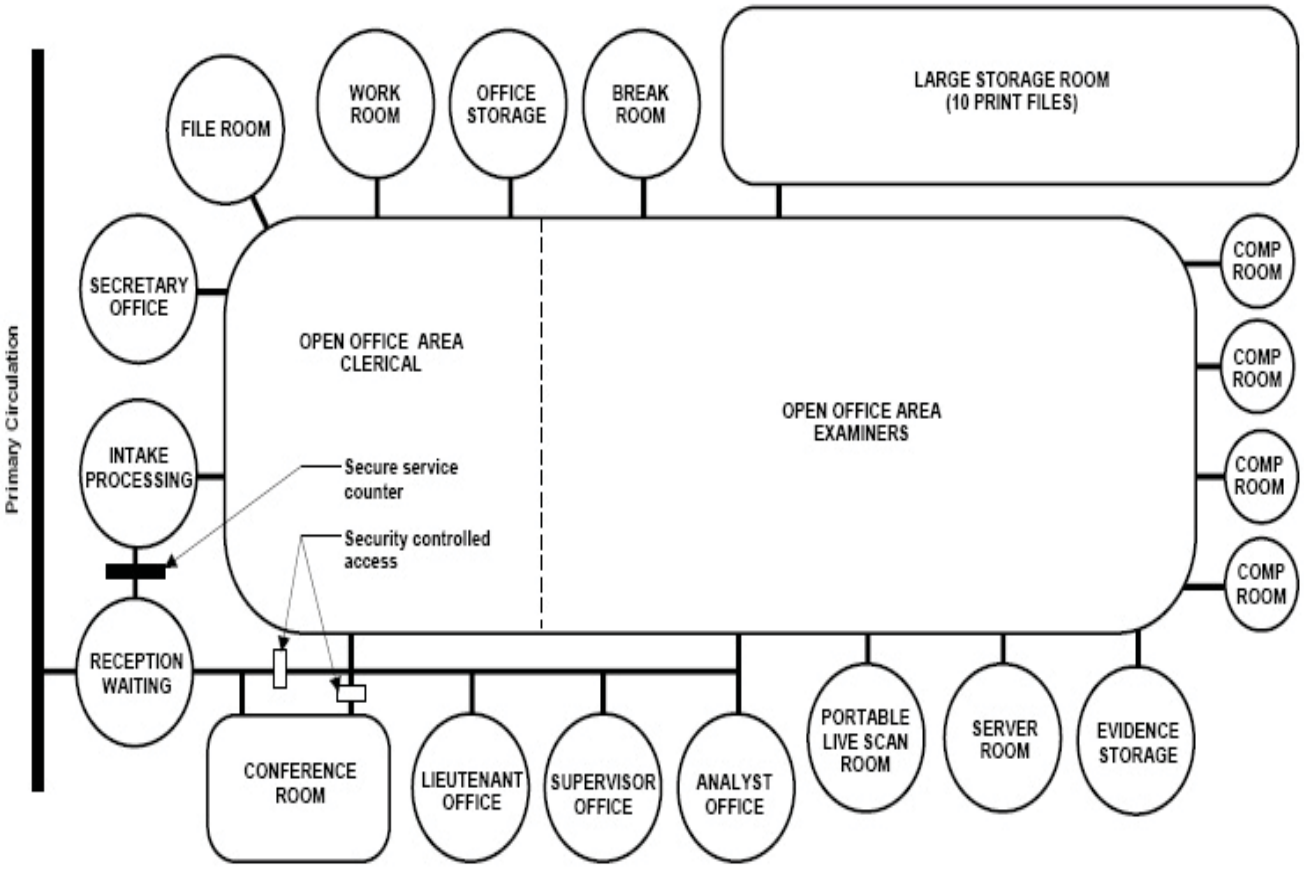
Trace Evidence



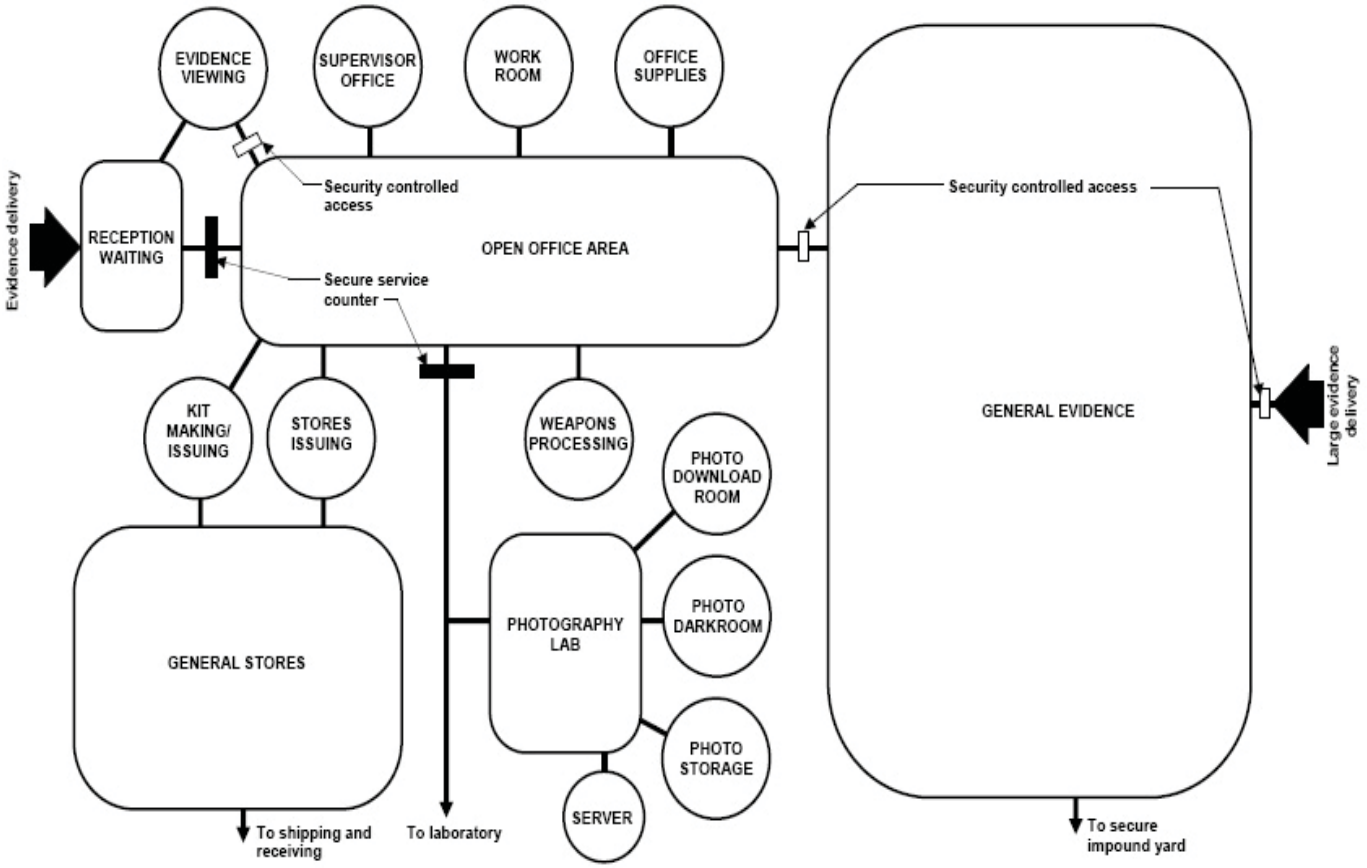
Crime Scene Investigations



CAL ID


Primary Circulation
FILE ROOM
WORK ROOM
OFFICE STORAGE
BREAK ROOM
LARGE STORAGE ROOM (10 PRINT FILES)
SECRETARY OFFICE
OPEN OFFICE AREA CLERICAL
OPEN OFFICE AREA EXAMINERS
COMP ROOM
COMP ROOM
COMP ROOM
COMP ROOM
INTAKE PROCESSING
Secure service counter
Security controlled access
RECEPTION WAITING
CONFERENCE ROOM
LIEUTENANT OFFICE
SUPERVISOR OFFICE
ANALYST OFFICE
PORTABLE LIVE SCAN ROOM
SERVER ROOM
EVIDENCE STORAGE

Property and Evidence



4.4. Space Standards

Introduction

The following pages provide graphic representations of Space Standards that are applicable to this project. A Space Standard, as used in this Needs Assessment, consists of a partial floor plan of a space that is expected to be repeated throughout the project. For example, the same floor plan of a laboratory workstation in the Controlled Substances Section will be repeated as needed for the number of staff in the Controlled Substances Section. The same floor plan of an instrumentation unit (GCMS, FTIR, etc.) will be repeated as needed for the number of instrumentation units required. Each of these floor plans constitute a Space Standard.

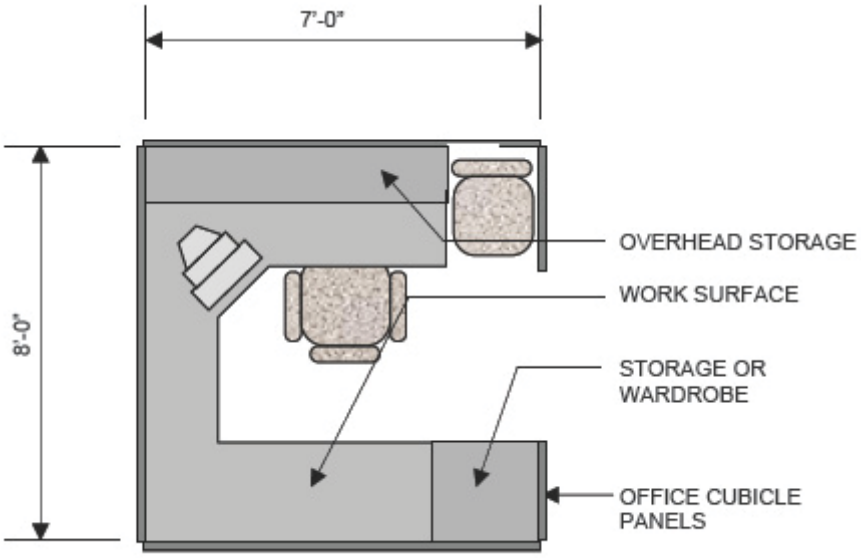
There are five separate series of Space Standards, designated as Series A through Series E. Each series of Space Standards are defined as follows:

- Series A Open office space standards
- Series B Enclosed office space standards
- Series C Open laboratory space standards
- Series D Enclosed laboratory space standards
- Series E Miscellaneous support space standards

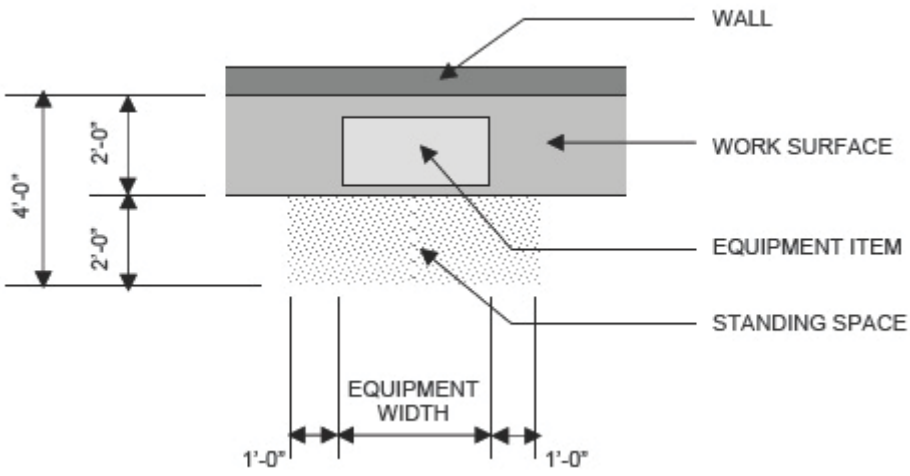
Each Space Standard is given a designator consisting of its series letter and a number. In the "Facility Space and Staff Analysis" this designator appears in the "Space Standard" column, corresponding with the space that it represents.

SERIES-A

A-1 Office Workstation
64 SF

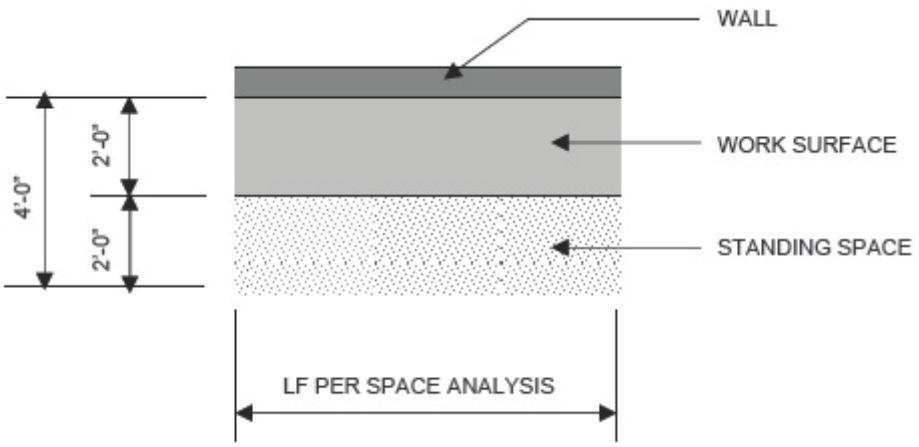


A-2 Office Countertop Equipment
SF varies per LF requirement



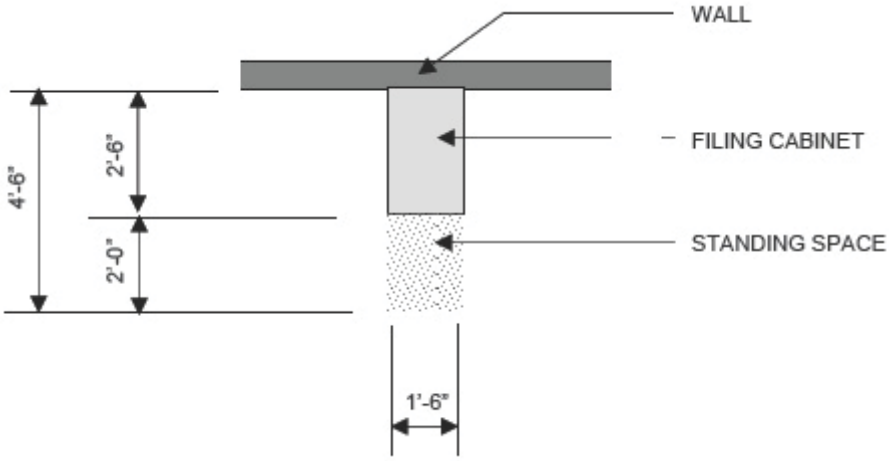
A-3 Office Countertop Spaces

SF varies per LF requirement



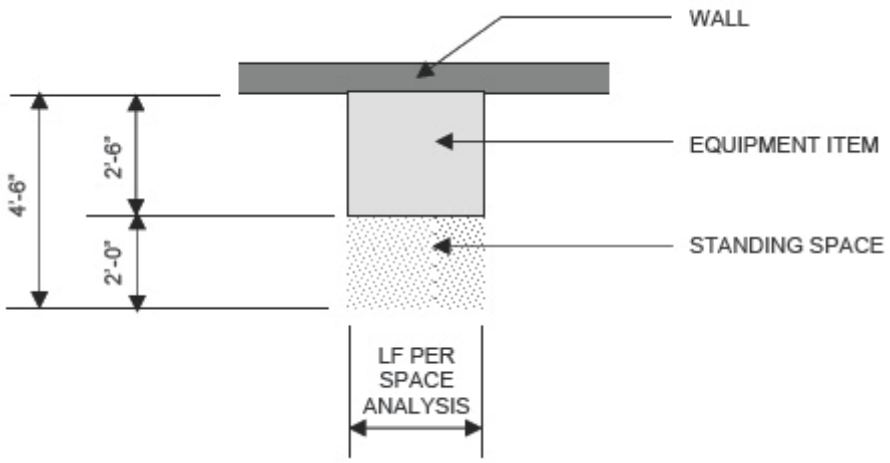
A-4 Filing Cabinet

6.75 SF



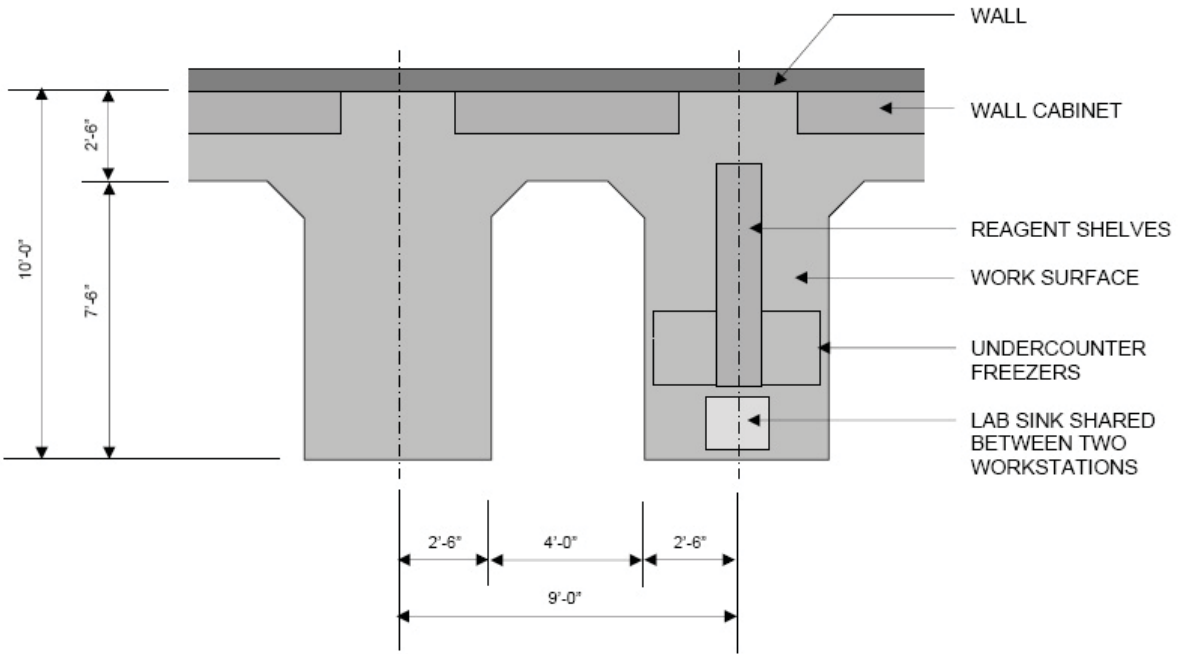
A-5 Office Equipment Floor Space

SF varies per LF requirement



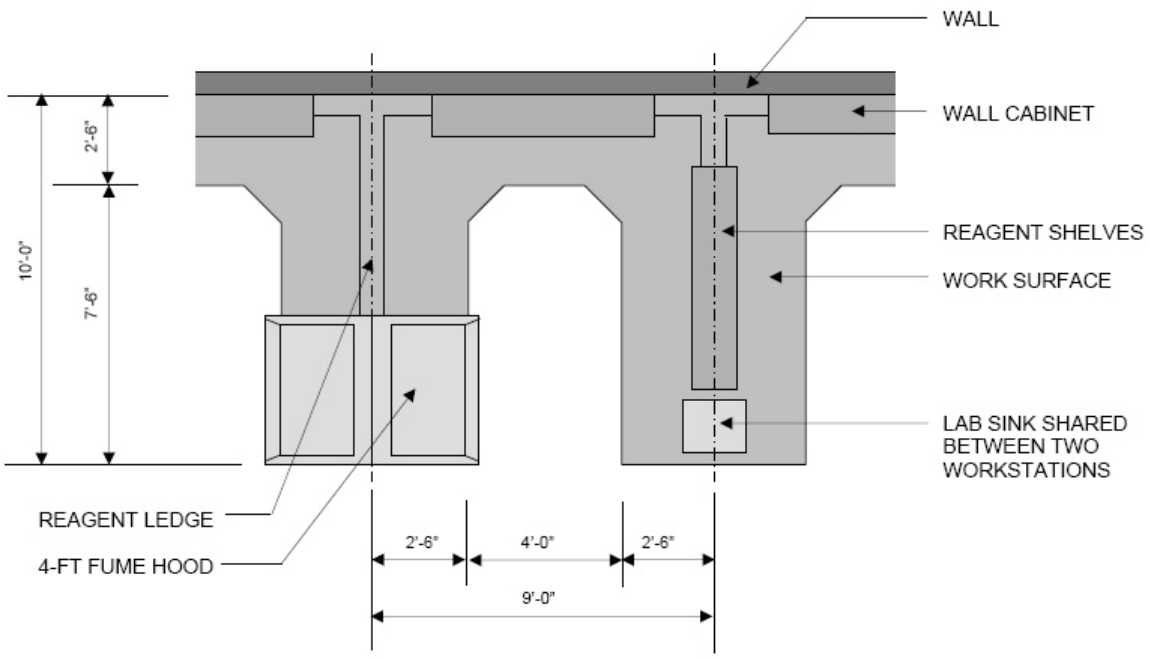
SERIES-C

C-1 Analyst Workstation - Forensic Biology
90 SF



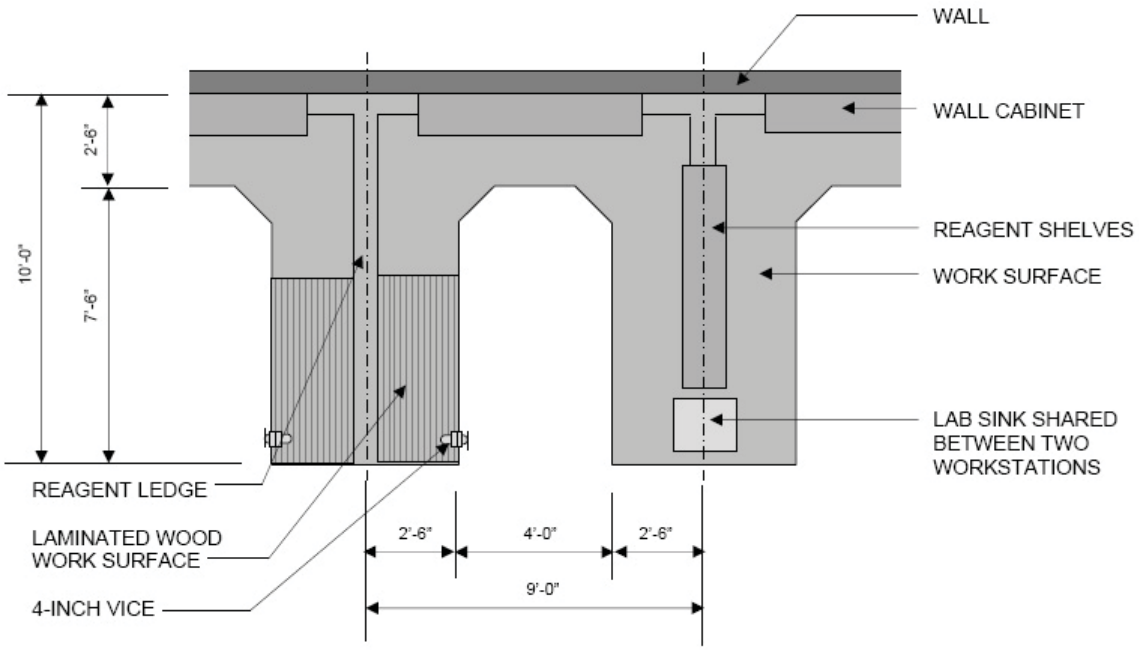
C-2 Analyst Workstation - Controlled Substances

90 SF



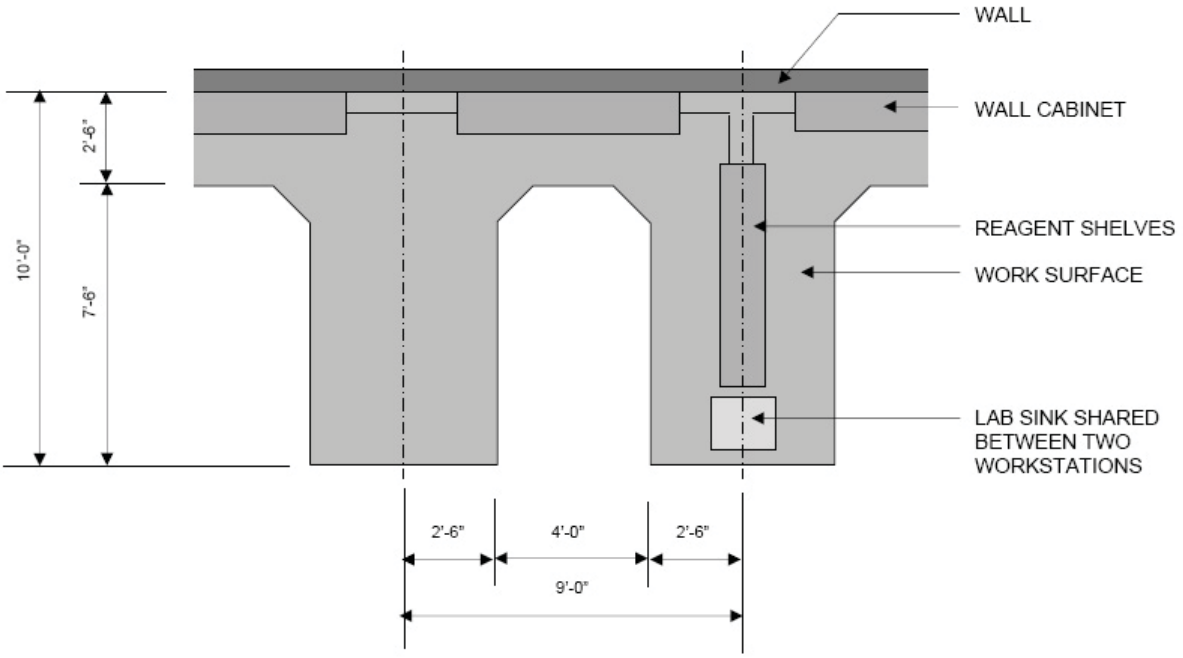
C-3 Analyst Workstation - Firearms

90 SF



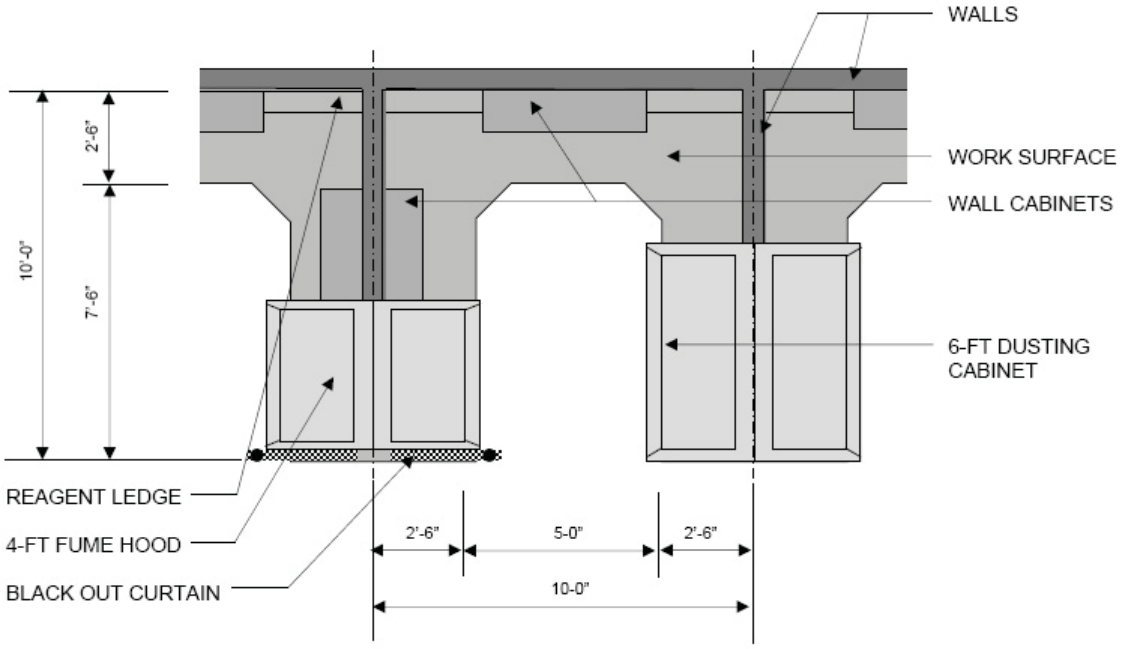
C-4 Analyst Workstation - Trace Evidence

90 SF



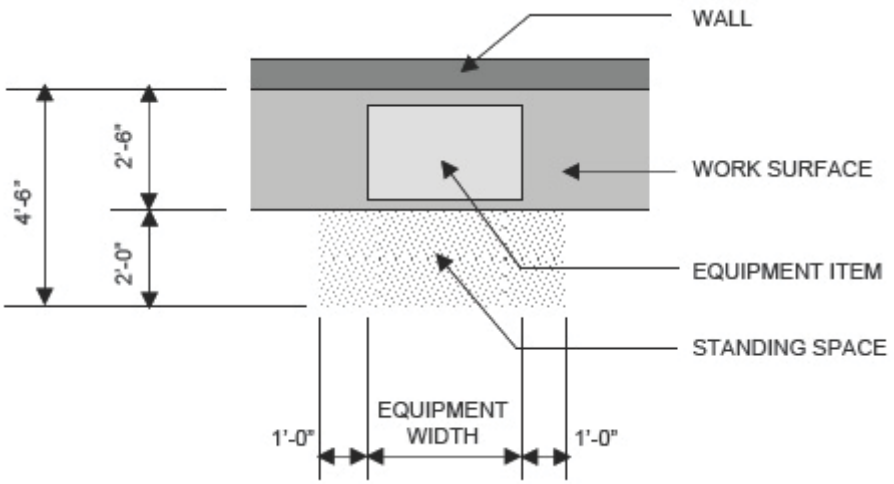
C-5 Analyst Workstation - Latent Prints

90 SF



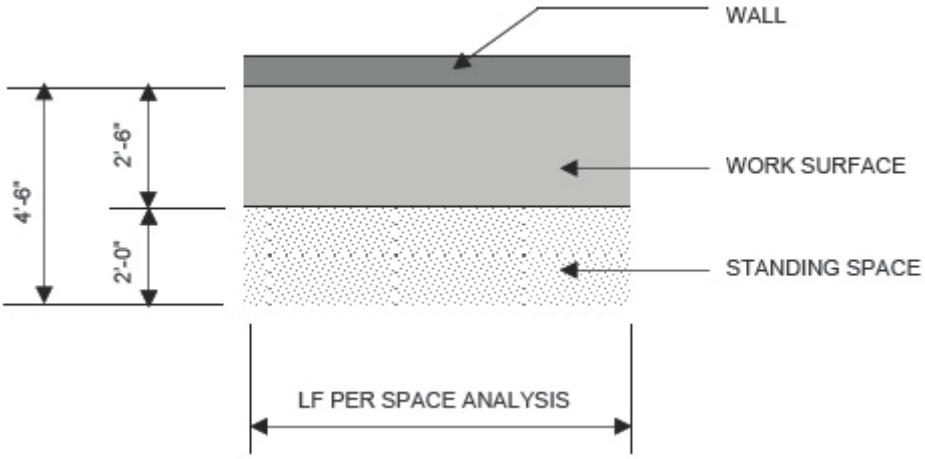
C-6 Lab Bench Equipment

SF varies per LF requirement



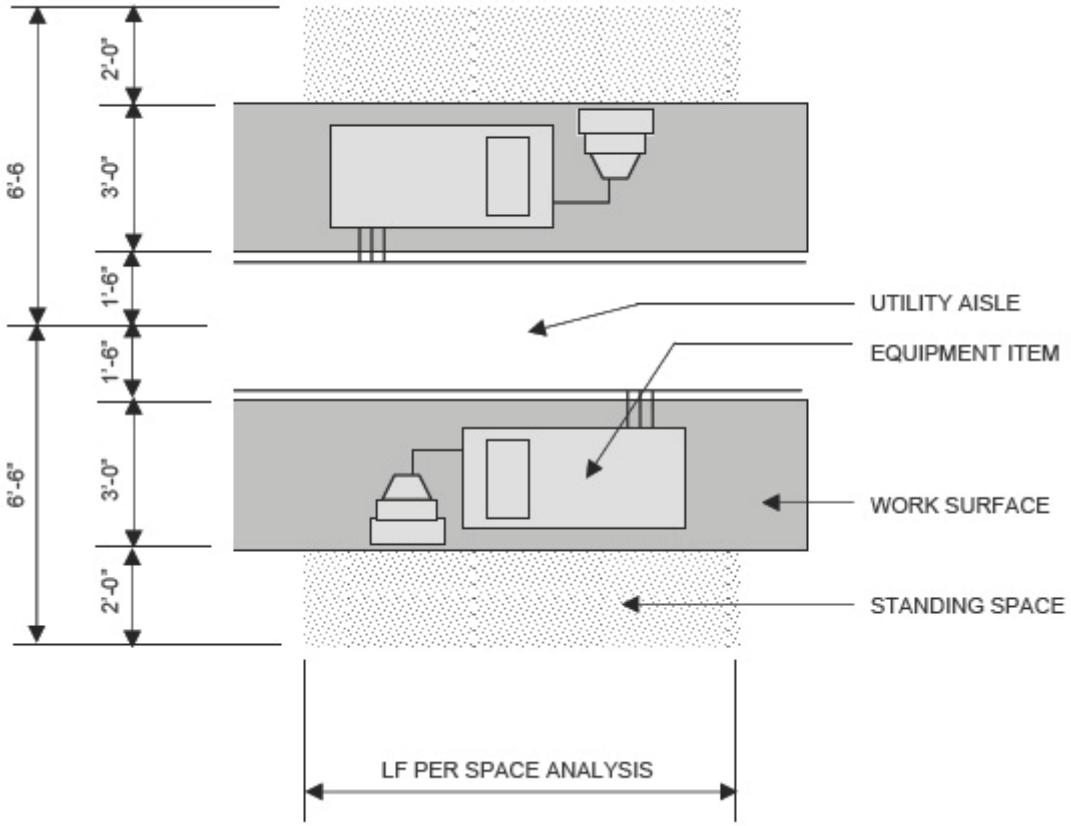
C-7 Lab Bench Shared

SF varies per LF requirement



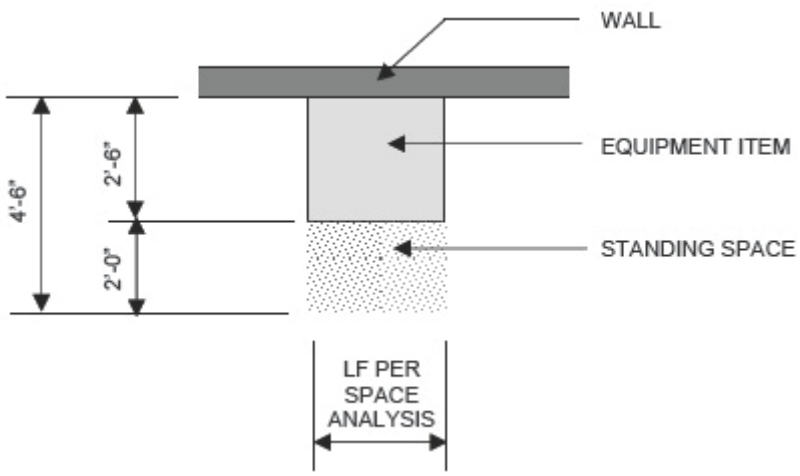
C-8 Lab Bench Equipment - Rear Access

SF varies per LF requirement



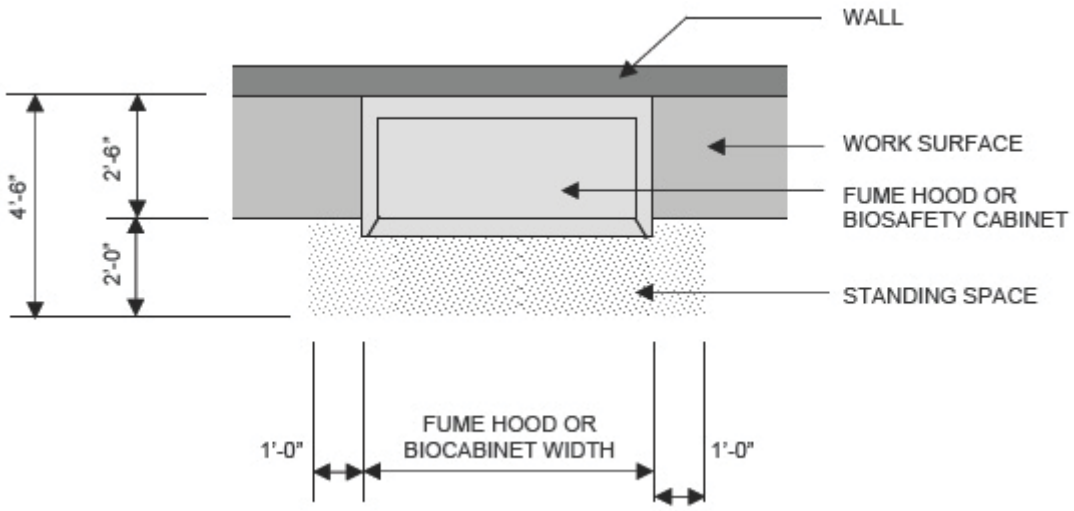
C-9 Lab Equipment Floor Space

SF varies per LF requirement

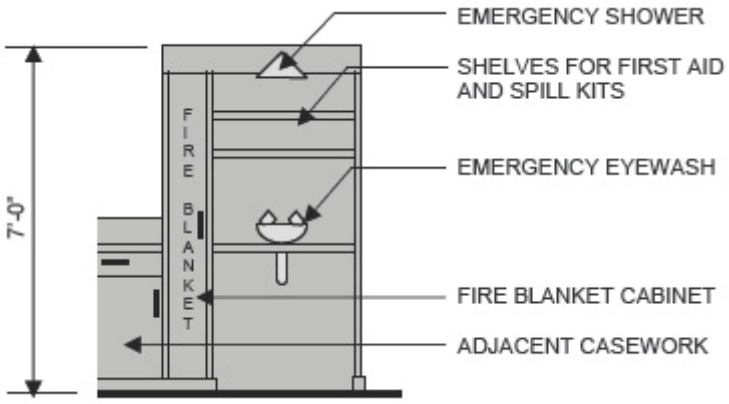


C-10 Fume Hood or Biosafety Cabinet

SF varies per hood width

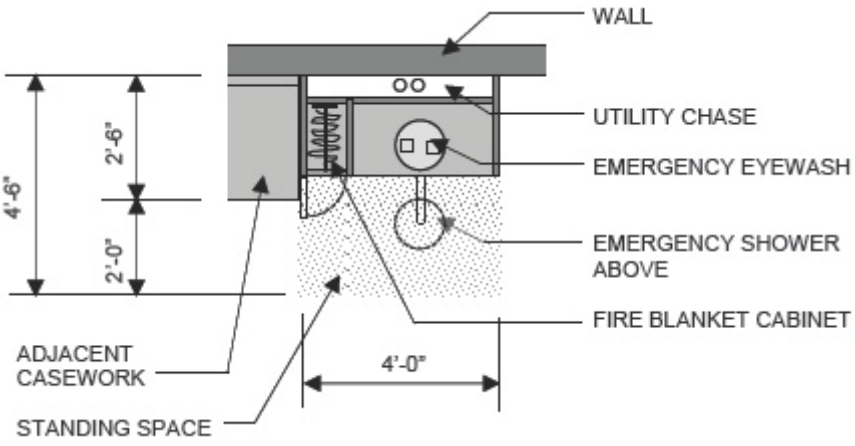


C-11 Safety Station Elevation



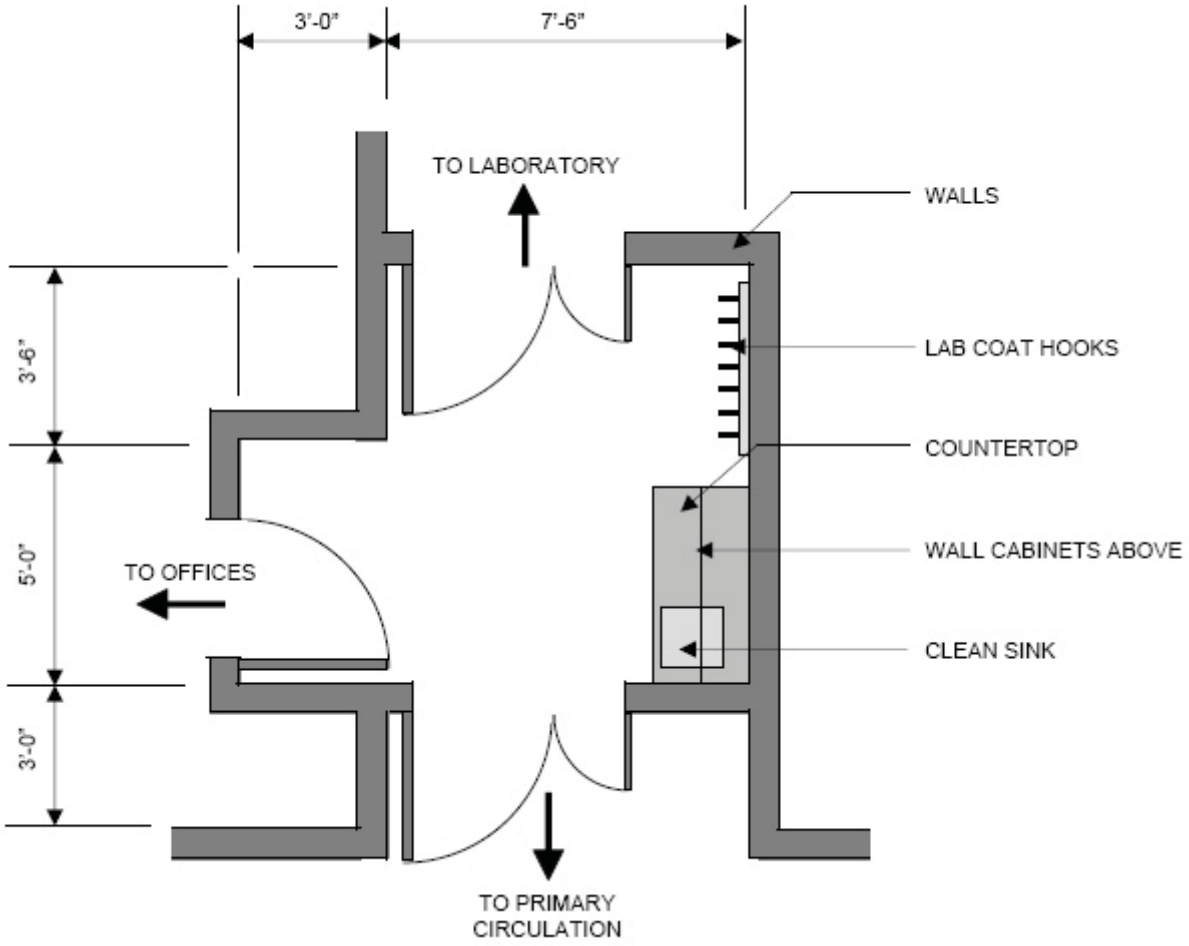
C-11 Safety Station

18 SF



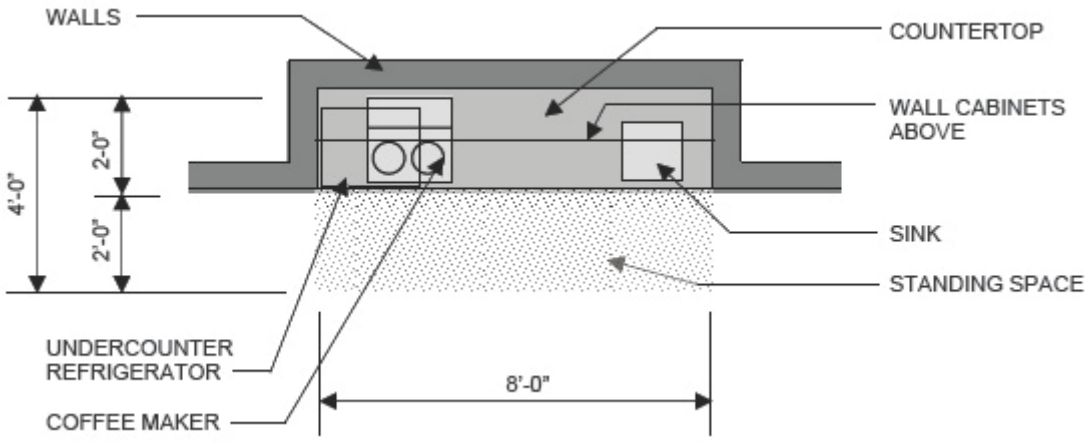
SERIES-D

D-1 Biovestibule
80 SF

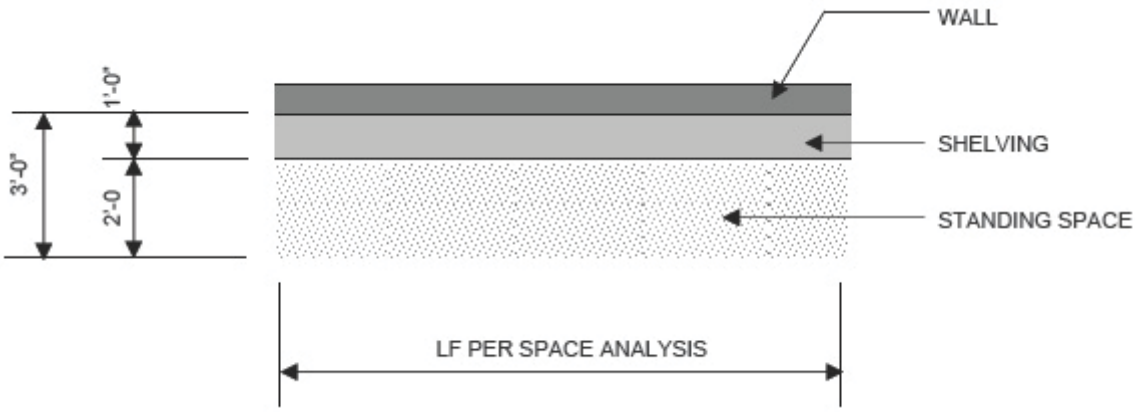


SERIES-E

E-1 Coffee Bar
32 SF

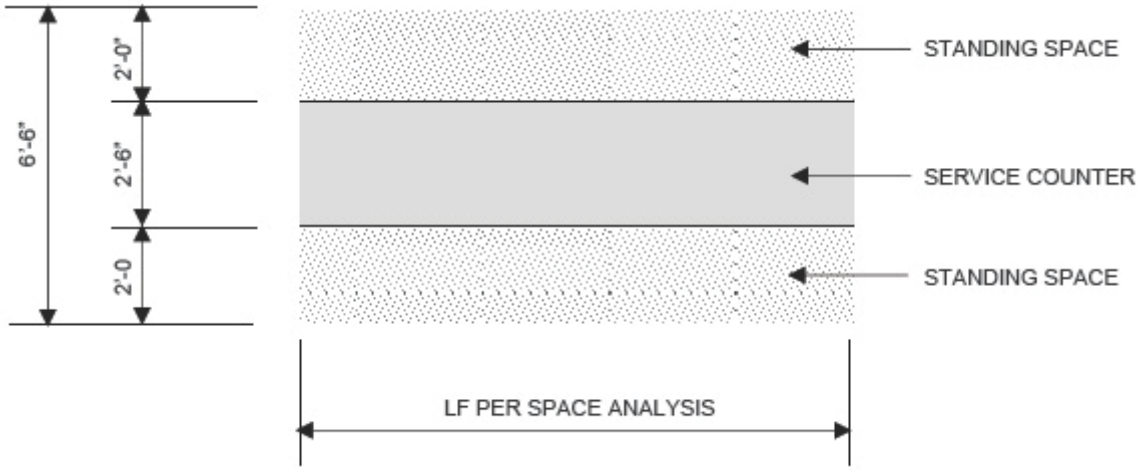


E-2 Shelving
SF varies per LF requirement



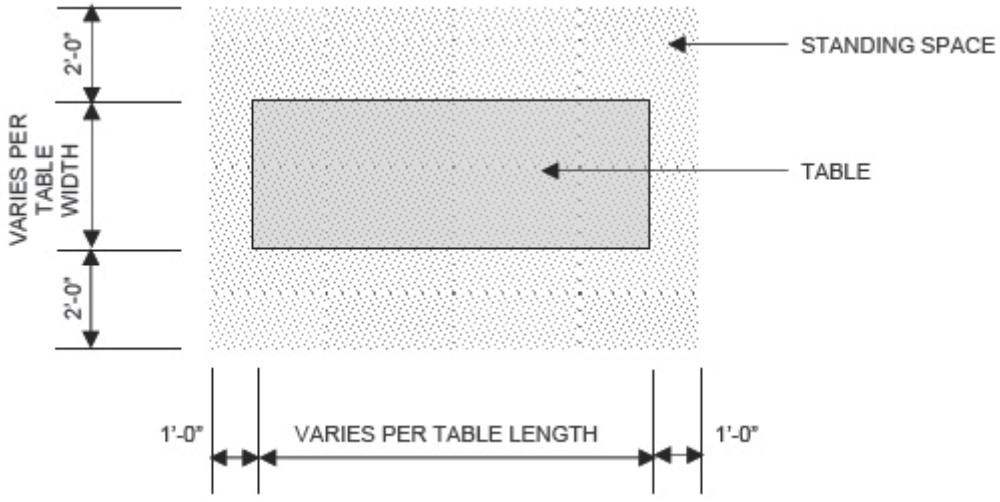
E-3 Service Counter

SF varies per LF requirement



E-4 Work Table

SF varies per table size



4.5. Design Criteria

This section of the Needs Assessment contains the design criteria. Data sheets supporting these narratives are included in the Appendix 8.2 - Room Data Sheets. Room Data Sheets provide the design team with information pertaining to the following design issues and features:

- Hours of Operation
- Security
- Utilities
- Furnishings
- Power and Lighting
- Communication and Data
- Chemical Use and Storage
- Equipment and Hoods
- Interior Finishes

An individual Room Data Sheet has been provided for each room in the building as they are identified in the Space Analysis Spreadsheets.

4.5.1 Environmental

No environmental concern was discovered during the Phase I Environmental Site Assessment.

4.5.2 Geotechnical Engineering

The regional seismicity of the subject sites is comparable to the rest of southern California. The nearest potentially active fault is the San Jacinto Fault – San Bernardino segment, located approximately 3 to 4 miles (5 to 6 km) from the site. The San Andreas Fault – San Bernardino segment is also in the near vicinity of the project sites and is considered to be a principal element of the overall San Andreas Fault system. The region does experience frequent strong ground motions related to earthquakes, and the project should be designed in accordance with the California Building Code (CBC) for Seismic Zone 4.

Our review of geologic literature indicates that the following details regarding the subject sites:

- The subject sites are anticipated to be underlain by alluvial

deposits of the San Bernardino Basin.

- Records provided by the California Department of Water Resources indicate ground water has been recorded at depths between approximately 20 to 170 feet below ground surface.
- The subject sites are not located within a designated Alquist-Priolo Earthquake Fault Zone (APEFZ) as defined by the State of California in the Alquist-Priolo Earthquake Fault Zoning Act.
- Anticipated high groundwater levels within the subject sites, in association with the proximity of the sites to active faults and the anticipated subsurface materials, indicate the sites are highly susceptible liquefaction and dynamic settlement event(s).
- The project is not located within the boundaries of a presently established earthquake-induced landslide zone.
- Inundation by tsunamis (seismic or "tidal waves") or seiches ("tidal waves" in confined bodies of water) are not considered to be a significant threat to the subject site due to the absence of proximal large bodies of water.
- According to FEMA, the project site is not located within a designated flood zone.

4.5.3 Civil Engineering

To be included in the final document.

4.5.4 Landscape Architecture

The City has landscape standards to establish landscape regulations that are intended to:

- Enhance the aesthetic appearance of development in all areas of the City by providing standards relating to quality, quantity and functional aspects of landscaping and landscape screening.
- Increase compatibility between residential and abutting commercial and industrial land uses.
- Reduce heat and glare generated by development.
- Protect public health, safety and welfare by minimizing the impact of all forms of physical and visual pollution, controlling soil erosion, screening incompatible land uses, preserving the integrity of neighborhoods and enhancing pedestrian and vehicular traffic and safety.
- To establish a water conservation plan to reduce water consumption in the landscape environment by using drought tolerant principals.

The consultant shall also review and determine appropriate operational and maintenance standards needed to meet the current and future program and facilities needs. They should also provide maintenance and operational specifications, ADA compliance, and identify landscape and maintenance issues.

4.5.5 Architectural

To be included in the final document.

4.5.6 Structural Engineering

To be included in the final document.

4.5.7 Mechanical Engineering

Codes and Standards

- Mechanical systems for the San Bernardino County Forensic Lab will be designed in compliance with applicable Mechanical and Plumbing Codes and applicable standards from SMACNA and NFPA. Ventilation will comply with ASHRAE Standard 62, "Ventilation for Acceptable Indoor Air Quality".

- Design of mechanical, plumbing and fire protection systems shall be in accordance with the California Code of Regulations (CCR) Title 24.

- Mechanical system design goals include energy efficiency, user safety, comfort and flexibility, system reliability and maintainability, environmental sustainability, and providing value for San Bernardino County.

- Design Conditions
  Indoor Design Conditions:
  Summer: 75 °F, 55% maximum relative humidity
  Winter: 72 °F

  Outdoor Design Conditions (ASHRAE 0.4% cooling, 99.6% heating):
  Summer: 103°F dry bulb/ 69°F wet bulb
  Winter: 33°F dry bulb
  Building Pressurization:
  Positive 0.01 in.W.G. mean pressure with respect to atmosphere, actively controlled.

Heating Service

- The building will require approximately 4,500 MBH of heating hot water. The heating system should be designed to provide a level of redundancy for system maintenance

and reliability, sizing two boilers for three-quarters capacity each would require (2) 100 horsepower boilers (3,350 MBH).

- The hydronic heating hot water pumping system should be configured in a constant flow primary/variable flow secondary arrangement to serve air handling units and variable air volume terminal reheat coils located throughout the building. Provide variable frequency motor drives for secondary pumps.

- Heating hot water system to be complete with an expansion tank, air separator, and side stream chemical pot feeder. Heating hot water coil connections to utilize two-way control valves, inlet strainers, isolation and balancing valves. A 6 inch heating hot water main pipe line will be sufficient for this heating capacity.

Cooling Service

- The building will require approximately 350 tons of chilled water cooling capacity. Refrigeration service for the building is assumed as water cooled electric-driven chillers. To assure a level of redundancy for system maintenance and reliability, two 350 ton centrifugal chillers allowing one for standby service should be provided. The hydronic chilled water pumping system should be configured in a constant flow primary/ variable flow secondary arrangement with distribution to Air Handling Units and other required cooling needs. Variable frequency motor drive for secondary pumps should be provided. Chilled water system to be complete with an expansion tank, air separator, and side stream chemical pot feeder. Chilled water coil connections to utilize two-way control valves, inlet strainers, isolation valves, and balancing valves.

- A 8 inch chilled water main pipe line will be sufficient for this chilled water system capacity.

- Heat will be rejected from the chillers to the atmosphere via two induced-draft, cross-flow cooling towers matched in size to refrigeration machines. Provide two condenser water pumps connected to a 10 inch main condenser water piping network.

Building Management System

- A distributed direct digital control system will be required to serve all building systems. The system will consist of a web based system including software, distributed microprocessor controllers, panels, and associated sensors,

switches, alarms, flow meters, relays, control valves, control dampers and wiring.

- The system will be an operator-programmable system, based on the user applications, to perform closed-loop, modulating control of building equipment. All digital controllers will be connected through the communication network to share common data and report to workstation Building Management System computer complete with system graphics.

- Specialized applications software will be required to fully interface with the BMS to include all major building mechanical systems and equipment such as chillers, boilers, laboratory temperature, laboratory space pressure, fan and pump motor VFD control systems. Consideration should be given to integration of fire alarm and security systems into the building management system.

- The complete mechanical system should be on the emergency generator back-up power system. The BMS system should be utilized to prioritize the operation of the most critical systems and demand limit operation within the limits of emergency on site power capacity.

Crime Laboratory HVAC Systems

- The forensic laboratory spaces will be designed to BSL-2 containment requirements as outlines in Centers for Disease Control and Prevention CDC/NIH Bio-safety in microbiological and biomedical laboratories.

- Laboratory ventilation rate minimum air changes per hour (ACH) will be 6 ACH to control fumes, odors, and airborne contaminants during lab occupied hours and 4 ACH during lab unoccupied hours. All supplied air into laboratory spaces that have a potential for airborne chemical or biological contamination will be once through 100% exhausted. Airflow within lab spaces should in general have directional movement from clean to dirty operations. Laboratory sections will be maintained at a relative negative pressure to surrounding areas. Personnel entry/exit laboratory bio-vestibules will provide separation for differential pressure zones.

- Each laboratory space HVAC system will be sized to accommodate the needed supply and exhaust air to support internal equipment heat gain, number of fume hoods, bio-safety cabinets, snorkels, etc. Supply and exhaust air will be metered into the laboratory space through air valves set for a volumetric offset to establish the desired

pressure relationship. The air valves will have an occupied and unoccupied airflow setpoint to allow the lab space to reduce airflow levels when unoccupied down to 4 ACH.

- Fume hoods will be class A per ANSI/AIHA 29.5 specification and be of the high efficiency constant volume exhaust type. Hood face velocity will be maintained at 100 fpm at the 18" operating sash position with a minimum of 55 fpm in the full open sash position.

- The air handling units serving the crime laboratory will have pre-heating coils, cooling coils, pre-filters to capture 30% of the particulates over 85 microns and final filters to capture 95% of the particulates down to 30 microns. Design consideration should be given to installation of energy recovery run-around coil between outside and exhaust airstreams. The building should have the capacity to deliver 115,000 CFM supply airflow. In order to provide redundancy the design should be based on multiple fan air handling units or fan wall air handling systems. Supply air will delivered from AHU(s) through galvanized sheet metal duct systems to air valves with reheat coils for distribution to ceiling mounted supply diffusers.

- The crime laboratory exhaust system will require a capacity of approximately 50,000 CFM. To provide a level of redundancy provide for three exhaust fans sized for 25,000 CFM allowing for one fan to serve as standby. The laboratory effluent will discharge from roof exhaust stacks a minimum of 10 foot in height above roof level at an exit velocity of 2500 to 3000 FPM to direct exhaust away from air intakes and adjacent buildings. Branch exhaust ductwork serving fume hoods and bio-safety cabinets will be constructed from 316 stainless steel. Exhaust air valves will be required to meter the flow through exhaust terminal devices.

- Office space functions will be maintained at a positive pressure with respect to the laboratory areas. Return air from the office space functions will be recirculated and ducted back to the air handing unit. Temperature control for the offices spaces will be through variable air volume terminal units with reheat coils. Supply and return ductwork will be galvanized sheet metal duct. Air distribution will be through ceiling mounted diffusers, and registers. Toilet rooms and lockers will be exhausted through a general exhaust air system with a capacity of 5000 CFM .

4.5.8 Plumbing

- A 4 inch potable water service will be require to serve the building with required metering, and backflow protection. Additional backflow preventers will be required for make up water to heating hot water, chilled water, RO/DI laboratory pure water, and laboratory industrial water systems. Gas fired tank or semi-instantaneous water heaters with sealed combustion air should will be required to meet potable and industrial hot water service requirements. Potable and industrial hot water systems to include system circulation pumps and expansion tank.

- Domestic potable water, which serves locker rooms, toilets, kitchenettes and emergency safety eye wash shower stations, will be separated from industrial non-potable water which serves laboratory sinks and makeup water to equipment through proper backflow protection to prevent cross contamination. Domestic and industrial hot water will be delivered to end users through recirculation piping systems from separate water heaters.

- Combination safety showers/eyewash will be installed in compliance with the latest edition of ANSI 2358.1 and will be located with an unobstructed travel path. They will have a controlled flow capable of 3 gpm for 15 minutes. Tempered domestic water will be delivered via a re-circulated water system to the safety shower and emergency eye washes.

- The crime laboratory will have two separate waste systems; a sanitary waste system and a laboratory waste system. The toilet rooms, locker rooms and kitchenettes will be served by a 4 inch cast iron pipe sanitary waste system.

- The laboratory waste system will collect waste from all sinks and floor drains in the laboratory and support areas. The laboratory waste system shall be 4 inch pipe size constructed from chemical resistant schedule 40 polypropylene pipe. The laboratory waste system will drain by gravity to a PH neutralization and sampling basin before being discharged to the site sanitary sewer system.

- College of American Pathologists Type II Reagent grade pure water system including water softener, carbon filter, reverse osmosis unit, deionization tanks, ultra-violet sterilization, particle water filters, storage tank, and recirculation pump shall be provided. The water system will be distributed through 1-1/2 inch pipe size schedule 80 polypropylene piping system. The run outs shall consist of a loop at each faucet termination to prevent

any dead end conditions. The deionized reagent grade water system will be continuously re-circulated back to the storage tank. Water quality specifications resistivity shall be greater than 10 meg-ohm/cm, Bacteria shall be less than 10 cfu/ml, with a 0.2 micron water filter. Central system components include a recirculation pump at 30 GPM, a 500 gallon storage tank with mix bed demineralizers at 3.6 cubic feet.

- Laboratory compressed air plant shall deliver clean (oil free), dry compressed air 50 psig pressure from the plant to the point of use via 1 inch pipe size seamless copper type L hard tempered piping system. System demand 37 SCFM. Compressed air plant duplex 7-1/2 HP (second compressor serves as partial redundant back-up unit.)

- A laboratory vacuum plant will provide 19 inches HG intake vacuum to laboratory service fixtures. The vacuum piping will be type L copper 2-inch pipe size. System demand 20 SCFM. Vacuum plant duplex 5 hp (second vacuum pump serves as redundant back-up unit).

- A bulk laboratory gases room should be provided for laboratory gas cylinder manifold systems for helium, nitrogen and any required specialty gas service with distribution piping to laboratory equipment and service valves. The room should have adjacency to the heaviest user laboratories controlled substances, breath and blood alcohol, and trace evidence. Systems should be monitored by BMS system for alarm when systems are operating on reserve cylinders. Hydrogen and zero clean air gas needs will be produced in the prospective laboratory sections through the use of gas generators.

- A rain water roof drainage system serving roof drains, and canopies, will be extended to site systems.

Fire Protection

Wet sprinkler fire protection will be required for 100% building coverage, and fire protection requirements will be in accordance with NFPA. A 6 inch fire water main from the site will be required to serve the building complete with backflow preventer, fire department siamese connection, alarm valve, OS&Y valves with tamper switches, system flow switches, electric bell, inspector test and drain.

4.5.9 Electrical

Exact routes and requirements to serve the buildings will be determined and indicated in the final construction documents.

The number of buildings and the configuration on the site will determine the number of electrical services and utility transformers. The estimated electrical load for this new facility is calculated as follows:

Office:

Approx.	37000	SF						
Lighting	0.9	X	37000 SF =	33300	VA X	1.25	41625	VA
General Power	2	X	37000 SF =	74000	VA X	1	74000	VA
HVAC	8	X	37000 SF =	296000	VA X	1	296000	VA
Office Recpt's/Equip	4.5	X	37000 SF =	166500	VA X	1	166500	VA
							578125	VA

Lab:

Approx.	37000	SF						
Lighting	1.4	X	37000 SF =	51800	VA X	1.25	64750	VA
General Power	2	X	37000 SF =	74000	VA X	1	74000	VA
HVAC	8	X	37000 SF =	296000	VA X	1	296000	VA
Lab Equip.	18	X	37000 SF =	666000	VA X	1	666000	VA
							1100750	VA

Evidence Storage

Approx.	26000	SF						
Lighting	0.6	X	37000 SF =	22200	VA X	1.25	27750	VA
General Power	0.5	X	37000 SF =	18500	VA X	1	18500	VA
HVAC	5	X	37000 SF =	185000	VA X	1	185000	VA
MiscEquip.	2	X	37000 SF =	74000	VA X	1	74000	VA
							305250	VA

Total 1984125 VA

= 2388 A @ 480V-3ph

Power Distribution

Power will be distributed throughout the facility at 277/480V -3Ph-4W. In general lighting, HVAC equipment, miscellaneous motors and heating loads will be served at 277/480V. General purpose receptacles and lab equipment will be served from 120/208V-3Ph-4W panelboards via dry type transformers. Transformers will be NEMA TP1 compliant.

Emergency Power

An outdoor diesel-driven generator will be provided to accommodate emergency power for egress and exit lighting. It will also include standby power for selected areas and equipment as directed by the owner to include but not limited to: elevator if applicable, computer systems, telephone equipment, selected refrigeration equipment, selected lab equipment and any other items directed by owner. Automatic transfer switches shall be provided for life safety loads and will be separated from optional emergency standby loads. The generator is tentatively sized at 600KW/750KVA @ 480/277V-3Ph, 4W. Estimated load calculations for the generators are as follows:

Emergency Load:
100000 SF x 7 VA/SF = 700 KVA / 560 KW

Lighting

All areas will be illuminated as recommended by the Illuminating Engineering Society of North America as set forth in the IESNA Lighting Handbook, 10th edition and in compliance with California Title 24 energy codes. Lighting is proposed as follows:

- Energy efficient luminaires will be provided throughout the facility. Office and like areas will be provided with high efficient, low glare 2' x 4' fixtures. Lab areas, large offices and/or open areas will be provided with pendant mounted direct/indirect lighting fixtures.
- Storage and unfinished areas will be provided with 2' x 4' standard lensed troffers.
- Specialty luminaires will be provided as necessary in areas such as lobbies, entries and conference rooms.
- Display lighting will be provided for special artifact areas.
- Lighting will be controlled via a digitally controlled lighting control system. In general, occupancy sensors will be used throughout. Perimeter lighting in day lit areas will be controlled by photo sensors.
- All required egress and exit lighting will be connected to the emergency generator. LED exit signs will be used for exit signage.
- Site lighting fixtures and building mounted luminaires at entrances and other appropriate locations along the building will be selected with attention given to dark sky sensitivity. Bollards may be added along the circulation path where required.

4.5.10 Fire Alarm Systems

A stand alone digital fire alarm system with early warning capabilities will be provided to include the following:

- Fire alarm control panel.
- Annunciator.
- Booster panels.
- Heat detectors in elevator machine room, pit, and top of shafts.
- Complete corridor smoke detector coverage.
- Smoke detectors in high risk areas such as electrical rooms, IT rooms and computer rooms.

- Duct smoke detectors in air handling equipment over 2000CFM.
- Manual pull station at all exits and where required by code.
- Connection to fire protection sprinkler water flow alarm and tamper switches.
- Complete audio/visual coverage per NFPA-72 via ceiling mounted devices.
- Connection to central monitoring agency.

4.5.11 Telecommunications

Telecom outlets consisting of a minimum of two Cat 6 connecters per outlet shall be installed for telephone/data combination outlets in offices, workstations and other areas as directed by the owner. Backbone cabling will consist of multimode and single mode fiber optic cabling as directed by the owner. Copper backbone cabling will be provided where required. Wire management systems, cable tray, equipment racks will be provided where required. The telephone system will be provided outside of this contract.

4.5.12 Security

Card readers, door control, door monitoring, cameras and other required security equipment will be provided at locations directed by the owner.

4.5.13 Technology Assessment

Trends in programming and planning of modern analytical facilities, such as those required for criminal investigation, indicate:

1. A shift away from fixed laboratory casework applications and toward the use of 'plug & play' furniture systems to allow for ease of rearrangement and provision of flexibility of space and services to accommodate future change in investigative technique and any new crop of instruments required. These new systems feature caster mounted base cabinetry to allow for mobility from space to space.

2. Once prominent central service systems, such as piped specialty gases, are no longer the norm. Instead, as determined by initial capital cost versus ongoing operational costs, modern scientific instrumentation is provided with dedicated specialty table top gas generators, or by the traditional use of replenishable cylinder gas.

3. While the need for traditional piped service systems have waned, the need for increased, clean power has increased dramatically as more scientific instrumentation has made its way to the investigative environment.

4. In concert with the increased demand for electrical power, comes the need for an integrated and well distributed data network. This increase in data requirements, and the ability of the various instruments to communicate with central systems, has lead to the development of Laboratory Information Management Systems (LIMS). The development and application of LIMS, in turn, has caused yet more need for an extensive data network.

5. And, of course, the primary trend is toward energy conservation and sustainability. Sophisticated control devices are placed on environmental systems, such as lighting and exhaust. While additive to initial cost, life cycle costs are such that pay-back is within acceptable limits and ongoing financial savings are accumulated thru energy use reduction.

5.0 Conceptual Master Plan

5.0 CONCEPTUAL MASTER PLAN

An illustrative diagram of the conceptual Master Plan for the San Bernardino County Forensic Science Laboratory is presented on page x. For reference, the existing site with the three proposed locations is shown on page 120.

The final approved master plan's organization is .....

5.1 Key Design Issues

Program and site issues were integrated into the following six key design objectives:

1. Provide a straightforward, functional and flexible building plan to meet SID's specifc needs for a forensic science laboratory, office and training facility.
2. Provide a cost-effective design that delivers the best value for SBC, the community and citizens of the state.
3. Provide an effective, pleasant and humane work environment with opportunities for staff to interact within the building.
4. Provide a building and site designed to express openness to the community as a good neighbor, while providing absolute safety and security for staff 24 hours a day.
5. Provide operational quality and efficiency through low maintenance and longevity of materials (75-100 year building design)
6. Provide for future expansion.

5.1.1 Parameters

Many functional requirements were critical to the development of the conceptual Master Plan. For example, the staffing projections alone mean that an additional x people will visit the site daily. The following design parameters influenced the design of the final master plan option:

- An identifiable 'front door' to the facility
- Separate buildings for the multi-purpose room and the laboratory
- Secured storage, delivery and staging area associated with 5.2 Building Adjacencies

5.1.2 Building Adjacencies

Proximity of the multi-purpose room and other public spaces to the Administration offices is desirable so that these spaces can be used by other department for lectures, workshops,

training and meetings in addition to use by the media during emergency situations.

In the future...

5.1.3 Vehicular and Pedestrian Access

Clear and controlled traffic patterns throughout the site are critical. ….more information to be included in the final document.

- the forensic garage and property and evidence warehouse
- Adequate on-site parking with visitor access
- Prominent placement of the administration offices
- Service access to the facility

5.1.4 Parking

According to County Zoning regulations, the proposed construction would require xxx spaces. In future design phases, more detailed studies confirming the parking requirements should be undertaken.

5.1.5 Future Expansion

Future expansion of the facility has been planned for in the final master plan concept for all portions of the facility. Additional development on the site may necessitate a larger parking facility to be addressed in future design.

5.1.6 Master Plan Studies

Numerous option were studied during the macro programming phase of work. These options have been presented in the Appendix.

5.2 Block Diagrams

The block diagram referenced in this section are shown on page x. It is important to understand that these diagrams are not intended to be actual building layouts. They are visual tools that assist in confirming the Space Program, understanding potential building proportions, and exposing critical departmental adjacencies that might impact the overall master plan. Each diagram was developed in conjunction with the master plan effort and reviewed with the appropriate county staff and stakeholders.

Fold out for existing site

6.0 COST ESTIMATE

6.0 Cost Estimate

To be included in the final document.

6.1 Basic Assumptions

To be included in the final document

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8.0 APPENDIX