# IV. Facilities

## Enrollment

College credit enrollment is expected to grow by over 60% in the next decade, from 5,045 full time equivalent students (FTES) in 2004 to over 8,100 FTES in 2015. Las Positas College enrollment for 2020 is projected to exceed 9,700 FTES, over a 92% growth from the current enrollment[1]. The Facility Development Plan is designed to accommodate this growth

## Facilities

The Chabot-Las Positas Community College District Measure B, passed by the voters in 2004, outlined development of several new facilities on campus as well as renovations to existing buildings and infrastructure.

*Existing Las Positas College Facilities*

*Multi-Disciplinary Classroom Building*
This building has lecture rooms, computer labs, and a large classroom that is wired for distance education. It also has a large interdisciplinary study space and an Innovation Center to facilitate research, evaluation, and development of new approaches to student learning. Offices for faculty and staff have been designed to support cooperative interdisciplinary teaching. Refer to Volume 2, Exhibit A-09.

*Multi-Disciplinary Education Building Elevation*

*Child Development Center*
This project will provide an on-campus facility for the Early Childhood Development (ECD) program. The proposed building will contain a variety of teaching, demonstration, and observation rooms for preschool children and toddlers. In addition, a lab/demonstration space will provide practical experience for students in the ECD classes. With this facility, ECD students will be able to participate in a year-round training program and will be able to complete the ECD Certificates and Degrees in a timely manner. Refer to Volume 2, Exhibit A-10.

*College Center for the Arts*
This building addresses the growing community demand for courses in Music, Dance, and Speech. It will provide classroom and workspace for Theater and Drama, as well as a technical Theater Program and will have specialized Forensic and Music labs (including a MIDI lab for computer music). The building will also include a theater for stage productions and associated college activities. Refer to Volume 2, Exhibit A-11.

[1] Las Positas College Enrollment Growth Scenario, Merle Cannon April 2005.

*Science Technology Phase II, Classrooms / Labs*
The expansion of the Science Technology Center will provide needed space to support growth in the Chemistry, Biology, Engineering, Physics, Astronomy, and Earth Sciences programs. It will also house high-tech facilities for emerging and popular programs such as Laser Technology and Viticulture. The Center will have specialized laboratories, independent study areas, project development space, classrooms, and offices. Refer to Volume 2, Exhibit A-12.

*Existing Science Building 1800*

*Physical Education, Phase II*
This project allows for the construction of outdoor PE areas to augment and support the College's educational and athletic programs. This project includes a swimming pool, grass and synthetic playing fields, baseball and softball fields, tennis courts, an outdoor running track with seating for 1500, a field-house, with restrooms and concession facilities. Refer to Volume 2, Exhibit A-13.

*Competitive Aquatic Center*

*Student Services*
This two-story building will allow the College to centralize all student service functions including (but not limited to) counseling, admissions and records, financial aid, the career/transfer center, articulation, DSPS, EOPS, services for seniors, the health center, the cafeteria, bookstore and the student government offices. Refer to Volume 2, Exhibit A-14.

*Classroom / Lecture Hall*
This two-story building will provide additional lecture halls and high-technology classrooms. Refer to Volume 2, Exhibit A-15.

*Lecture Room*

*Classroom Renovations*
Existing Buildings will be renovated to replace 30-year-old classroom fixtures and HVAC systems. It also improves the acoustic integrity of the classrooms. The new classrooms, studios, labs and meeting rooms will incorporate state-of-the-art media technology to meet the needs of new instructional methods and update programs.

*Library Renovation / Expansion*
This project will allow for necessary expansion of the 2100 building to accommodate the growing enrollment and increased demand on the library and its book and media collection.

*Existing Library*

*Maintenance & Operations Center*
The proposed building will house all of the department's custodial, grounds, maintenance equipment and operational functions. In addition, Maintenance and Operations existing structure and portable buildings need to be moved to provide space for classroom buildings and other campus functions. Refer to Volume 2, Exhibit A-16.

*Central Administrative Services*
This building will house the personnel required to support campus growth and operations, including institutional research, grant writing, public relations, business/finance services, academic administration, the president's office, and the LPC Foundation. This building should be centrally located with ample visitor parking. Refer to Volume 2, Exhibit A-14.

*Information Technology Service Building*
The building will continue the District's Data Center operations supporting the network infrastructure, administrative and instructional servers, and office space for the ITS personnel from the District and Las Positas College. Refer to Volume 2, Exhibit A-15.

*Server Room*

*Site Preparation, Utilities, Technology Wiring*
This project will complete the College's necessary infrastructure and site development including electrical, plumbing, outside writing and an extension of the campus computer network.

*Security, Safety, Lighting, Energy Efficiency, Miscellaneous Projects*
This project includes but not limited too:

- Access roads
- Fire alarms
- Security upgrades
- Additional parking lots
- Sidewalks, driveways
- Directional signage
- Alternate transportation methods (including bike paths)
- A small demonstration vineyard
- Interior and exterior painting
- Landscape
- Alternative energy sources (solar and/or wind)
- Additional campus entrances and exits

**Measure B Development Plan**

| | | |
|---|---|---|
| New Buildings | | |
| Multi-Disciplinary Classroom | 28,425 | GSF |
| Child Development Center | 24,000 | GSF |
| College Center for the Arts | 58,000 | GSF |
| Science Technology Classroom & Labs, Phase II | 25,575 | GSF |
| Student Counseling, Financial Aid and Admissions | 65,000 | GSF |
| Classroom / Lecture Hall | 30,000 | GSF |
| Maintenance Operations Center | 10,000 | GSF |
| Central Administrative Services | 12,000 | GSF |
| Information Technology Building | 7,000 | GSF |
| **Subtotal New Area** | **260,000** | **GSF** |

New Site Facilities
Physical Education, Phase II
Site Preparation

Modernizations / Enrichments
Classroom / Vocational Repair
Library Renovation
Campus Repair
Instructional Equipment

*Measure B Brochure*

### Existing Buildings

At the time of writing this document, existing facilities[2] to remain include eighteen buildings including the gymnasium. The twelve buildings in bold are scheduled to be modernized. Four existing structures are scheduled to be demolished or removed from the Las Positas campus. One building, 1700 is planned to be moved to a location close to the master planned Maintenance and Operations Center. Refer to Volume 2, Exhibit A-02.

| | | |
|---|---|---|
| **Building 100 – Administration** | 3,008 | GSF |
| **Building 200 – Classrooms** | 3,008 | GSF |
| **Building 300 - Photography** | 6,272 | GSF |
| **Building 400 – English Center / Classrooms** | 6,090 | GSF |
| **Building 500 – Math / Computer Lab** | 7,707 | GSF |
| **Building 600 – Physical Education** | 6,272 | GSF |
| **Building 700 – Counseling / Admissions** | 6,735 | GSF |
| **Building 800 – Tech – Vocational / Little Theater** | 28,350 | GSF |
| **Building 1000 – Assessment / Tutorial** | 4,126 | GSF |
| Building 1100 – Horticulture / Shade House | 3,139 | GSF |
| **Building 1200 – Fitness Center** | 2,993 | GSF |
| **Building 1300 – Book Store / Faculty Offices** | 5,760 | GSF |
| Building 1700 – Student Center | 8,118 | GSF |
| Building 1800 - Science Technology Center | 27,465 | GSF |
| Building 1900 - Communication | 486 | GSF |
| **Building 2000-2100 – Learning Resource Center** | 32,562 | GSF |
| Building 2200 - Classrooms | 8,040 | GSF |
| Gymnasium | 63,000 | GSF |
| **Subtotal Existing** | **224,131** | **GSF** |

### Proposed Campus GSF

| | | |
|---|---|---|
| Existing Buildings - Renovated | 224,131 | GSF |
| Bond Funded Projects – includes the Multidisciplinary Classroom | 260,000 | GSF |
| **Total Master Plan** | **484,131** | **GSF** |
| Projected Need Identified in Educational Master Plan (base on 2004 Five Year Plan)[3] | 554,445 | GSF |
| **Variance** | **73,314** | **GSF** |

### Variance

The variance between the Educational Facilities Master Plan and the Total Master Plan projected build out indicates a overall gross square footage shortage of over 15%. The projected need should be compared to the Master Plan build-out with each update of the Five Year Plan to verify the facility needs are keeping pace with educational needs.

### Landscape / Open Space

*Local vernacular*

### Overall Landscape Design Principles

The landscape/ open space is a vital part of the Las Positas campus and community and should be preserved and enhanced to the greatest extent possible through careful sighting of future buildings, facilities and infrastructure. The landscape/ site design should be an integral component of each project and the effect on the relationship to the overall campus environment should be paramount, including:

- Respect existing attributes of the site while responding to the context created by surrounding areas and facilities. It should be recognized that the landscape/site design will be the primary way of weaving together the existing fabric of the campus and unifying the campus.

[2] Chabot-Las Positas Community College District, Report 17, Building Summary Report

[3] Provided by Merle Cannon

- The requirements of plants should be fully understood in selection and landscape layout, to avoid over-planting, excessive maintenance, excessive water requirements and conflict with utilities and structures.
- Areas within and adjacent to new building projects should be preserved in their existing condition (in some cases this means no landscape irrigation), or improved to be compatible with both new construction and the existing surrounding landscape with a sustainable campus landscape as an overriding goal.
- New development will increasingly be accommodated on sloped sites. As a result, site design will be especially challenged to provide for drainage, access, views, and noise buffers.

### Landscape Design Concepts

The landscape design should integrate the new development into the present campus by building on the existing design concepts, and embracing new directions for the campus as a result of the new master plan. This design includes:

- Creating a sense of "arrival" to the campus using landscape, paving, signage and focal points, highlighting campus entrances and drop-off points.
- Creating a sustainable campus landscape.
- Creating an awareness of existing grade across the site, capitalizing on and identifying slopes with tree "drifts", contrasting the garden/ park-like academic core with the natural open space and agricultural fields.
- Creating "social spaces" throughout the campus environment for student and faculty interaction, contributing to the identification of campus precincts, enhancing landmark and gateway buildings.
- Defining and highlighting pedestrian "passages" throughout campus to create recognizable malls, key crossroads, and plazas.
- Creating a defined campus edge with an "active" zone for new sports fields and complexes, while providing transitions and buffers to adjacent community areas.

*Pedestrian Passages*

### Maintenance Considerations

The landscape design should facilitate maintenance operations, including:

- Provision of access to plantings and irrigation systems for maintenance and repair.
- Use of plant materials in a sustainable manner suitable to growth habit and length of life; minimizing irrigation demands, and suited for site environmental conditions.
- Where possible reduce maintenance and resource intensive lawn areas in a manner to facilitate a movement towards a more sustainable campus.
- Layout of paving areas to facilitate regular maintenance activities, such as machine sweeping and cleaning, and service cart access.
- Use of durable materials, site furniture, signage, and other features which can withstand wear, abuse, local environment and vandalism.

### Open Space Network

The Open Space Network should be viewed as a hierarchy of spaces beginning with transitional spaces linking the campus edge to the major interior central spaces; then to the minor open spaces & plazas which function as arrival/reception areas to the core building groups. The open space network of the Las Positas College is comprised of the following three elements:

*Perimeter Spaces*

The open spaces located around the edges of the campus are of significant importance because it is here that the first impression/introduction to the college community is made with natural landscaping associated with the hillsides, the washes and the agricultural surroundings. Major entrances (vehicular and pedestrian), vehicular circulation, parking, campus maintenance and service uses, and undeveloped lands are the essential elements and uses found here. Organizing these spaces and integrating the uses into a definable edge that is consistent with order and continuity is as important as the equivalent goal of the campus core. The scale of the open spaces at the campus perimeter is in many instances, undefined and a structuring element should be introduced. This shall be accomplished by the use of new oak trees as a street tree at the perimeter loop road. Continuity and identity can be introduced and strengthened by treating the perimeter vehicular circulation system as a parkway with formalized tree spacing. This should include strong emphasis at destination arrival zones at the major vehicular entrances to the campus as it starts to fade into transitional spaces

*Transition Spaces*

Transition spaces occur on the campus when visitors shift from vehicular arrival points to pedestrian entry ways such as at drop-off and major buildings and groups. A shift in scale, from the vehicle to the pedestrian, occurs at the transition spaces. This occurs at the Center for the Arts building, the Central Administrative and Student Services building, and is highlighted by movement from the campus perimeter areas drop offs & sustainability demonstration lot to the campus core areas. These major pedestrian entrances to the Las Positas campus should reinforce the sense of arrival into the campus core through scale, materials and landscape to highlight the transition. Once this transition is made the environment should reflect the academic program that surround and create outdoor spaces.

*Central Spaces*

The formal landscape of the Arts Core and central Academic Core, along with other developed areas of campus such as the open landscape of the Athletic Core; the playfields, courts and support structures make up the central spaces. The character and structural form of the campus is achieved in these spaces. Major buildings and building groups provide the definition of central spaces. Pedestrian movement via "passages" focus attention to these areas where "social spaces" allow for interaction, and respite in planned people places with unique landscaping, paving and microclimate via shade trees, trellises and windbreaks. It is here where the activity, color and excitement of the campus community are fully expressed.

*Central Space*

*Circulation*

The pedestrian circulation system is the backbone that links the campus together. It is this "passage" system that makes the campus facilities accessible and it is in this system that the chance meetings between members of the campus community occur. The essential components of the pedestrian circulation system are the walkways and the plaza ("social spaces").

*Walkway*

*Walkway/Passages*

The materials and surface treatment of the walkways can vary, but should relate to existing campus materials and pallets. The use of sustainable elements and natural materials such as stone, decomposed granite and recycled elements are encouraged. As an alternative, the walk can reflect the materials of the building it is to serve, or it can be of a less articulated material when traversing open space with differential grade changes. Special attention should be given to pedestrian paths that cross the perimeter loop road where interaction with vehicular traffic should be minimized through the use of bollards, speed bumps/ speed tables and safety as the main focus.

*Transition in the landscape*

*Plaza/Social Space*
The plaza (or "social space") is defined as a space with an opening or gathering place and a special feature in the circulation system; it is an essential element in providing focus, and being a destination. All destination accent areas, such as the reception plazas to major buildings or building groups, should reflect a similar degree of material richness, texture and quality. They should incorporate elements to contribute to microclimate; shade, and windbreaks. They should also incorporate built in seating and sustainability. Natural materials such as stone and landscaping should be introduced. The plazas shall be of a size to provide for the breaking up of spaces for student events and clubs. Where possible, utilities such as power, phone and lighting shall be incorporated.


*Social Spaces*

## Campus Landscape, Plant Materials

### Purpose

Trees and plants serve as symbols, have substance and performance functions. They help provide positive solutions to the many problems existing in a contemporary campus environment such as:

- Air pollution
- Noise pollution
- Sun glare
- Micro climate temperature variations
- Soil erosion (wind and water)
- Nighttime glare from vehicle headlights
- Floodlights from athletic fields
- Vast and impersonal outdoor areas, inhuman
- Privacy
- Aesthetics

Plant materials are complex because they are living, growing and changing with each season. Their primary use has focused on their aesthetic qualities; at Las Positas College the functions of plants should also be the basis for their use in campus environmental design. Basic to this is knowledge of their characteristics, what functional problems they solve, how they can contribute to a sustainable campus through the following criteria listed below.

### Architectural Use of Plants

*Space Articulation*
Any element, natural or man-made, which is able to form a floor, wall, or ceiling, may be used to articulate space. Buildings, walls, fences, earth forms, rocks, water, plants and changes in ground elevations should all be used to indicate the parameters of external campus space.


*Spaces defined by Landscape Elements*

*Screening*
Man-made development disrupts the natural landscape. As the existing campus environment becomes more developed, some portions of campus landscape risks becoming increasingly devoted to utilities and infrastructure. Some of these facilities are not always attractive and presentable from all directions. Screening is visually blocking out that which is unsightly with something more harmonious, or at least less offensive. Screening is a means of providing visual control in the campus landscape through view, direction and negation of undesired elements simply by hiding them.

*Privacy Control/Screening*
Privacy control secludes a particular area from its surroundings. Planting for privacy control is secluding an area from its surrounding for special use such as courtyards, terraces and patios. Screening allows free access through the campus landscape while inhibiting certain views.

### Engineering Uses Of Plants

In the course of campus development, the existing environment will be altered and/or disrupted. One Potential side effect could be soil erosion caused by wind and water.

*Ground Covers*

*Wind Erosion*

Plants control wind erosion through dense leaves or needles that create an effective barrier to air movement through the plants; dense branching that controls and slows wind close to the ground; multiple stems and rough bark that decrease wind velocity as it passes through them; and fibrous roots that grow close to the surface and effectively hold surface soil in place. Plants as windbreaks slow damaging wind in proportion to the heights of the plants used. The best plants for wind erosion control on campus are turfs and ground covers.

*Water Erosion*

Plants should be used on campus to control and prevent water-caused soil erosion in at least three ways. Leaves and branches form canopies or blankets interrupting raindrops, thus reducing splash erosion; roots form fibrous masses within the soil, holding it in place; leaves and other dead parts of plants on the soil surface increase the organic material in the soil, loosening it and increasing its water absorption rate.

*Canopy Trees help prevent water Erosion*

*Acoustical Control*

Basically, the effectiveness of plants to control sound levels is determined by the sound - its type, decibel level, intensity and origin; the planting - type, height, density, and location; and the climatic factors - wind direction and velocity, temperature and humidity. Plants are more effective in screening sounds at some frequencies than at others. Plants, while not absolutely effective in the screening of all sounds, do seem to screen out sound levels sensitive to human ears. Plants do this by modifying climatic conditions, and by absorption, deflection, refraction, and reflection of noise. The foliage of plants because of their flexibility and softness, absorb sound. The trunks and heavier branches deflect and refract (bend) sound. Scattering and absorbing sound waves by plants, grass and groundcovers, reduces the sound level. It is also noted for design consideration that when noise levels cannot be reduced to an acceptable point, it is useful to consider masking them by adding desirable or random sounds - the play of water, music, the rustle of leaves, or even "static" or "white" noises.

*Atmospheric Purification*

Plants condition and clean the air. This includes the use of plants for abating gaseous, particulate and odoriferous air pollution. Plants cleanse the air by the process of photosynthesis and control air polluting gases through oxygenation and dilution. Plants also remove from the air other impurities such as air-borne dirt, sand, fly ash, dust, pollen, smoke and fumes. Growing plants also transpire a considerable amount of water into the atmosphere.

*Traffic Control*

If the direction of movement is planned and controlled, the experience should be more enjoyable than if the direction of movement is random and uncontrolled throughout the campus when random movement through an area is permitted, the area is usually damaged or destroyed and the environmental quality reduced. When planning campus elements, the landscape architect and other design professionals, should consider the predictable movement of pedestrians and vehicles (cars, transit, bicycles and other). Plants should be used to assist in controlling campus traffic, while adding to the visual quality of the environment. Plants enhance the beauty of an area when they are used to direct people through it in a definite pattern or direction and can function effectively as vehicle barriers.

*Glare and Reflection Control*
Plant materials screen, blunt, or soften glare and reflection; an important factor in the Las Positas climate. The degree to which they can do this depends upon their height, density and location. This is often a cost sensitive alternative to architectural elements used to solve these problems. Architectural solutions have the disadvantage of hardness, excessive cost, inflexibility and lack organic qualities related to a sustainable campus.


*Plant materials Soften Glare*

## Climatologically Use Of Plants

The campus is located in an inland northern California area with a coastal influenced climate. This area is marine influenced with mild winters that create warm valley floors and colder micro climates in the surrounding hills.

*Solar Radiation Control*
Trees, shrubs, groundcovers, and turf are among the best exterior solar radiation control devices that should be used on campus. This has been and is one of the major functional uses of plants especially in the Las Positas/Livermore area where solar radiation is strongest in summer, requiring seasonal control. A single plant or a grouping of plants should be used to control direct solar radiation by shading the sun, or by intercepting reflected radiation from some campus surface. Solar radiation can be intercepted, either before it strikes or after it is reflected in much the same manner as glare is intercepted.


*Deciduous Trees provide shade in hot months & Heating in cool months*

- Interception: Plants used for interception of solar radiation may completely block the sun's rays or filter them. Obstruction occurs when plants with dense foliage, multiple layers, or a dense canopy are used. Filtration occurs when plants with open, loose foliage are used.
- Reflection Reduction: To be effective, plants may be introduced either before or after the rays of the sun strike a reflective surface. A dark plant, with a smaller leaf surface, is more effective in breaking down reflection. Pines and other needled, or small-leafed plants with pubescent (covered with soft down) surfaces greatly decrease solar radiation reflectivity. To lessen the intensity of the heat and light that is reflected in the Las Positas climate from paving or walks, vines growing up on a building wall or as a groundcover provide a buffer against solar radiation. The use of these materials for the purposes stated should be considered on the Las Positas campus in balance with maintenance considerations.
- Trees shrubs, groundcover, and turf and even a combination of these, are very effective in reducing direct as well as reflected solar radiation. They absorb the heat, provide shade for walls and ground surfaces, and create dead air spaces. Thus plants provide insulation for campus buildings and the soil, not only from

the intense heat of solar radiation, but also from abrupt temperature changes. Plants absorb more of the sun's heat during the day and release it slowly in the evening-not only cooling the day time campus temperature, but also warming the evening temperature and moderating it.

*Wind Control*
Prevailing fall and winter winds in Las Positas are almost constant. For this reason, trees and windbreaks should be encouraged, plants control wind by obstruction, guidance, deflection, and filtration. The differentiation is not only one of the effectiveness of plants, but of the techniques of placing plants. Obstruction with trees, as with all other barriers, reduces wind speed by increasing the resistance to wind flow:

- Plants may be used in conjunction with landforms and architectural materials to alter the airflow over the landscape and around or through buildings.
- Deflection of wind over trees or shrubs is another method of wind control that should be considered at Las Positas to mitigate winds. Plants of varying heights, widths, species, and composition planted either individually or in rows, have varying degrees of effect on wind conditions.
- Filtration of wind, passing under or through plants, is another method of control on campus that may be used where it may be desirable to speed up or slow down wind.

*Precipitation Control*
Precipitation in all forms (rain, fog, dew, etc.) is intercepted and controlled to some degree by plants, leaves, needles, twigs, branches, trunks, and bark - all catch, entrap, hold, and filter precipitation. Therefore, radiation, precipitation and humidity, around, through, and under plants - modify temperature to the extent that is sensed by the human in the environment, and contribute to microclimates. Plants should be used on campus to:

- Intercept rain
- Mitigate rainfall intensity
- Modify or control climate thru transpiration and evaporation
- Modify humidity and temperature
- Enhance moisture retention
- Minimize ground dew and fog

*Temperature Control*
Temperature control is linked directly to and is a result of solar radiation control, wind control, and precipitation control. Plants used on campus for temperature control have the greatest effect by modifying temperatures near the ground through:

- Shade and Absorption
- Heat transfer
- Air movement
- Heated air

At existing parking lots, new trees should be introduced to help alleviate solar heat gain. Existing site soil should be analyzed and amended. An ultimate 5'x5' planter shall remain open at the surface for planting. Provisions shall be made for watering during acclimation and growth with a future weaning from watering. For this reason, native and drought tolerant species shall be selected (see Volume 2, Exhibit s-07).

### Aesthetic Use of Plants

*Aesthetic Values*
Plants are beautiful and stimulating to the senses. Plants should continue to be a welcome relief from campus development because of their diversity of form, color and texture. The ways in which plants should be used aesthetically are many and include:

- Visual as positive element.
- Two-dimensional element such as a vine on a wall.
- Three-dimensional specimen element.
- Textural element - smooth, polished, rough, craggy, gnarled, rippled, and rugged.
- The organic properties of a plant alone may be enough reason to use it aesthetically.
- Color - the vast palette of color available in plants should be a basic aesthetic consideration in their use.
- Dynamic - plants are the most dynamic components of the site. They are elements that are constantly changing in appearance.
- Visual controllers - plants are visually controlling elements by providing masking, view direction, perspective control and perceptual control.
- Attractors - plants are used aesthetically because they attract things to themselves such as birds, animals and people. People are attracted to plants because of their color, odor, shade, beauty, texture, or because of their shelter value.
- Unifiers - plants are unifiers, synthesizers and organizers; they should be used on campus to pull together disparate elements, and to organize divergent parts of a scene or facility.

*Contrasting Plants create dramatic effect*

## Educational Use of Plants

Educationally, the value of the campus landscape for both formal and informal purposes is important given the College's mission of teaching, research and public service and includes the following uses/considerations:

- Opportunities for students & staff to observe plants, birds and other vertebrate wildlife, insects and plant pathogens
- Class activities (outdoor laboratories) to demonstrate biological principles
- Plant materials can be collected (i.e. leafy shoots, flowers, fruit, twigs, etc.) from campus plantings and provided to students to observe and manipulate during laboratory sessions within the classroom
- Informal instruction through campus departments can occur with plant identification and horticultural practices demonstrations.
- Tours of the campus landscape including its diverse community plant materials can be conducted for public education and information.

*Demonstration Vineyard*

*Outdoor Laboratories*

## Water Conservation in Plant Selection

Water conservation is an important factor in plant selection, and a major contribution to a sustainable campus. Strategies include:

- Use of drought tolerant plantings
- Use of native or naturalized plantings throughout campus
- Grouping plantings in relationship to their water demands.
- Limiting use of turf to recreational use areas or a mall/plaza functions requiring usable lawn; use of native turfs, ground covers or permeable surfaces for other areas.

*Eschscholizia California*

### Maintenance Consideration In Plant Selection

The following plant characteristics are desirable, to reduce maintenance and repair costs:

- Non-invasive root systems, especially trees which will not lift the paving
- Ease of regular maintenance, such as plantings with little leaf, flower, or fruit drop on paving areas, or clean species requiring little pruning to achieve the desired landscape effect, shrubbery should not be pruned in a manner that will create a "box-like" appearance.
- Pest and disease resistant
- Can be irrigated through automated systems
- Suitable to soil conditions without extensive amendment or feeding
- Long-lived and hardy, limiting the need for frequent replacement
- Mature growth characteristics appropriate to the location and spacing provided in the design; avoid over-planting.
- Non-poisonous
- Appropriate growth patterns in areas requiring maintenance of sight lines or for security along paths

### Disposition Of Existing Significant Vegetation

Generally buildings should be sited to minimize destruction of existing vegetation. For any project sites involving large or mature trees, or other significant vegetation, the project plans should indicate the disposition of all existing vegetation, including:

- Retention in place
- Removal for replanting on-site (including storage provisions during construction)
- Removal and relocation to other sites
- Demolition

This includes detailed coordination among the design specialties of the site demolition plan, grading/excavation plan, site utilities plan, site plan indicating construction yard, foundation plan, landscaping plans, and irrigation plans.

### Three Major Types Of Campus Plant Materials

The success of the design and development of open spaces on campus is dependent upon the appropriate use of plant materials as well as a sensitive concern for construction materials. For purposes of the Campus Landscape Master Plan, plant materials can be differentiated into three major types: tree cover, shrub massing, and turf/ground covers.

*Tree, Shrub, & Ground cover*

*Tree Cover*

The rationale in the distribution of trees on campus should be consistent with the design concepts for open spaces. Whenever the scale of a particular space is undefined, (i.e., the edges are not certain), the use of tree massing at the edges is recommended as the appropriate defines. Tree grouping should also be used in structuring a continuity of open spaces whenever buildings do not perform this function.

When massing trees in a formal manner they shall be positioned in a means that will provide shelter and enclosure. Trees in an area that has full exposure shall be positioned to provide dense shade. Formality in the use of trees should be extended to the major walkways for reinforcing structure and to provide shade. Outside the main plazas and the major walkways, trees should be massed informally into large groupings. Discourage random scatter of trees that has the effect of nullifying open spaces. The organization of space to draw the eye and carry a person through is essential in amplifying movement throughout the campus. The informal grouping of trees within smaller areas is recommended whenever the space is designed with sufficient edge definition. Whenever this edge definition is not present, (i.e., the reception area may have only one building edge with the remaining edges open) formal massing of trees should be considered.

*Trees Shading Buildings*

*Shrub Cover*

Shrub massing should be conceived in large scale and limited to a few (or single) varieties in any one bed. The use of native and drought tolerant species is encouraged, with flowering annuals in lieu of annual color. The effect desired is to reduce the disorganizing look resulting from using many species in spotty, visually confusing combinations of plants. Trees should provide another means for developing continuity in open space structure and for surface circulation on campus, and for erosion control.

*Turf and Ground Cover*

Turf areas should be reduced with the predominate use of turf for sport fields on campus. Opportunities for native and drought tolerant shrubs and groundcovers should be capitalized on throughout the campus. The use of shrubs and groundcovers should also be encouraged on gently sloping mounds and swales whenever maintenance permits and where erosion control is a factor. Other ground covers and shrubs should be considered where slopes exceed a 3:1 ratio.

*Turf Limited to Athletic Fields*

*Existing Angled Parking*

## Transportation

*Existing Conditions*

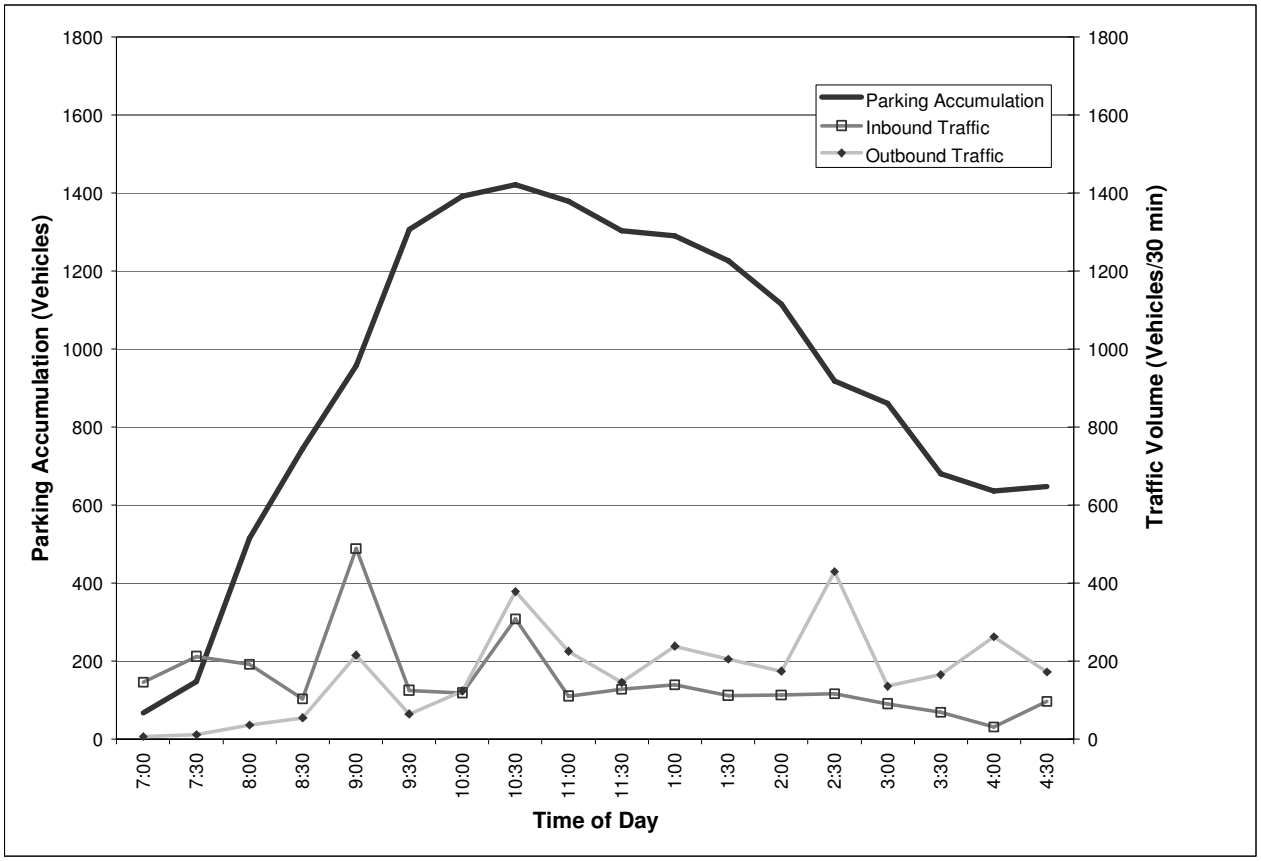
The existing campus is configured with a Loop Road encircling the campus. Parking, academic buildings and athletic fields are all located within the Loop Road. Access to the Loop Road is provided from an un-signalized intersection with Collier Canyon Road on the west side of the campus. Collier Canyon Road connects to Airway Boulevard and Interstate 580 via N. Canyon Parkway,

Bicycle lanes are present on most segments of the Loop Road as well as on Collier Canyon Road.

The campus is currently served by the Livermore Amador Valley Transportation Authority (LAVTA) WHEELS public bus service. Route 12 connects between the Dublin/Pleasanton BART station and the Livermore Transit Center with an intermediate stop at LPC. The WHEELS bus stop is located at the end of the drop-off loop between Parking Lots C and D.

*BART*

**Figure. Parking Accumulation and Traffic Volumes, Wednesday, February 2 ,2005**




There are currently 1,705 parking stalls on campus. The parking is primarily located on the south side of campus adjacent to the Loop Road. On the north side of campus there are smaller off-street lots and parallel on-street parking is permitted on the Loop Road.

Table Existing Parking Supply

| Parking Space Type | Number |
|---|---|
| General, Student | *1,507 |
| Staff | 138 |
| Visitor | 11 |
| Disabled | 45 |
| Security | 2 |
| Electric Vehicle | 2 |
| **Total** | **1,705** |

**Includes 199 spaces on loop road*

Parking at the campus is essentially full to capacity at peak times. A parking accumulation study was completed during spring semester 2005. Peak parking demand was observed at 10:30 AM, with a total of 1,421 vehicles parking on campus. At this time, approximately 90% of the parking spaces on campus were occupied. Observations by campus staff indicated that parking demand was higher in the previous Fall 2004 semester with effectively all available stalls full at the period of demand.

Traffic movements at LPC are Concentrated near class start and end times. These peaks tend to be short in duration but can generate relatively high levels of traffic. For example, a peak occurs between 8:45 and 9:15 AM for both inbound and outbound traffic.

*Existing Parking Lot*

### Future Parking Demand

Future parking demand at LPC was estimated by extrapolating existing demand with projected growth in student enrollment. The underlying assumption was that the current pattern of scheduling and private vehicle usage would remain constant.

Table. Peak Parking Demand Forecasts

| Year | Enrollment (Full Time Equivalent Students) | Peak Parking Demand (Stalls) |
|---|---|---|
| 2004 | 5,045 | 1,705 |
| 2015 | 8,135 | 2,700 |
| Campus Build-out | 9,700 | 3,200 |

There are a number of pressures that could cause peak parking demand to increase or decrease per student.

Pressures to increase peak-parking demand per capita include:

- Periods
- Parking Rates
- Campus policies and decisions regarding the amount of parking provided

### Master Plan Concept

The LPC Master Plan responds to a number of future conditions that necessitate changes to the existing circulation arrangement. These future conditions include:

- Significant growth in campus population
- Need for large increases in parking supply
- New campus facilities, including development east of the Loop Road
- Planned construction of a new I-580 interchange at Isabel Avenue/Kitty Hawk Road and extension of Isabel Avenue north to the Campus
- Development of the Shea Homes property south of the site
- Planned construction of a multi-use pedestrian, bicycle, and equestrian path along the north edge of the Shea Homes property and along the Isabel Avenue Extension
- More academic program space will alleviate current space shortages, allowing more peak period classes to be scheduled
- More services on campus may encourage people to stay on campus longer, extending the peak periods and potentially increasing the peak demand

Pressures to decrease peak-parking demand per capita include:

- Increased transit mode share resulting from improved transit service to the campus
- Increased carpool or vanpool mode share
- Other Transportation Demand Management (TDM) measures
- Future telecommuting, remote learning initiatives or off-site classes

Other variables that could affect parking demand include:

- Relative amount of staff per student
- Changes in future scheduling that could increase or decrease the number of students on campus at peak times.

The Isabel Avenue Extension (also known as the Campus Connector Road) is planned to connect to the Loop Road on the southeast side of the campus. This roadway will create a major new campus gateway that has convenient freeway access and will serve a significant amount of trips to LPC.

*Conceptual Image of Gateway Entrance*

The design of the new Campus Connector Road is currently under discussion with the City of Livermore and Shea Homes. The College would prefer the roadway consist of two lanes in each direction with a median to improve traffic safety and accommodate landscaping and signage. It would also be desirable to minimize vertical grades on the roadway while also proving an approach to the Loop Road that is as level as possible.

The intersection of the Campus Connector Road will serve as the principal gateway to the campus. Designed as a tee intersection, there will be an opportunity for gateway signage and landscaping opposite of the Campus Connector Road approach. A free right turn from the westbound Loop Road to the Campus Connector Road will be desirable to facilitate uninterrupted traffic flow from the existing parking areas while also providing a landscaped traffic island.

It is proposed that the Loop Road be widened to provide a median near the gateway intersections with Collier Canyon Road and the new Campus Connector Road. The median would separate opposing traffic while also providing an opportunity for consistent gateway landscape treatments at both campus entrances.

The loop road will be retained, but would be closed to public traffic on the far eastern side of campus. Demand for auto trips to the north side of the campus will be limited because parking will be concentrated to the south near the campus entrances. Cul-de-sac loops will be provided at the ends of the public portions of the Loop Road to provide a drop-off area for the stadium and other athletic facilities. The segment of the Loop Road closed to public access could be narrowed and would remain open to pedestrians, bicycles, service vehicles and emergency vehicles.

*segment of the Loop Road closed to public access Between Vehicular Turn-Abouts*

New surface parking lots will provide additional parking capacity. New lots are proposed for the following locations:

- West of the future Center for the Arts
- East of the existing lots inside the Loop Road
- East of the future Campus Connector Road, outside the loop road

The existing parking lots are proposed to be re-configured in order to create the new main drop-off crescent, maximize the number of parking spaces and optimize both pedestrian and vehicular circulation.

The parking arrangement shown on the Master Plan will provide approximately 2,959 total parking spaces. This is sufficient to accommodate projected demand beyond the year 2015. The need for additional parking spaces will need to be reevaluated in the future including updating the projection for build-out parking demand.

The Master Plan provides an opportunity to add additional future parking capacity if necessary. If demand requires additional parking, parking structures can be built over surface parking lot sites. For example, the proposed parking lot west of the Center for the Arts was sized and configured to provide the option to construct a three-aisle wide rectangular parking structure, if desirable in the future. Refer to Volume 2, Exhibit A-04.

*Disneyland Parking Structure*

Additional options for pedestrian and bicycle circulation to and within the campus have also been included in the Master Plan. A new pedestrian/ bicycle/equestrian path will be located along south side of the campus (to be constructed be Shea Homes). This path will connect to the south along campus connector road. Crossing opportunities on the loop road would be provided to connect to the principal pathways into the campus core. The internal campus network of pedestrian pathways will also be significantly expanded in the Master Plan, providing connections to the new athletic fields and through parking lots.

Transit service will be accommodated on the main drop-off crescent roadway. This will provide an opportunity for a transit stop as close as possible to the campus core while permitting buses to circulate through the campus with minimal out-of-direction travel.

While not specifically studied as part of the Master Plan process, Transportation Demand Management (TDM) activities are encouraged to help minimize peak traffic demand and parking capacity requirements. As identified in the Sustainability section of this document, potential TDM measures include:

- Encouraging improved transit service
- Modifying class schedules to limit peak demand
- Providing carpool/vanpool incentives
- Providing parking pricing strategies
- Providing bicycle parking facilities
- Supporting off-site pedestrian and bicycle improvements
- Telecommuting and remote instruction

Note: Detailed traffic operational analyses have not been completed to date. Specific requirements with respect to capacity and traffic need to be confirmed.

## Utilities

The topographic survey completed by BKF earlier in 2004 along with Las Positas College as-builts (1998) and the City of Livermore Master Plan 2004 were used to study the site and to prepare the exhibits showing all known existing utilities on the campus.

*Domestic Water*

Las Positas College has a network of domestic water lines that loop the site and serve most buildings at the College through various service lines. In addition to the looped system routed along Loop Road, a separate 8-inch water main bisects the inner campus near the new Physical Education Building. Based on record information, the domestic water system is dedicated to domestic water uses, and therefore does not appear to serve other uses such as fire protection and irrigation.

Based on information provided by the City of Livermore's Water Master Plan 2004, the existing water main serving the site is located on Collier Canyon Road. The water main is a 14-inch diameter pipe with a reported pressure of 37 PSI with a hydraulic grade line of 638 feet at the intersection of Collier Canyon Road and Loop Road.

According to Las Positas College Record Drawings (1998), domestic water is supplied to the College by an 8-inch service extending from the 14 inch water main. The water supply is metered through a 3-inch turbine water meter, and a reduced pressure backflow assembly isolates the College water system from the City's water main. The main domestic water meter and service is located on the southeast corner at the intersection of Collier Canyon Road and loop road.

Beyond the meter and backflow assembly, as indicated previously the main 8 inch service line to the college is generally routed and looped along upper and lower loop road. There is a 1927 foot 8 inch diameter water lateral service connection at the stub road located on the northeast side of upper loop road. There is also a bisecting 8-inch pipe that creates another loop in the system. Refer to Volume 2, Exhibit E-02.

The City of Livermore's Master Water Plan states that the current average day demand is 0.41 MGD (284/GPM) and the future average day demand is projected to be 1.29 MGD (895 GPM). The City of Livermore's Capital Improvement Plan (CIP) has identified six water distribution projects to correct hydraulic deficiencies that consist of installing new main lines, booster pump stations, and a storage tank.

*Sanitary Sewer*

The on-site pipes in the sewer collection system range in size from 4 inch to 10 inch in diameter. Generally, the upper end of the sewer system is located near stub road, and terminates at the sewer manhole in Collier Canyon Road. Based on the City of Livermore Sanitary Sewer Master Plan 2004, the offsite sewer system consists of a 12-inch diameter VCP sewer and is shown along Collier Canyon Road. Refer to Volume 2, Exhibit E-04.

Based on the City of Livermore's Sanitary Sewer Master Plan 2004, the new developments in west Livermore call for a need to expand the existing collection system. This causes a bottleneck to occur on a 15-inch diameter sewer line that ultimately serves the College. This bottleneck occurs underneath Interstate-580 2,500 lf south of Las Positas College where Collier Canyon ends. The City of Livermore has proposed a solution to this by increasing the existing pipe size from 15 to 18 inches. The City's Master Plan has included the above sewer system improvements in its capital improvement program but deems it as a low priority. The Las Positas College Pump Station was also determined to be insufficient for future flows by the City and grouped into priority 2 capital improvement projects. Priority 2 states that these projects are needed to address capacity deficiencies causing surcharging or overflows based on future growth in service areas.

*Existing Access to underground Utilities*

*Storm Drain*

Record information of the offsite storm system was provided by the City of Livermore Storm Drain 2004 Master Plan. The onsite storm system was provided by the Las Positas as-builts (1998). Building sub-drains are shown to convey water away from the site in two ways: the creek outfall located north of the school and the storm drain pipes surrounding the perimeter of the school under loop road. The sub-drains discharge through two 12 inch and 24 inch outfalls. The storm drainpipes are High Density Polyethylene (HDPE) and range from 12 to 36 inches in diameter. The upper loop road storm system drains to the southwest and empties into a 108-inch diameter culvert. The culvert runs perpendicular to the campus entrance into an offsite storm drain channel. From the offsite pond, two 54-inch diameter pipes flow south down Collier Canyon Road. The Lower Loop Road storm-drain system also drains southwest where it empties into a 36-inch diameter RCP offsite storm drain pipe which runs parallel to the pond and connects to a 48 inch diameter RCP pipe on North Canyon Parkway. The northeast section of the site has also been developed with three sections of storm drainpipe for future expansion. The first of these sections consists of 1,100 lf of 18 inch HDPE storm drain pipe located on the turnoff road on the northeast side of Upper Loop Road, which flows southwest underneath the road and ties into Upper Loop Road's system. The second section will be located southeast of the first section and consists of 1,025 lf of 18 to 24 inches in diameter HDPE and flows southeast to a 24 inch outfall into a wetland area. The wetland area is located on the east side of the site that drains into an existing creek that flows south. The last area of storm drain is located east of Lower Loop Road and consists of 1,070 lf of 18 to 24 inches in diameter HDPE and flows southeast to the creek outfall. Refer to Volume 2, Exhibit E-03.

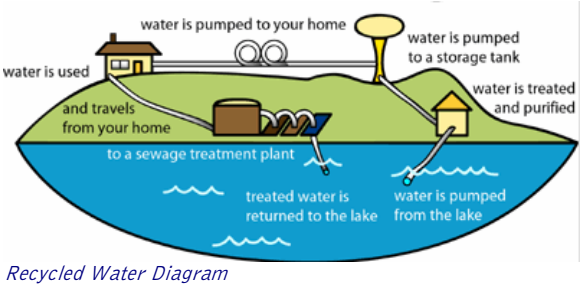
The capacities of the individual building drainage and the three upper storm drain systems were not analyzed for capacity. The Upper Loop Road storm system has capacities varying from 44.97 CFS to 240.33 CFS. The Lower Loop Road system capacities range from 5.31 CFS to 122.09 CFS. The capacities for the Upper and Lower systems are shown on the exhibit provided as well as most of the offsite storm drain pipe capacities in the vicinity of Las Positas College.

Based on discussions with the Las Positas College maintenance personnel there are no problems with flooding or standing water with the storm drain system with in the limits of the college campus.

*Low Point of Las Positas Campus*

*Recycled Water*

Based on Las Positas College Record Drawings (1998) and the City of Livermore Recycled Water Master Plan 2004, the significant network of the recycled water system serving the College is used for irrigation and fire protection.




*Recycled Water Diagram*

The 24-inch diameter offsite recycled main runs parallel with Collier Canyon Road and has a residual service pressure during maximum hour demand of a minimum of 40 PSI. The service pressure of this pipe during maximum day under fire flow conditions is a maximum of 20 PSI. The Las Positas College site relies on recycled water for irrigation, fire hydrant, and fire sprinkler usage.

The onsite service main lateral for the recycled water is a 12-inch diameter pipe that has a point of connection on the southeast corner of Collier Canyon Rd and Loop Road and connects to a Double Detector Check Backflow Prevent assembly 135 ft east of the main connection. An 8 inch recycled irrigation and a 4" backflow pipe taps into the 12 inch recycled water line and goes through a gate valve and a 3-inch turbine meter. It then continues north on Upper Loop Road around the campus to Lower Loop Road where it taps back into itself. The irrigation line has 1200 foot 8 inch diameter lateral located on lower loop road south of Turnoff Road. The 12 inch recycled water line also has gate valve and a 3-inch turbine meter and follows a similar path to the recycled irrigation around the school. There is a bisecting 12-inch diameter pipe that connects upper loop road to Lower Loop Road and runs through the middle of the campus. There is also a stubbed 12-inch recycled water service lateral on the turnoff road on upper loop road with a blowout valve on the end. A 14-inch diameter fire water line taps into the recycled water service at the corner of upper and lower loop road. This 14-inch line carries recycled water to the building services. All of these of the services are shown on the attached exhibit E-03.
The City of Livermore's Master Recycled Water Plan states that the existing total demand is 3.37 GPD (2340 GPM) and the future total demand is projected to be 6.02 GPD (4180 GPM). The City of Livermore has identified five primary upgrades needed for future demand. They consist of expand filtration capacity, construct new reservoir, construct new pipeline, improve fire protection and increase capacity of recycled water pump station.

This study was prepared to provide a general understanding of existing utilities in the vicinity of the Las Positas College in Livermore.

## Electrical

The Las Positas College demand for electricity is estimated to increase by no more than 2.8 MVA at the conclusion of the Master Plan build-out with final demand dependent largely on new building program and design practices, existing building obsolescence, and facility operation practices. Existing feeder capacity should be confirmed prior to onset of construction in order to assure adequate availability of supply. Any shortfall, should it occur, may be addressed by increased capacity and/or demand mitigation. Refer to Volume 2, Exhibit E-06 for Electrical Distribution Plan and Exhibit E-08 for Preliminary Electrical Load Estimate.

| | Assumed Normal Demand (kVA) |
|---|---|
| Mult. Disciplinary Classroom Facility | 435 |
| Child Development Center | 213 |
| College Center for the Arts | 488 |
| Science & Tech Classroom & Labs Phase II | 500 |
| Student Services | 582 |
| Classroom & Lecture Hall | 310 |
| Maintenance & Operations Center | 162 |
| Central Administrative Services | 110 |
| **Cumulative Demand** | **2801** |

## Natural Gas

The Las Positas College demand for natural gas is estimated to increase by no more than 8400 CFH at the conclusion of the Master Plan build-out with final demand dependent largely on new building program and design practices, existing building obsolescence, and facility operation practices. Existing line capacity should be confirmed prior to onset of construction in order to assure adequate availability of supply. Any shortfall, should it occur, may be addressed by increased capacity and/or demand mitigation. Refer to Volume 2, Exhibit E-05 for Gas Distribution Plan and Exhibit E-09 for Preliminary Gas Load Estimate.

| | Assumed Demand (MBTUH) |
|---|---|
| Mult. Disciplinary Classroom Facility | 1021 |
| Child Development Center | 715 |
| College Center for the Arts | 1705 |
| Science & Tech Classroom & Labs Phase II | 993 |
| Student Services | 1854 |
| Classroom & Lecture Hall | 921 |
| Maintenance & Operations Center | 495 |
| Central Administrative Services | 385 |
| **Cumulative Demand** | **8089** |

## IT/Communication

*Introduction*

As part of the development of a facilities master plan for Las Positas community college, a process is underway to identify the requirements for new information technology and communications (it/comm) infrastructure and systems, and the impact they will have on the new campus design. the primary goal of this it/comm master plan is to increase the capability of the campus to service the current and future needs of its community. the first step in this process will be the construction of several new buildings and the renovation of some of the existing facilities. However, this will only address physical capacities. to properly achieve functional expansion the plan must also address the increased requirements of the systems that support the new campus environment and its users.

The provisioning of services to this new environment, and the manner in which these services are accessed by the users, will also undergo change. For each new building proposed in the LPC Facilities Master Plan, the installation of additional fiber and copper to service them is mandated. As an initial step, a program to evaluate the state of the existing underground cabling pathways was undertaken to assess their reuse in this new environment. Additional conduits may be required to meet the needs of the new environment; however, the reuse of current infrastructure routing would minimize any costs. Unfortunately, present LPC Facilities Master Plan documents show conflicts with existing underground cabling infrastructure in areas where construction is proposed, and the possibility of service outages needs to be evaluated.

The development of any site with active facilities poses a number of challenges, and each needs to be thoroughly evaluated and its impacts clearly defined. The LPC Facilities Master Plan proposes a number of new buildings within the current site, some replacing existing structures while others are planned to inhabit what is currently "open area". In addition, a number of athletic fields and enclosed recreation areas are proposed within this same area of the campus, which will add to concerns for the cabling infrastructure. Planning for the IT/Comms infrastructure will be determined by several factors, each potentially adding costs to the bottom line for the building project. Proper coordination of the design plans for each is essential to minimize impact, reduce the costs of later mitigation and eliminate the possibility of service outages during the redevelopment process. A comprehensive approach which addresses all these elements will assure that the end product is achieved effectively, efficiently, and through the most constructive course available.

*Evaluation of Campus Infrastructure Standards*

Evaluation of the current state of the IT/Comms infrastructure and technology system standards is an essential part of the Master Plan process. As the baseline for the campus standard continues to evolve over the life of the project, continued enhancements to the campus-wide system standards can be made. These can then be evaluated against comparable educational facilities and those established by accredited national organizations. The information developed through this evaluation will provide the criteria to perform a gap-analysis, which during any phase of the project will help define necessary changes to existing standards. Implementing these changes will assure that LPC campus standards meet the highest levels of performance, and the long-term goals of the campus and community.

Initial actions to address this would be to stabilize new campus cabling standards (in progress) and define the new infrastructure for TCP/IP based connectivity.

*New Construction*

Under the current LPC Facilities Master Plan, the proposed construction of new facilities will require the implementation of standards. Cost-effective implementation will require coordination with a number of disciplines during the early stages of the design plan for each facility. The needs for each should be defined individually, and the collective information should be collated to produce a list of overlapping and isolated requirements. Currently, the District ITS network staff, in conjunction with the College Computer Support staff, is in the process of developing new standards which, when completed, will address the variances in each facility and room type without compromising the needs of each. These new standards can then be modified as needed to adjust to new code or facility requirements.

While the creation of new IT/Comms standards addresses initial planning requirements for the new facilities, the success of each will also be dependent on its ability to adapt to the future of technology. Setting guidelines for the implementation of infrastructure and services that offer extended life expectancy is an important design goal. Assuring that these new facilities can easily adjust to changes in technology without impacting bottom line costs will allow the campus to avoid early obsolescence of the infrastructure. Initiating standards and guidelines that control costs through the disciplined application of growth oriented technologies will position the new facilities at LPC to be fully functional well into the future.

The high level considerations for the new cabling standards can include:

- Redundant fiber backbone connectivity (Single mode and 50 micron Multi-mode fiber)
- Category 6 voice/data station cabling
- Voice-over-IP (VOIP) ready
- Wireless ready
- Standard classroom/office/lab designs
- "Technology Enabled" classroom design standard
- Flexible infrastructure designs for multi-purpose room usage

*Renovated Facilities*
The renovation of existing facilities requires a different set of considerations than those of newly constructed facilities. Existing buildings normally have fully implemented infrastructure designs that provide services within the framework of the original building plan. Any re-designation of the current space during renovation may require changes to existing infrastructure routing to properly service, and this could greatly impact the associated costs of the renovation. Current building code requirements may also impact the costs associated with installation of new infrastructure, and in turn may limit the flexibility of the space. For instance, should existing conduit not allow for the installation of new cabling, it would need to be completely removed under the current California Building Code requirement.

The current LPC Facilities Master Plan proposes the renovation of twelve existing buildings, each currently servicing the either students, faculty, or staff. The intention of these renovations is to reuse these facilities in the most appropriate manner, limiting costs where possible. Traditionally, renovations make use of very little except the structural elements of a building; however, the broad application of technology in the past 10 years has changed this dramatically. As a general design directive, the infrastructure in buildings with major renovations should be brought into compliance with new cabling standards and construction codes as part of the construction project.

*New Information Technology Center*
Currently, Chabot Campus hosts the District Data Center provisioning the data services for Chabot College, Las Positas and the District office. This structure will change as part of the Campus redevelopment plan, transferring the District Data Center functions to the Las Positas campus. To accommodate this, a new building is being constructed as part of the Master Plan which will be called the Information Technology Center. This building will act in conjunction with the current wiring center to supply data and voice services to the Las Positas campus, and access to administrative computing from all sites. The expansion of services expected requires this space be created to support the additional staff and equipment that will service the environment.

The new Information Technology Center will house the District Data Center with the Enterprise and Administrative Servers and the multiple connections to the backbone systems supporting Las Positas. New core and distribution equipment, tasked with supporting the proposed expansion, will drive changes to the existing network topology as well. While initial responsibilities may not immediately demand the performance levels of the new networking environment, it will be critical to have robust core systems in place as the development of each site progresses. This building will support 24x7 access to computing servers and will require robust generators and UPS systems to enable maximum uptime.

Because of its importance, the Information Technology Center should be one of the first buildings to be constructed. The sooner this facility is in place, the sooner the cutover of responsibilities from the Chabot facilities can occur. This ensures stable support for all newly constructed buildings and eliminates the possibility of service outages during a later stage cutover. It additionally will allow for release of the Chabot facilities for renovations at that campus.

### Evaluation Of Networking Equipment And Architecture

The manner in which a campus environment distributes network services is addressed though infrastructure planning, routing configuration and redundancy in connectivity. How these services are generated, managed and provided to the users is a product of networking architecture. Establishing a comprehensive network design for delivery and management of these services will assure adaptability and conformance as the environment grows. Assuring that the architecture is robust and can meet the expanding demands of the users and the campus will require detailed planning and coordination.

Critical to the success of this process is a clear definition of future requirements based on present understanding of the students and faculty. Once collated, this information can be used to develop a core network design plan that services the needs defined. Next, an assessment of future needs should

be undertaken that addresses data, voice and video requirements and support for converged systems. The outcome will be a comprehensive IT and Communications development program that will address the needs of the environment as it continues to expand.

The recommendations made in the categories to follow are life-cycle based. This means that based on current technology life expectancy set by the manufacturers, the replacement of equipment or applications may be warranted more then one time during the life of this project.

*Core Switching and Routing*
The successful performance of all network systems is based on the capability of the core devices that control transmission and pathways. Core switches and routers define the parameters for all network traffic, setting prioritization and dictating how information gets from one point to the other. These core system designs can have several topologies, generally dependent on the type of information they handle and the capability of the systems they support. Core systems must be robust, inter-dependent, and designed to meet the capacity and criticality of the information that travels through them.

For the LPC campus, it is essential that the plan for the core system address capacity issues first. The changes proposed in the Master Plan will put great demands on existing systems, and this impact must be included as part of any existing core systems assessment. These systems may address the needs of the campus at present, but planning is required to assure that they capable of expanding current provisioning as the environment expands. Defining these elements is critical for the IT and Communication systems Master Plan to meet its goal.

Initial considerations include:

- Installation of new core switching/routing equipment to address immediate and future needs
- Increased capacity at port level for greater throughput
- Reallocation of existing core switching/routing equipment for use in the distribution/access layers
- Expansion of distribution capabilities through installation of additional fiber and re-termination or replacement of existing problems
- Multiple routing capabilities supported by a diverse core system configuration

*Firewalls and Security*
The inherent nature of today's College campuses increases the requirements for protecting the systems and applications that run them. Open environments for learning while directed at eliminating restrictions to students and faculty, also promotes unauthorized traffic. Securing these environments while maintaining open access and performance levels, can be a difficult task. The integration of appropriate firewall appliances and/or applications that control access and restrict unauthorized traffic is crucial to providing secure and uninterrupted service on the network. This plan includes the enhancement of current firewall technology and subsequent upgrades to support new functions.

*Desktops and Laptops*
The immediate plan for LPC is to replace existing desktops and laptops with newer, more capable equipment in accordance with the District standard equipment life cycle. In conjunction with the development of new core systems and the services they provide the capability of the users to access and utilize these services must also be enhanced. To properly address the service requirements of the students and faculty it is essential that the equipment they use meet minimum educational standards.

The District has established standards for equipment configurations and replacement life cycle. As LPC grows, so will the demands of the faculty and student body, driving the need to create more robust educational services. Providing the proper tools to allow the users to transition this period of growth will greatly impact their experience at LPC. To assure that the users are provided with the broadest level of capabilities it is essential that new campus standards for PC's and laptops are enacted.

*Server Technology*
The data server environment that is currently provisioned at Las Positas, while adequate to meet present day requirements, needs to be enhanced to be prepared for the future. The District ITS and LPC Computer Support staff are presently defining new standards for this environment which will establish a foundation for future server technology planning.

The servers in this environment presently distribute and manage enterprise applications and support the storage requirements of the administrative users, students and faculty. The expansion of this environment will drive broader requirements for performance and provisioning, which will put greater demands on those who manage it. The LPC

campus is expected to expand enrollment considerably over the course of the redevelopment project and a plan is required to assure all growth considerations are addressed. It will be critical to create appropriate levels of redundancy and use load-balancing and clustering to create failover capability. Consolidation of equipment where appropriate, should also be a consideration, reducing the environmental impacts on the facility and creating stability within the new core system configuration. Where high capacity storage is required, investigation and standardization on the appropriate storage technology and backup solution will be pursued.

The current design of the server environment at LPC needs to be evaluated against the demands that will result from the expansion of campus facilities. The structure of the main environments that support them must meet today's codes and standards, as should those at the distribution and access levels. Standards must be established that define how servers are built and deployed, and controls must be put in place to assure the integrity of all the applications supported by the server environment. All these issues must be considered in the process of designing a server farm to meet the new demands of the LPC campus.

*Wireless Networking*

LPC plans to utilize wireless networking to augment the existing wired environment, applying industry best practices and standards. Wireless capabilities enhance any environment where the demand for access to the web and data continues to expand. The deployment of wireless networking is becoming the norm in educational environments, though at present there are still serious concerns about security and performance. The use of wireless connectivity to access stored information and web sites has increased the capability of schools to service their rapidly expanding requirements. The infrastructure of many educational institutions today cannot immediately service the demand for access, and deploying a wireless LAN environment provides them with a cost effective option for short-term expansion.

As access to networks for day-to-day use increases, so will the demands on existing capacities. The deployment of secure, robust wireless access systems can mitigate the need for immediate infrastructure improvements. As an adjunct to existing wired access, wireless networking can expand the service capabilities with limited financial impact.

*Campus Connectivity*

Current connectivity between the LPC Network and the Chabot and the District Office sites is serviced across several low-bandwidth T-1 connections. Internet connectivity for instructional purposes is serviced outside of this environment over two T-1s connected to the Internet. While direct fiber links are not currently available for this connectivity, the District is already investigating high-speed DS-3 alternatives, such as that provided by CENIC and funded through the State Chancellor's Office. This increased speed is an absolute requirement to ensure suitable performance when the Data Center is moved to the LPC campus. As new technology alternatives become available, initiatives to pursue higher speed links will be investigated.

Existing underground cabling infrastructure at LPC is presently undergoing a review to assess its capability to continue to be used as part of the Campus Redevelopment Plan. Under the current planning for the construction of new buildings on campus, conflicts with existing infrastructure and cabling routes have been identified. The particular areas of conflict include: (1) the current conduit runs containing the production fiber backbones underneath the soccer field, where the new Performing Arts and Teaching buildings are planned, (2) the east side of campus where the new Multi-Disciplinary building is planned to be built. Although buildings may be relocated to address these issues, any nearby construction activity may still cause service disruptions. Alternate conduit routes and new backbone cabling is recommended as part of the Campus Redevelopment Plan so as to avoid serious service outages.

At present the LPC network is serviced by multimode fiber from the core network systems over the campus backbone and with copper servicing the distribution and access layers of the network. There is single mode fiber available; at present, it is not being utilized. To properly address the needs of new buildings on campus, the installation of additional multimode and single mode fiber backbones is necessary. For existing buildings, the activation of the existing single mode (should sufficient amount be available) should be considered. When the design issues between the new building construction and existing infrastructure are clarified, a revised topology for the fiber backbones will be developed to include both the new and existing cabling infrastructures.

For the future, coordinated planning of both the facilities development and cabling infrastructure during the design stage will provide greater flexibility as the environment grows. Standards currently exist for the media, installation and application of cabling for the campus. These will need to be updated to assure they meet or exceed changing connectivity requirements. As technology advances and network systems offer greater capabilities, having a balanced, performance-based cabling design and high-bandwidth connectivity will ensure optimal end user access to computing resources. Refer to Volume 2, Exhibit E-07 for IT/Communications Distribution Plan.

## Grading

*Site Grading and Drainage*

Elevations of proposed surfaces are shown in Volume 2, Exhibit E-01. In general, the earthwork study broke the campus into four areas: the parking lot on the southwestern portion of the campus, the two large parking lots on the eastern side of the campus, the athletic fields to the north of Upper Loop Road and the athletic fields to the south of Upper Loop Road.

The parking lot on the southwestern portion of the campus adjacent to the College Center for the Arts Building will require a portion of fill material to achieve the finished grades shown. It is anticipated that excavation from other parts of the project will be able to provide this material.

On the eastern side of the campus two new parking lots are proposed. A significant amount of excavated material will need to be removed from this area. This material will be transported to other parts of the site.

The playing fields to the north of upper loop road comprise an area of approximately 19 acres. This portion of the project will require import fill in order to level the area.

The athletic fields to the south of upper loop road will require a cut that will be exported to the athletic fields on the north side of upper loop road.

At this time the site will require import fill to meet the grades shown on the attached grading exhibit. Additional calculation will be necessary to better balance the site.

*Grading for Gymnasium*

*Stormwater Best Management Practices (BMPs)*

New impervious surfaces will be added to the site by the campus improvements shown in the Master Plan. State regulations require the added rainwater runoff from these improvements be treated for the purpose of eliminating any negative impacts these may have on the surrounding watershed. The Master Plan has been analyzed and BMPs have been sized and placed in areas where practicable. These BMPs include infiltration areas, vegetated swales, and pervious paving surfaces.

The infiltration areas, shown in Volume 2, Exhibit E-01, provide a place for water to infiltrate through the soil and into subsurface drains. Vegetated swales are open channel where water is treated by planted vegetation while traveling across the campus and to the city storm drain system. The new parking lot in front of the new Student Services building will be paved with pervious asphalt for the purpose of treating the Stormwater runoff. Like the infiltration areas this water will infiltrate through the surface into sub-drains that will carry it to the city storm drain system.

## Security

A campus Security Master Plan has been developed and the primary intent is to define security mitigation standards that integrate efficiently with new building construction and building improvements, saving upgrade costs today by planning for the campus of tomorrow. By first prioritizing the identified campus risks, and then using a multi-faceted approach from the key areas of physical environment, security staffing, and feasible technology, the Security Master Plan presents a clear security philosophy to guide the selection and implementation of campus security upgrades. The Security Master Plan addresses long-term system compatibility, communication infrastructure, product obsolescence, and growing demands on the security staff.

While the Security Master Plan uses vulnerability and risk analysis as a foundation for developing guidelines, the Master Plan is not simply a report of current problems on campus. The objective of the Master Plan recommendations and guidelines is to systematically address the following issues:

- Prioritize the identified risks on campus, and thus the budget requirements for mitigation.
- Use risk prioritization to plan mitigation measures systematically, without undisclosed expectations.
- Establish clear security goals that guide the level of implementation over the long-term.
- Provide a standardized approach to security systems to retain compatibility, knowledge basis, and functionality.

Based on this approach, the Security Master Plan will be a central document, used by the District and design teams, to establish the scope and placement of all security equipment during the planning stages of new construction or retrofit upgrade work. Using the concepts presented in the Security Master Plan the design teams will identify security system architecture and device locations for electronic hardware, access control, intrusion detection, CCTV, and security communications equipment. It is further the intent for the Security Master Plan to address risk mitigation opportunities utilizing environmental design of lighting, pathway visibility, and landscaping. The Security Master Plan will evaluate the potential threats and vulnerabilities to the District campuses, and develop a security program incorporating electronic, programmatic and physical security measures as required to achieve acceptable levels of risk mitigation that can function in harmony with students, campus employees, and District service providers.