Sandia National Laboratories

CAMPUS DESIGN/ DEVELOPMENT GUIDELINES

New Mexico Facility

July 1996

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Preface

Buildings and their surrounding man-made landscapes are artifacts of culture events and values. The New Mexico site of Sandia National Laboratories is no exception in this regard. It reflects, for better and worse, its forty-five year history as part of the Department of Energy's aging Nuclear Weapons Complex.

Today, Sandia finds itself transitioning from fiscally secure weapons programs to new initiatives in defense related small lot fabrication, energy, environment, work for others, and technology transfer; all with less programmatic and fiscal certainty than experienced in past years. With these changes come renewed interest in site development and redevelopment to guide the Laboratories into the future.

This document provides a framework for guiding the physical development and redevelopment of SNL, New Mexico.

I. Introduction

The Campus Design Guidelines include a set of principles and detailed guidance with respect to:

- *Vehicular and Pedestrian Movement,*
- *Buildings and Architecture,*
- *Landscape Architecture,*
- *Signage, and*

an implementation process.

The anticipated benefits of the guidelines are improved site functionality and appearance.

A. What are Campus Design Guidelines?

Campus design guidelines are a set of principles and more detailed design guidance that provide a framework for the physical development and redevelopment of Sandia National Laboratories, New Mexico (SNL/NM).

The goals of the campus design guidelines are to create a framework that:

- Promotes consistency and compatibility in the functional and visual aspects of physical development at SNL/NM.
- Recognizes the existing diversity in architecture at SNL/NM.
- Enhances unity among the aggregate of buildings.
- Integrates new design into the existing context without creating greater disparity than currently exists.
- Defines a common palette for architectural and landscape design at SNL/NM.
- Provides a basis for evaluating proposed design solutions.
- Defines administrative processes for reviewing and approving design.

The guidelines provide a transition from the general nature of planning activities to the detailed nature of architectural and engineering design. They are intended to provide a framework for making decisions without precluding innovative solutions to design problems.

The focus of the guidelines is on new construction and redevelopment activities at SNL/NM. It is expected that all existing non-conforming areas will gradually be brought into compliance as part of long-range redevelopment.

B. Why are Campus Design Guidelines needed?

■ *SNL/NM currently lacks an integrated and coherent process for guiding physical development to insure quality exterior environments.*

In 1984, Sandia, along with other sites in the Department of Energy's (DOE) Nuclear Weapons Complex (NWC) issued its first ***Site Development Plan*** (SDP) in response to a DOE directive. This initial planning effort was updated with a revised SDP in 1989 which in turn was updated each year through fiscal year 1993. In April 1994, Sandia published a new Site Development Plan in accordance with DOE Order 4320.1B.

The SDP provides the primary policy guidance for directing physical development at SNL. While providing excellent baseline information and articulating overall development goals, the primary use and function of the SDP has been to outline locations for future buildings and facilities based on SNL's mission and programmatic and population projections for 5 to 15 years.

Two other recent SNL studies are notable in their effort to address planning and development issues:

- A draft ***Landscape Master Plan: Site/Landscape Guidelines*** (May, 1992) was prepared with the purpose of identifying, documenting, and streamlining site and landscape design and maintenance processes. These guidelines intend to ensure that quality site facilities and landscaping are provided at a reasonable cost. They have been integrated into this document.

- A draft ***"District" Planning Study*** (September 30, 1993) was also formulated. This study suggested the SNL site will be divided into a

number of 'districts' and that individual plans will be developed to reflect the unique characteristics of each district. A draft conceptual plan for one district is developed. The planning components for this effort include:

- Function
- Security
- Vehicular Circulation and Parking
- Pedestrian/Shuttle/Service Circulation
- Landscaping
- Utilities
- Topography/Geotechnical Conditions
- Architectural Context
- Hazard Zones/Environmental Quality

The contents of the *District Planning Study* will be integrated in the *Site Development Plan* and these *Guidelines.*

While each of these efforts have many features that can be capitalized upon, neither is clear regarding its relationship to the SDP, nor to each other. There are overlaps, gaps and potential confusion regarding purposes, intent and implementation. Due to the incremental nature of SNL/NM's development a number of issues are apparent including:

- *SNL/NM lacks visual coherence in physical development.*
  - Parts of SNL reflect a variety of settings including:
    - University/Academic
    - Industrial Park
    - Military Base
  - *There is a predominance of portable and modular buildings on-site with no overall plan guiding their placement.*
  - *There are a variety of ancillary structures (e.g., 'tank farms,' building mechanical and electrical equipment, utility plants, storage sheds, etc.)*

intermixed with major structures, with little regard to the overall impact on the site environment in particular views and pedestrian ways.

- *There are a number of 'clone' buildings that are repeated at a number of sites without due consideration to the surrounding context.*

- *SNL/NM lacks a unified development plan for the areas between building sites.*

  - Attention is lacking to the 'linkage between buildings' with respect to landscaping, pedestrian ways, service access, and other "streetscape" features.
  - Landscaping of streets/corridors and pedestrian ways is inconsistent.
  - It is difficult for visitors to find their way to and around SNL due to lack of consistent signage and building entry location and identification.

- *SNL/NM lacks single point responsibility for control of qualitative aspects of physical development.* Responsibility for physical development is spread among a number of departments, increasing the difficulty of coordination and implementation of various projects.

The Campus Design Guidelines build upon the Site Development Plan to provide a framework to guide the character and quality of new construction and redevelopment in a coherent and consistent manner befitting a world class research and development institution.

The anticipated benefits of these guidelines are to:

- Improve SNL staff and consulting architect and engineer (A/E) design decisions.
- Improved circulation of visitors and staff.
- Improve consistency in the design review and evaluation processes.
- Preserve areas of architectural and landscape quality.
- Improve visual continuity of new construction with existing facilities,
- Preserve elements of the existing environment that have cultural and/or other value.

Sandia's corporate goals recognize the importance of providing quality environments as important in not only fulfilling its mission but in attracting and retaining quality personnel.

The vision for the New Mexico site is to present Sandia National Laboratories as a publicly funded, national center for excellence, consistent with other national resources. The site should be a functional and attractive main campus with satellite research parks in a setting of native landscape and institutional and industrial buildings expressing science and technology.

- Promote new development that expresses an image of "science and technology."
- Improve the quality of the working environment
- Capitalize upon existing plans and studies to develop a unique and differentiated physical identity from Kirtland Air Force Base (KAFB).
- Provide a framework for siting facilities.
- Emphasize life cycle cost benefit rather than initial cost in physical development.
- Integrate new and existing buildings within a unified landscape context.

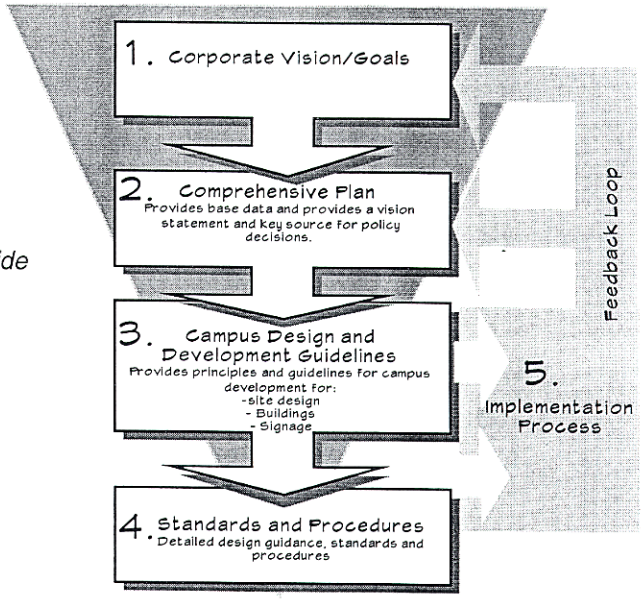
C. How do campus design guidelines fit within the SNL planning framework?

The campus design guidelines bridge the gap between general institutional and corporate goals and detailed architectural and engineering design standards. Within the Facilities organizations at SNL/NM, the guidelines provide a bridge between the Site Development Plan (SDP), and the Facilities Design Manual, Standard Drawings and Standard Specifications Manual.

***Exhibit** I-1*
SNL Planning Framework

See Section IV- for a description of the implementation process.

The guidelines seek to provide information for site planning and schematic design.



II.

Principles

- ✓ Image and Entrance
- ✓ Vehicular Movement and Parking
- ✓ Pedestrian Movement
- ✓ Landscaping/ Open Space
- ✓ Security and Safety
- ✓ Land Use and Siting
- ✓ Architectural and Visual Character

A. Introduction

The following seven principles provide a framework for future new growth and redevelopment of SNL, New Mexico lands. The principles build upon, and develop into more detail, ideas expressed in the SNL Site Development Plan. The overall intent is to develop a campus-like atmosphere within Tech Area I while providing for necessary security concerns by:

1. **Image / Entrance**
   - Establishing a distinct and separate identity from KAFB.
   - Developing clear points of arrival to the campus.

2. **Vehicular Movement and Parking**
   - Developing a loop vehicular access and perimeter parking system.
   - Providing a network of service and access roads that are separate and distinct from pedestrian modes of traffic.
   - Roadways designed for safe, coincident travel of vehicles with bicycles.

3. **Pedestrian Movement**
   Promoting a pedestrian-oriented interior with pathways composed of a series of sidewalks, malls and plazas and connections to the open space system. Where permitted, this interior would be available for destination (building to building) travel via bicycle.

4. **Landscaping / Open Space**
   Establishing common landscaping features linking campus zones and identifying areas of open space.

5. **Security and Safety**
   Respecting and reinforcing required security and safety areas and providing for safe movement of people by pedestrian, bicycling and vehicular modes.

This document uses Tech Area I as the primary basis for illustration.

6. **Land Use and Siting**
   Future land use and facility siting will be guided by considering:

   - Security requirements;
   - Safety / hazard impacts
   - Available building sites and infrastructure.

7. **Architectural and Visual Character**
   Promoting a unique architectural and visual character for campus areas that capitalize upon the development history, function and vision for the future.

Each of the principles will be briefly discussed and illustrated. More detailed design guidelines for site, buildings and signage are presented in Section III.

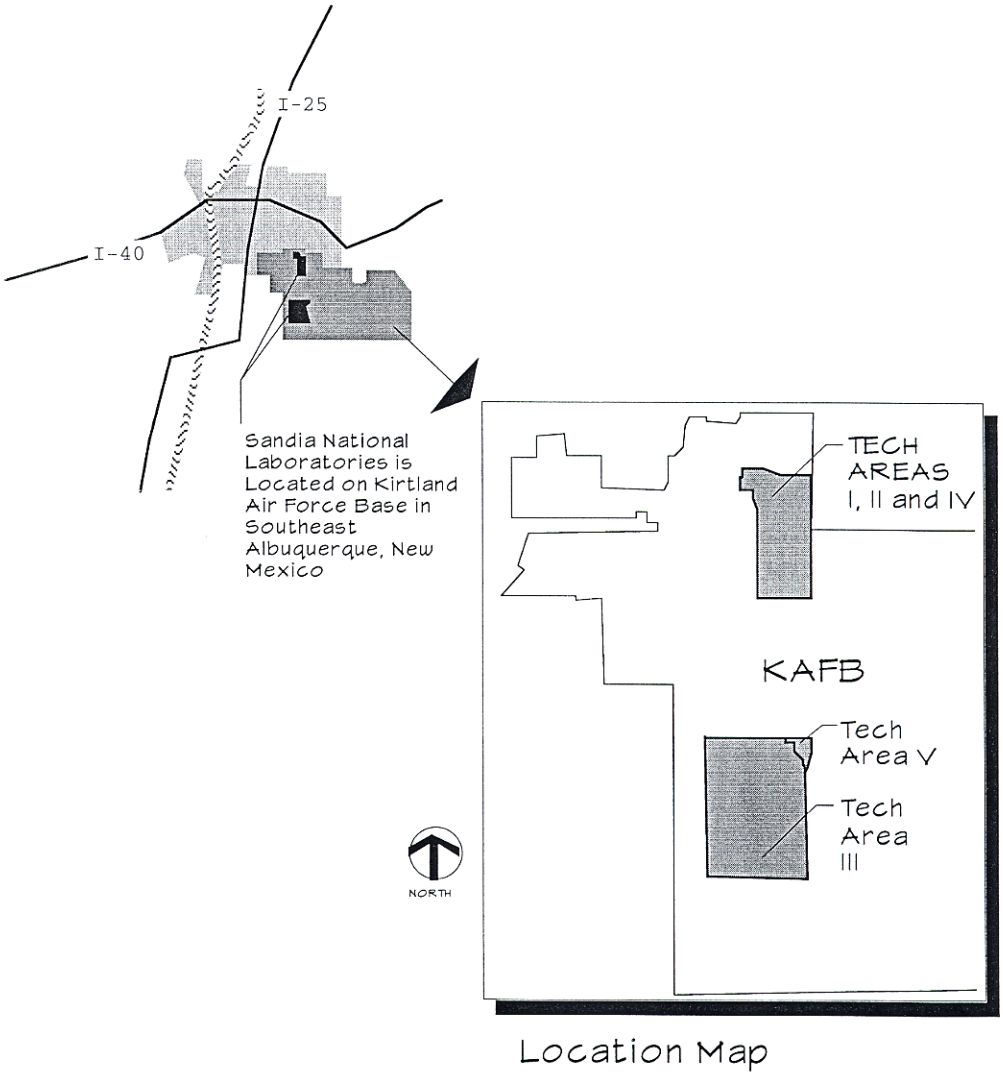


Exhibit II.-1
Location Map

Principles

1. Image and Entrance

SNL, New Mexico needs to present itself to the visiting public and its employees in a manner that expresses an overall image of "science and technology" that compliments a world class research and development institution.

SNL will seek to create a clear and separate identity from its KAFB neighbor by anticipating and managing the progression of a visitor to their destination by working with the state, city and KAFB, as appropriate, to:

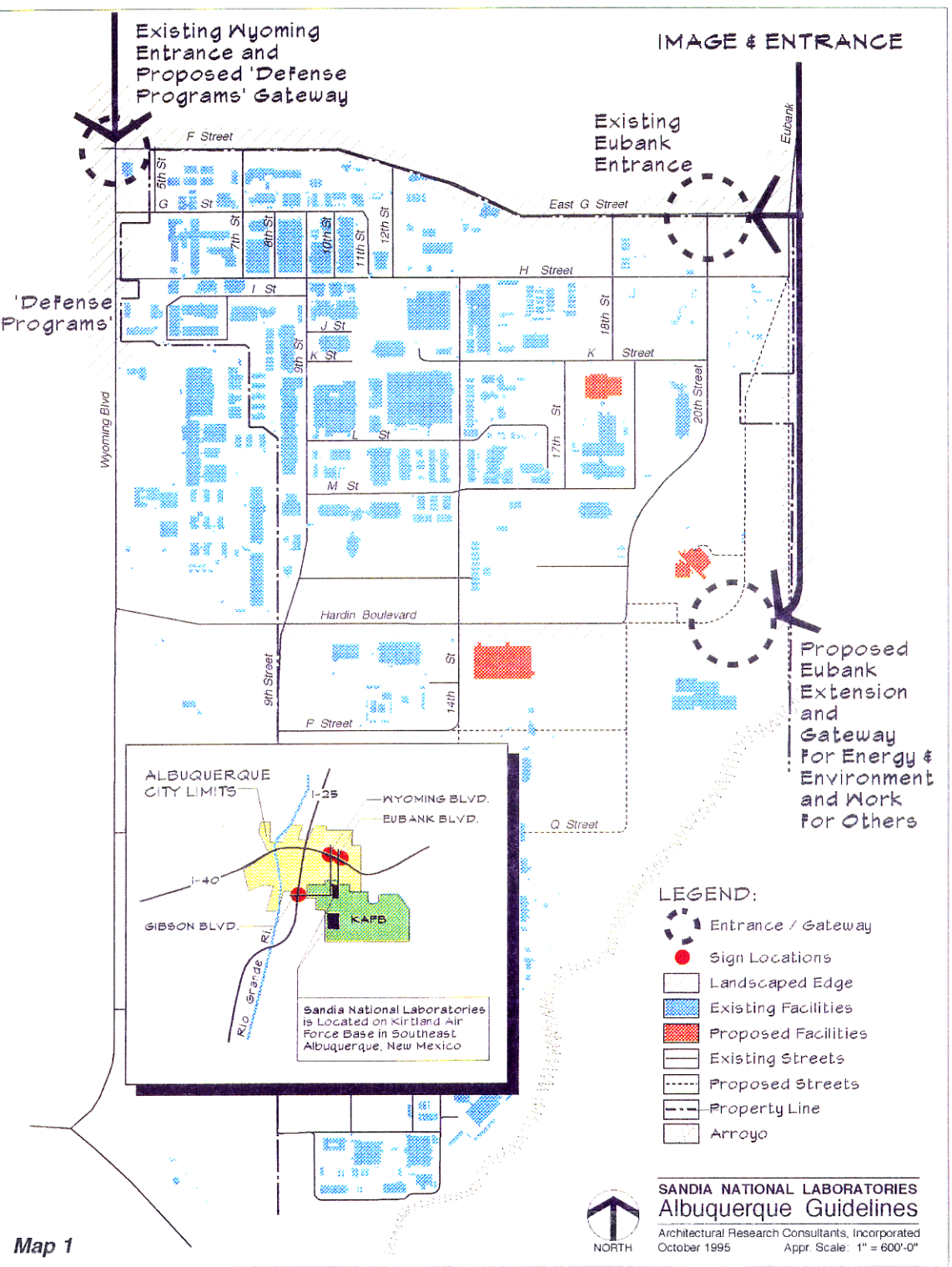
- *Improve directional signage from:*
  - *I-40 and major intersections to Wyoming and Eubank gates;*
  - *KAFB gates on Wyoming and Eubank to designated visitor areas; and*
  - *establishing a consistent signage system on SNL property.*
- *Develop a distinct "edge" demarcated by landscape and identification features that clearly identifies SNL from its immediate surroundings;*
- *Enhance entries to the site. This includes reinforcing the traditional "front-door" entrance for Defense Programs on F Street, enhancing the East G Street and 20th gate and creating a new Tech Transfer visitor entrance at the extension of Eubank and Hardin Boulevards.*

Visitors should feel welcome to the site and find the facilities "accessible" within security limitations.

"Gateways" will be developed to improve the sense of arrival to SNL.

Artifacts of the "cold war" such as unnecessary chain-link and barbed wire fencing should be removed when functionality permits.

See Map 1 - Image and Entrance


Existing Wyoming Entrance and Proposed 'Defense Programs' Gateway
IMAGE & ENTRANCE
Existing Eubank Entrance
'Defense Programs'
Proposed Eubank Extension and Gateway for Energy & Environment and Work for Others
F Street
G St
East G Street
H Street
I St
J St
K St
K Street
L St
M St
Hardin Boulevard
P Street
Q Street
Wyoming Blvd
Eubank
5th St
6th St
7th St
8th St
9th St
10th St
11th St
12th St
14th St
17th St
18th St
20th Street
9th Street
ALBUQUERQUE CITY LIMITS
I-25
I-40
WYOMING BLVD.
EUBANK BLVD.
GIBSON BLVD.
KAFB
Rio Grande
Sandia National Laboratories is Located on Kirtland Air Force Base in Southeast Albuquerque, New Mexico
LEGEND:
Entrance / Gateway
Sign Locations
Landscaped Edge
Existing Facilities
Proposed Facilities
Existing Streets
Proposed Streets
Property Line
Arroyo
NORTH
SANDIA NATIONAL LABORATORIES
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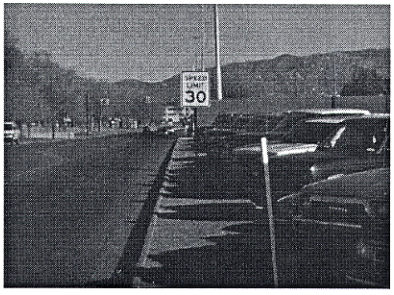
Appr. Scale: 1" = 600'-0"
Map 1

2. Vehicular Movement and Parking



Major roadways and parking areas will be landscaped.

Vehicular and pedestrian circulation will be physically or visually separated whenever possible.

Maps 2 and 3 show Future Roadways, Parking and Service/Emergency Roads.

Vehicle Access

Primary vehicle access will be by a 'loop road' that surrounds Tech Area I and is convenient to all access gates.

Eubank Boulevard will be extended south to Hardin Boulevard to provide a new distinct visitor entranceway to SNL/NM.

Access to the interior of Tech Area I will be by a system of service roads, bicycle lanes, and pedestrian pathways. A clear hierarchy of roadways will be established and reinforced elsewhere on the site.

E-Z Go's will share local and service roads inside the loop road. Bicycle pathways will be integrated into system.

Parking

Parking for the limited access area will be on surface lots conveniently located on the inside perimeter of the loop road near the security gates.

Parking for the flexible security zone will be distributed by building with each lot sized to meet visitor and staffing needs.

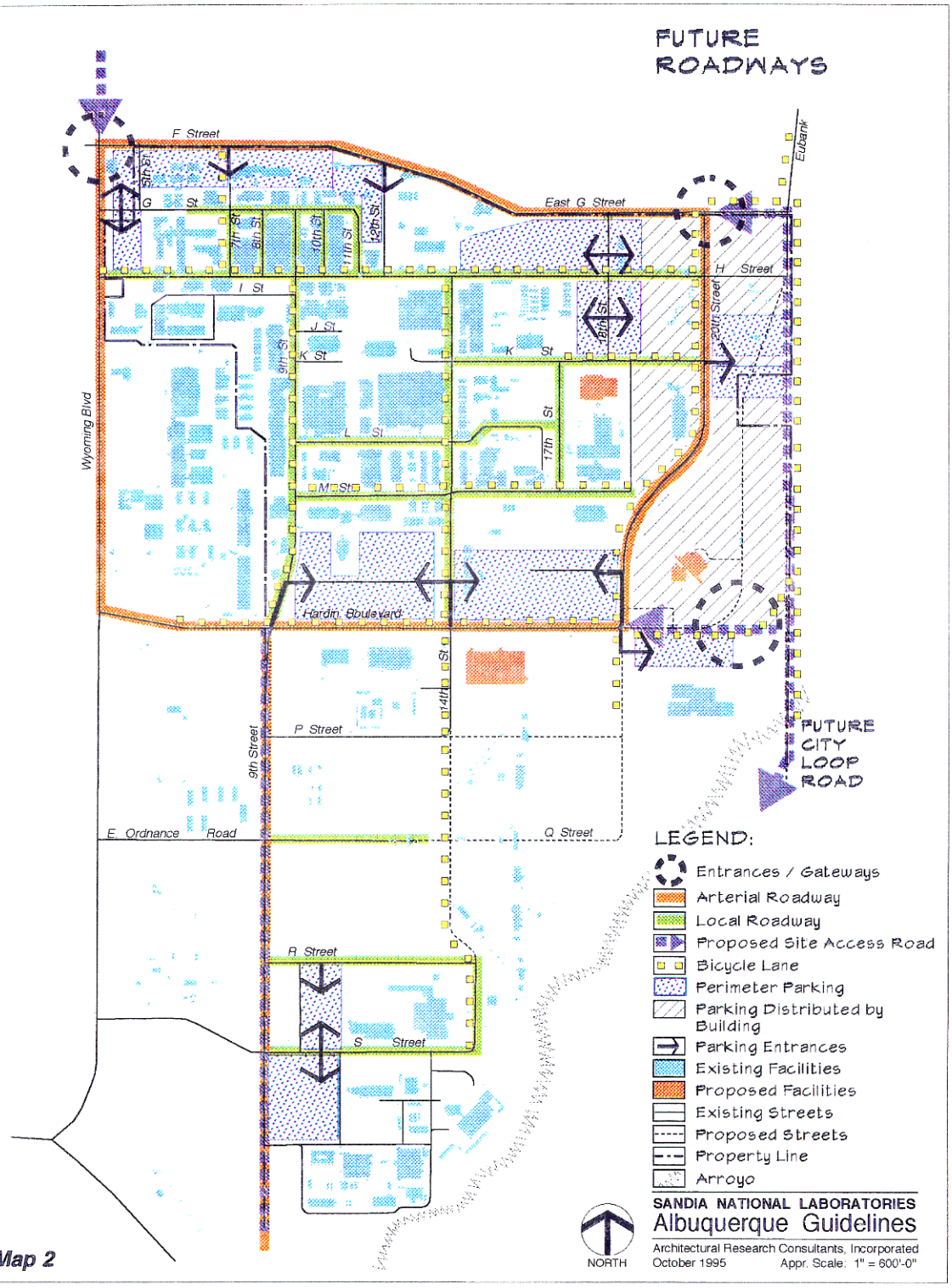
Smaller interconnected parking lots will be preferred to vast lots.

New parking lots will be created to reduce on-street parking.

Convenient connections will be provided from parking lots to pedestrian walkways and adjacent buildings.

Sufficient supply of parking spaces will be provided by construction of new lots and enforcement of parking regulations.

Parking for small vehicles (E-Z Go) and bicycles will be designated.


FUTURE ROADWAYS
F Street
G St
East G Street
H Street
I St
J St
K St
L St
M St
Hardin Boulevard
Wyoming Blvd
Eubank
5th St
7th St
8th St
10th St
11th St
12th St
13th St
14th St
16th St
17th St
20th Street
9th Street
P Street
Q Street
E. Ordnance Road
R Street
S Street
FUTURE CITY LOOP ROAD
LEGEND:
Entrances / Gateways
Arterial Roadway
Local Roadway
Proposed Site Access Road
Bicycle Lane
Perimeter Parking
Parking Distributed by Building
Parking Entrances
Existing Facilities
Proposed Facilities
Existing Streets
Proposed Streets
Property Line
Arroyo
NORTH
SANDIA NATIONAL LABORATORIES
Albuquerque Guidelines
Architectural Research Consultants, Incorporated
October 1995
Appr. Scale: 1" = 600'-0"
Map 2

Service Access

Visitor and service traffic access will be separated to avoid conflicts and maintain access clarity whenever possible.

Service and delivery access will be directed to the Eubank Gate.

Service and distribution will generally be from the central warehouse Building 957 and then to the interior of the Tech Area.

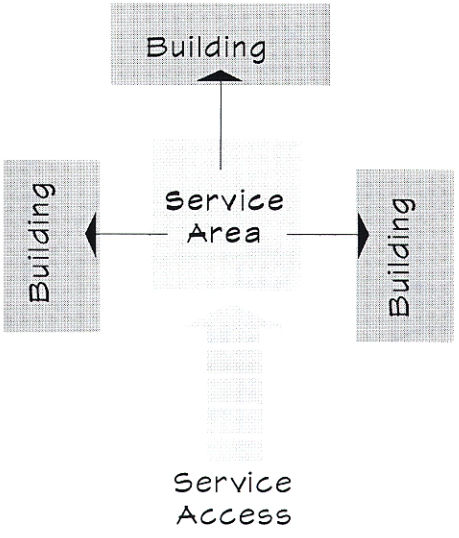
Interior service roads will be separate from pedestrian ways whenever possible but retain access to the service area of every building site (for trash removal, maintenance and deliveries). Interior service roads generally follow the existing road network within the Tech Area.

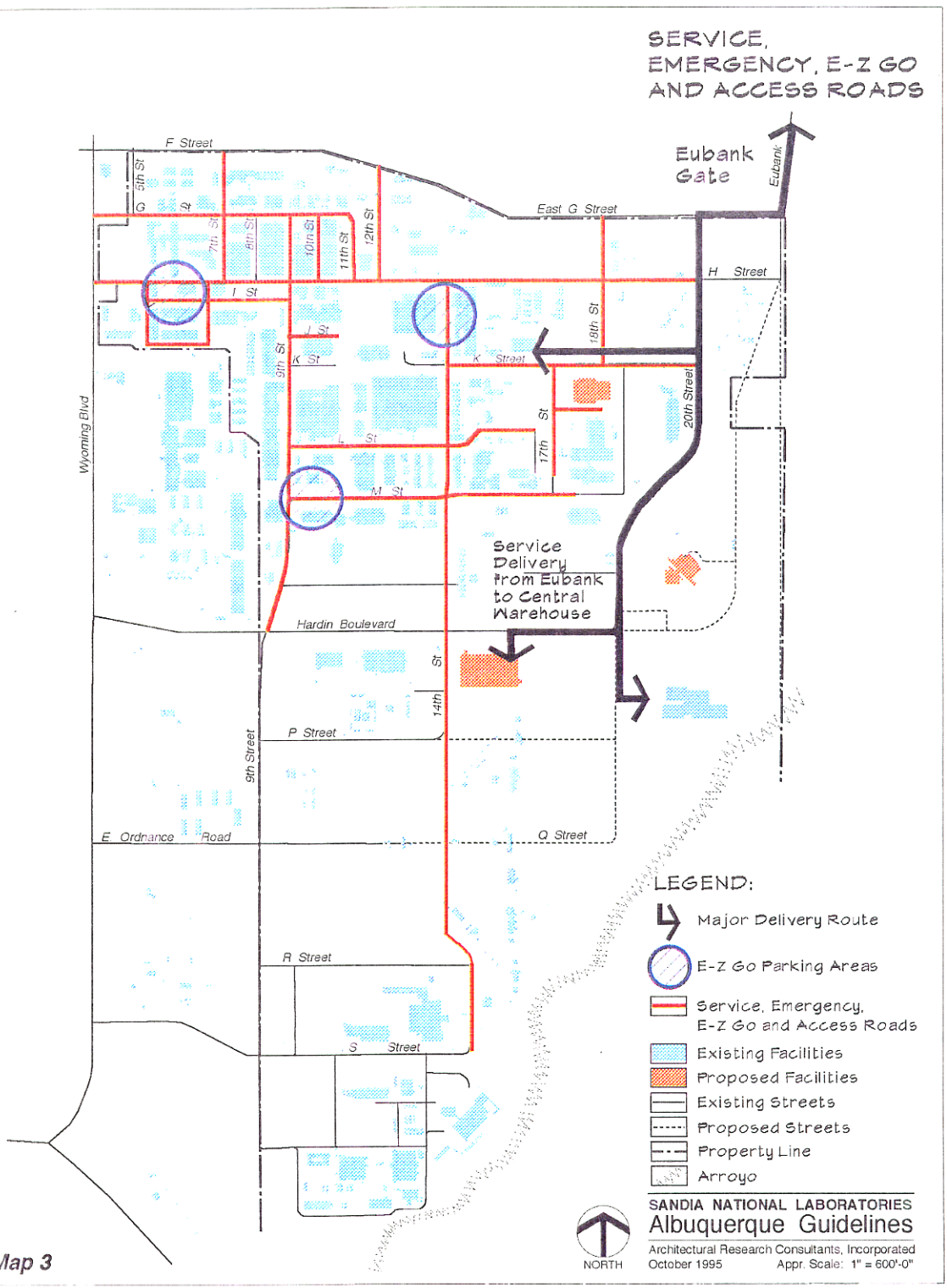
Pedestrian ways and service roads will be separated to the extent possible.

Emergency Access

Emergency access will be maintained in the design of all vehicular and pedestrian pathways.

Service areas will be centralized to service multiple buildings.




SERVICE, EMERGENCY, E-Z GO AND ACCESS ROADS
Eubank Gate
Eubank
F Street
East G Street
H Street
I St
K Street
L St
M St
P Street
Q Street
R Street
S Street
Wyoming Blvd
9th Street
20th Street
Hardin Boulevard
E. Ordnance Road
Service Delivery from Eubank to Central Warehouse
LEGEND:
Major Delivery Route
E-Z Go Parking Areas
Service, Emergency, E-Z Go and Access Roads
Existing Facilities
Proposed Facilities
Existing Streets
Proposed Streets
Property Line
Arroyo
NORTH
SANDIA NATIONAL LABORATORIES
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Appr. Scale: 1" = 600'-0"

Map 3

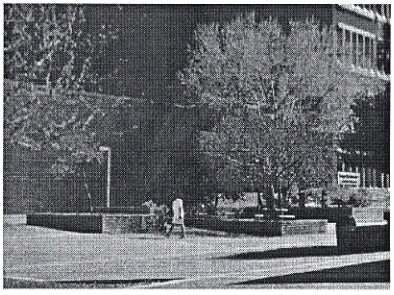
3. Pedestrian Movement

It is intended that selected interior areas of Tech Area I will be pedestrian-oriented. A system of sidewalks, malls and plazas will create an interior movement system separated from small vehicle and service access to the extent possible.

The pedestrian malls will provide a pleasant and safe way to travel from zone to zone and provide links to major activity areas and surrounding open space. Portions of malls and sidewalks will be designated for bicycles. Bicycle dismount areas will be provided when necessary to ensure pedestrian safety.

Plazas will be strategically placed at or near major intersections and will provide a central space for each zone. Plazas will provide outdoor spaces for eating, meeting, and break areas.

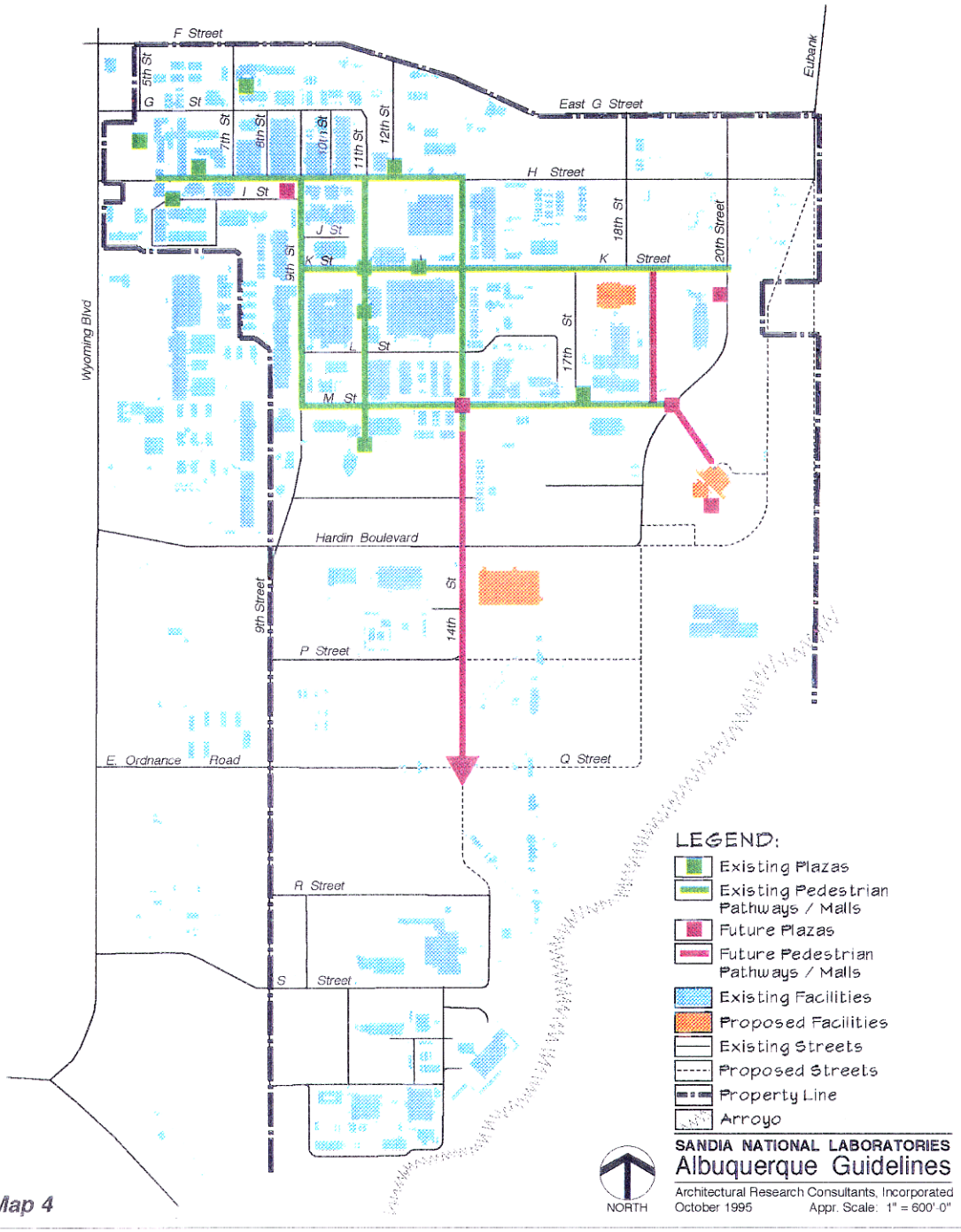
Landscaped entry courts will connect the 'front' doors' of all building sites to the interior pedestrian system.



Existing malls and plazas will be extended to enhance pedestrian circulation.

Pedestrianways will be developed to enhance safety and appearance.

Pedestrian movement is shown on Map 4.


PEDESTRIAN MOVEMENT
F Street
5th St
G St
7th St
8th St
10th St
11th St
12th St
East G Street
Eubank
H Street
I St
J St
K St
18th St
20th Street
K Street
5th St
Wyoming Blvd
L St
17th St
M St
Hardin Boulevard
9th Street
14th St
P Street
E. Ordnance Road
Q Street
R Street
S Street
LEGEND:
Existing Plazas
Existing Pedestrian Pathways / Malls
Future Plazas
Future Pedestrian Pathways / Malls
Existing Facilities
Proposed Facilities
Existing Streets
Proposed Streets
Property Line
Arroyo
NORTH
SANDIA NATIONAL LABORATORIES
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October 1995
Appr. Scale: 1" = 600'-0"

Map 4

4. Landscaping / Open Space

Landscaping will provide a cohesive and unifying element for all site development activities through use of plant material, paving, lighting, site furniture and signage.

Areas of poor visual quality will be enhanced through use of plant materials, fencing, walls and screening throughout the site.

Intensity of landscaping will vary according to type of use and visibility. Use of low and moderate maintenance plant material will be promoted throughout the site (See Exhibit II-2).

Open space areas are identified that:
- *take advantage of drainageways and other undevelopable lands.*
- *preserve important view corridors*
- *provide safety buffers, and*
- *link to designated pedestrian pathways.*

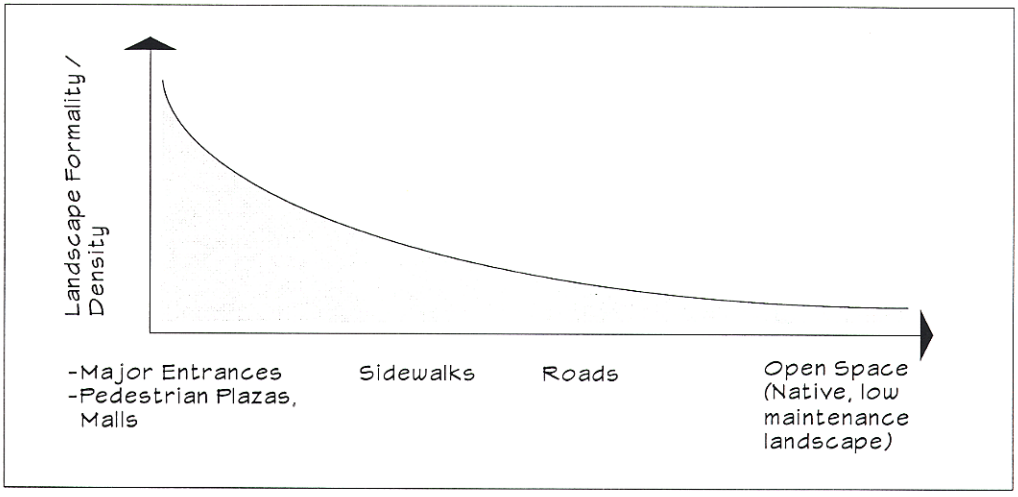
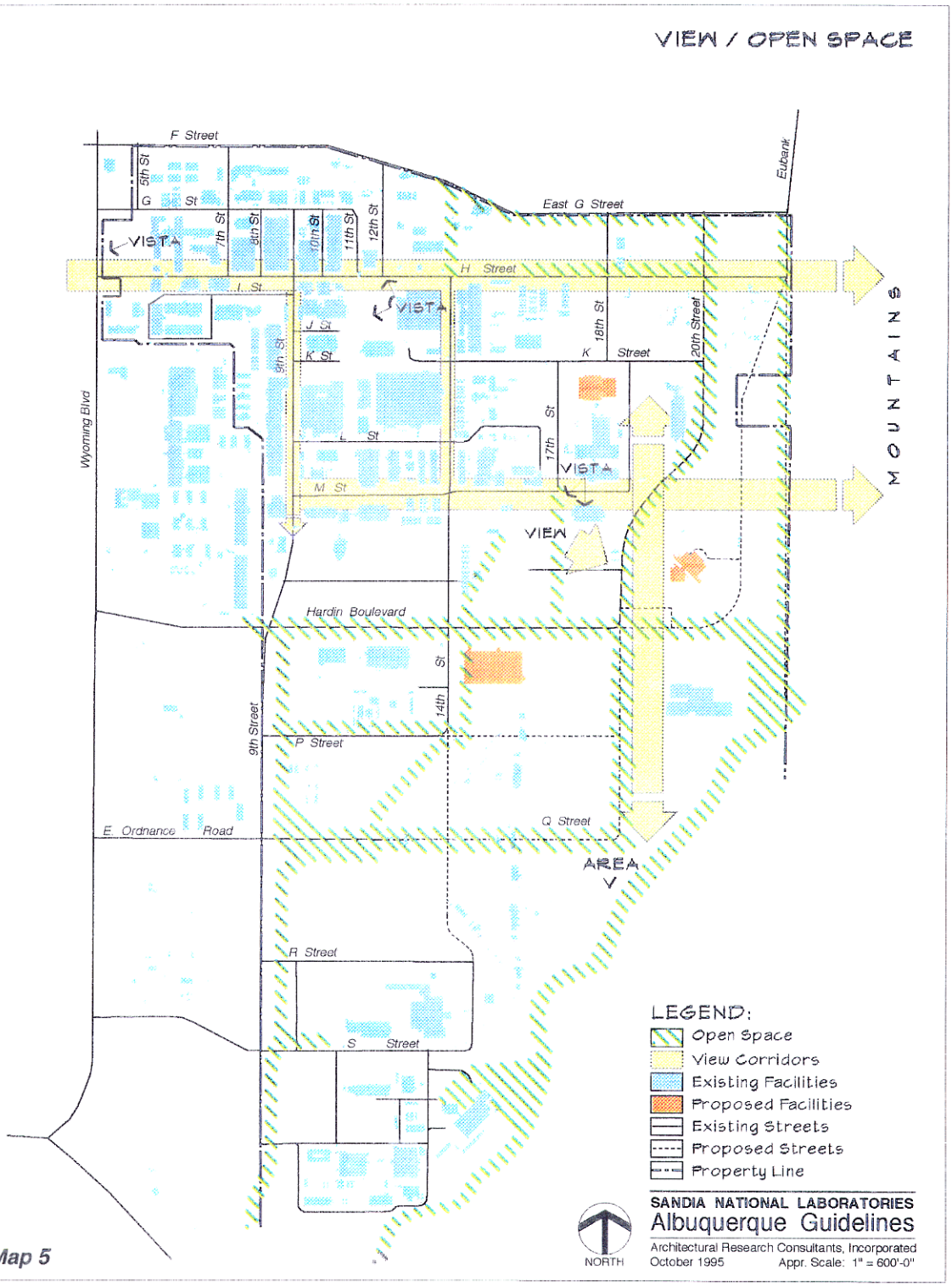


Exhibit II.-2
Landscape Intensity

Landscaping and open spaces is shown on Map 5.


VIEW / OPEN SPACE
F Street
5th St
G St
East G Street
Eubank
7th St
8th St
10th St
11th St
12th St
VISTA
H Street
I St
VISTA
J St
K St
9th St
18th St
K Street
20th Street
MOUNTAINS
Wyoming Blvd
L St
17th St
VISTA
M St
VIEW
Hardin Boulevard
St
14th
9th Street
P Street
E. Ordnance Road
Q Street
AREA
R Street
S Street
LEGEND:
Open Space
View Corridors
Existing Facilities
Proposed Facilities
Existing Streets
Proposed Streets
Property Line
NORTH
SANDIA NATIONAL LABORATORIES
Albuquerque Guidelines
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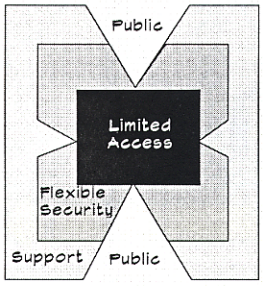
Appr. Scale: 1" = 600'-0"
Map 5

5. Security and Safety



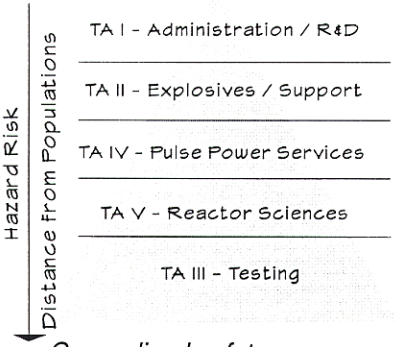
Site security is based on a concentric zone concept with most secure areas in the center.

Site Security

Required security and limited access areas are maintained. However, it is expected that SNL/NM will gradually become more 'visitor-friendly' and limited access areas will shrink in size and 'flexible security' areas established. Security perimeters will be better aesthetically integrated into overall site development planning. Security of personnel will be promoted by providing well lighted, 'defensible-space' site and building designs.

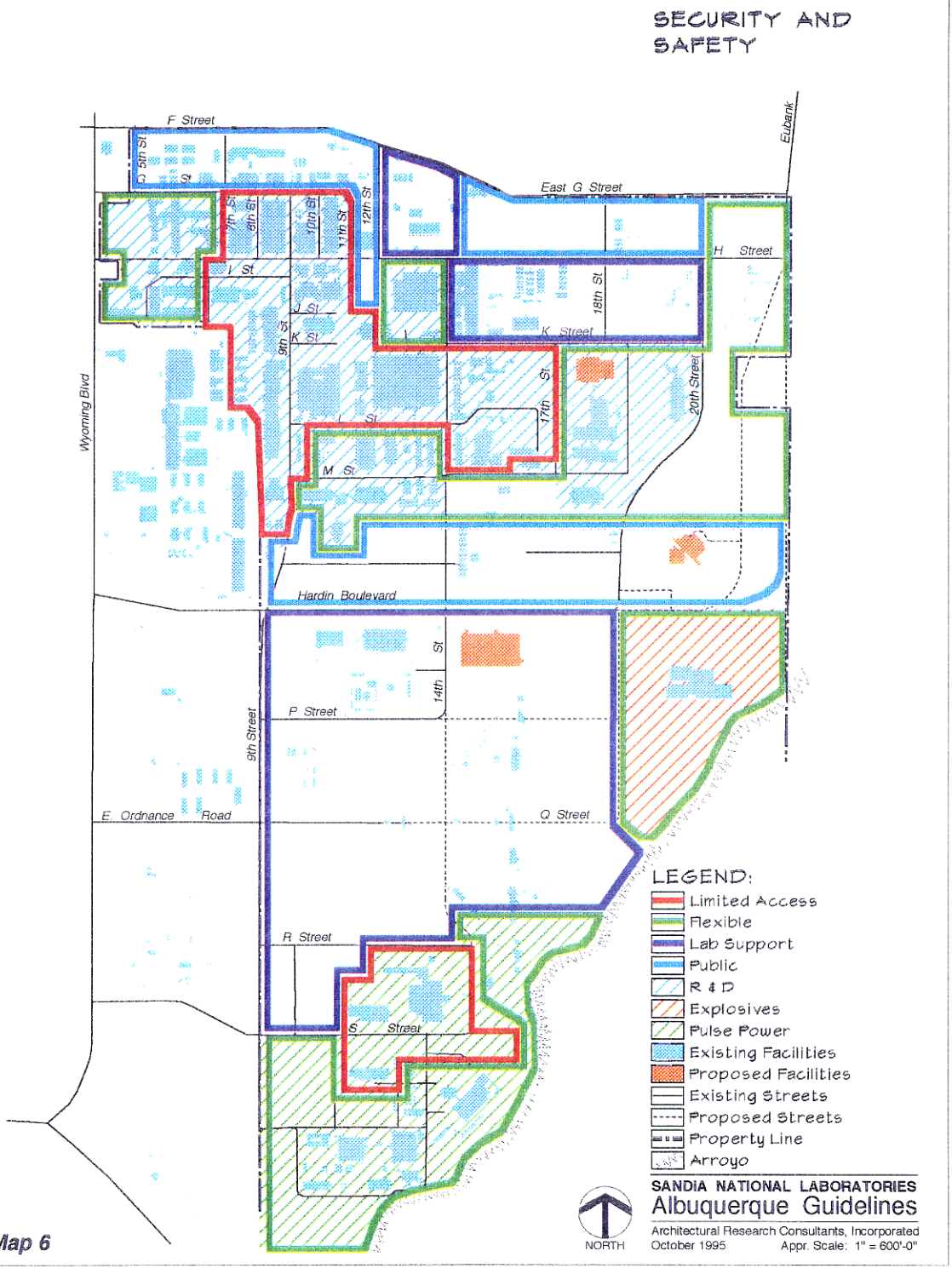
Safety Zones

Safety zones are established to protect site populations from hazards. These zones recognize past and current activities as well as desired long-term site conversion. In general, safety zones seek to place hazardous activities away from site populations.



Generalized safety zones.

Security and safety concepts are shown on Map 6.


SECURITY AND SAFETY
F Street
D 5th St
East G Street
Eubank
H Street
18th St
K Street
20th Street
17th St
Wyoming Blvd
M St
Hardin Boulevard
14th St
P Street
9th Street
E. Ordnance Road
Q Street
R Street
S Street
LEGEND:
Limited Access
Flexible
Lab Support
Public
R & D
Explosives
Pulse Power
Existing Facilities
Proposed Facilities
Existing Streets
Proposed Streets
Property Line
Arroyo
NORTH
SANDIA NATIONAL LABORATORIES
Albuquerque Guidelines
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October 1995
Appr. Scale: 1" = 600'-0"
Map 6

6. Land Use and Siting

Future land use and facility siting will be guided by considering:

- *Security requirements;*
- *Safety / hazard impacts, and*
- *Available building sites and infrastructure.*

Available Land and Site Utilities

Planning for the future will maintain flexibility to meet unexpected needs. Future potential building and redevelopment sites are to be identified and set aside based on:

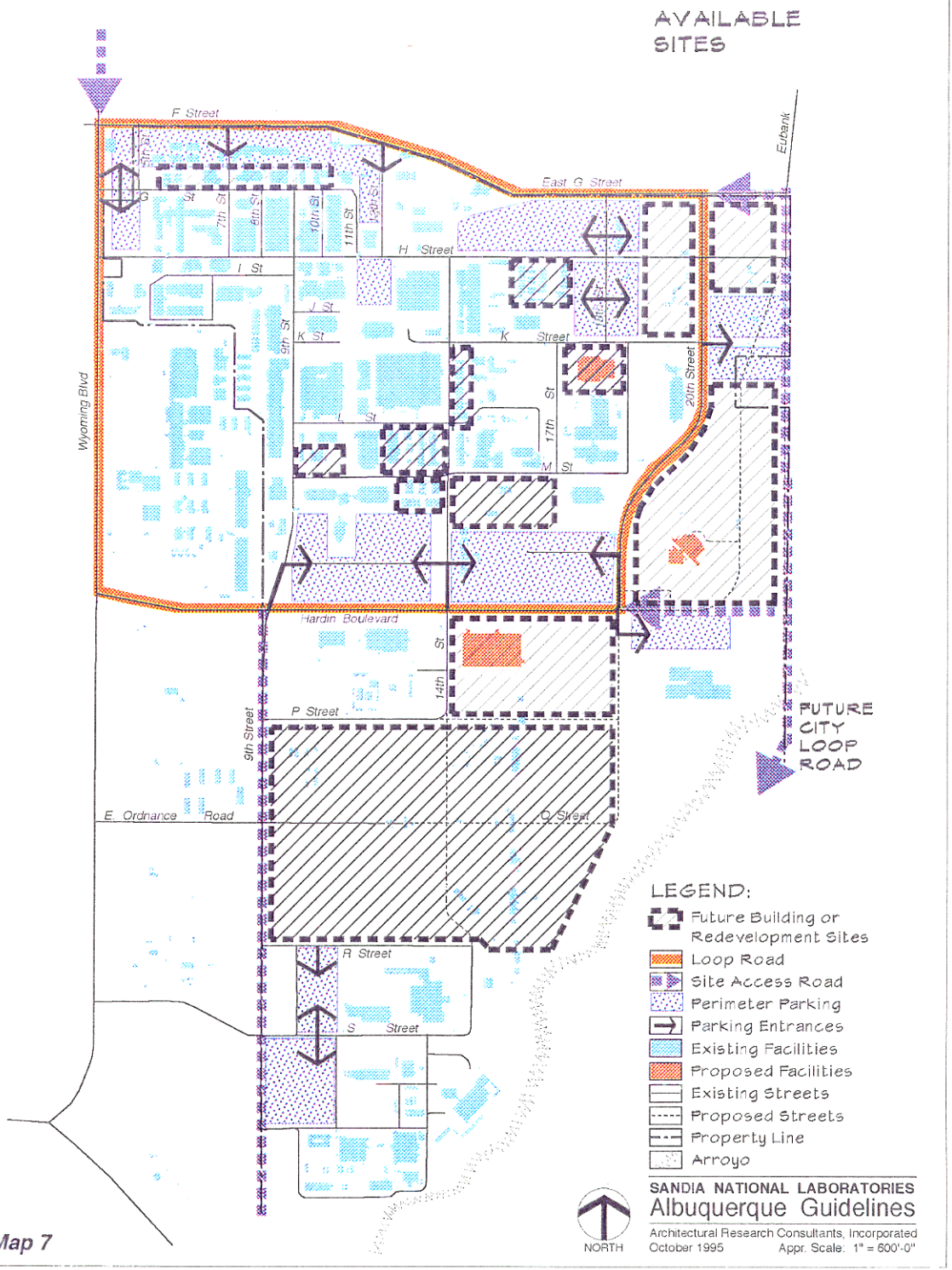
- *vehicular access*
- *pedestrian access requirements*
- *utilities*
- *buildings that are expected to be retained*
- *safety/security requirements*
- *environment restoration requirements.*

Building development and redevelopment will maximize available site areas to the extent practical.

Temporary, substandard and anciliary structures (mobile storage units, accessory use and transportainers) will be gradually replaced.

Utilities will be provided to serve existing and projected SNL needs. Utilities will be directed to designated corridors that are generally consistent with campus roadways or service streets.

Available sites and utilities are shown on Maps 7 and 8.


AVAILABLE SITES
F Street
Eubank
East G Street
H Street
I St
J St
K St
K Street
L St
M St
Wyoming Blvd
20th Street
17th St
Hardin Boulevard
P Street
9th Street
14th St
FUTURE CITY LOOP ROAD
E. Ordnance Road
Q Street
R Street
S Street
LEGEND:
Future Building or Redevelopment Sites
Loop Road
Site Access Road
Perimeter Parking
Parking Entrances
Existing Facilities
Proposed Facilities
Existing Streets
Proposed Streets
Property Line
Arroyo
NORTH
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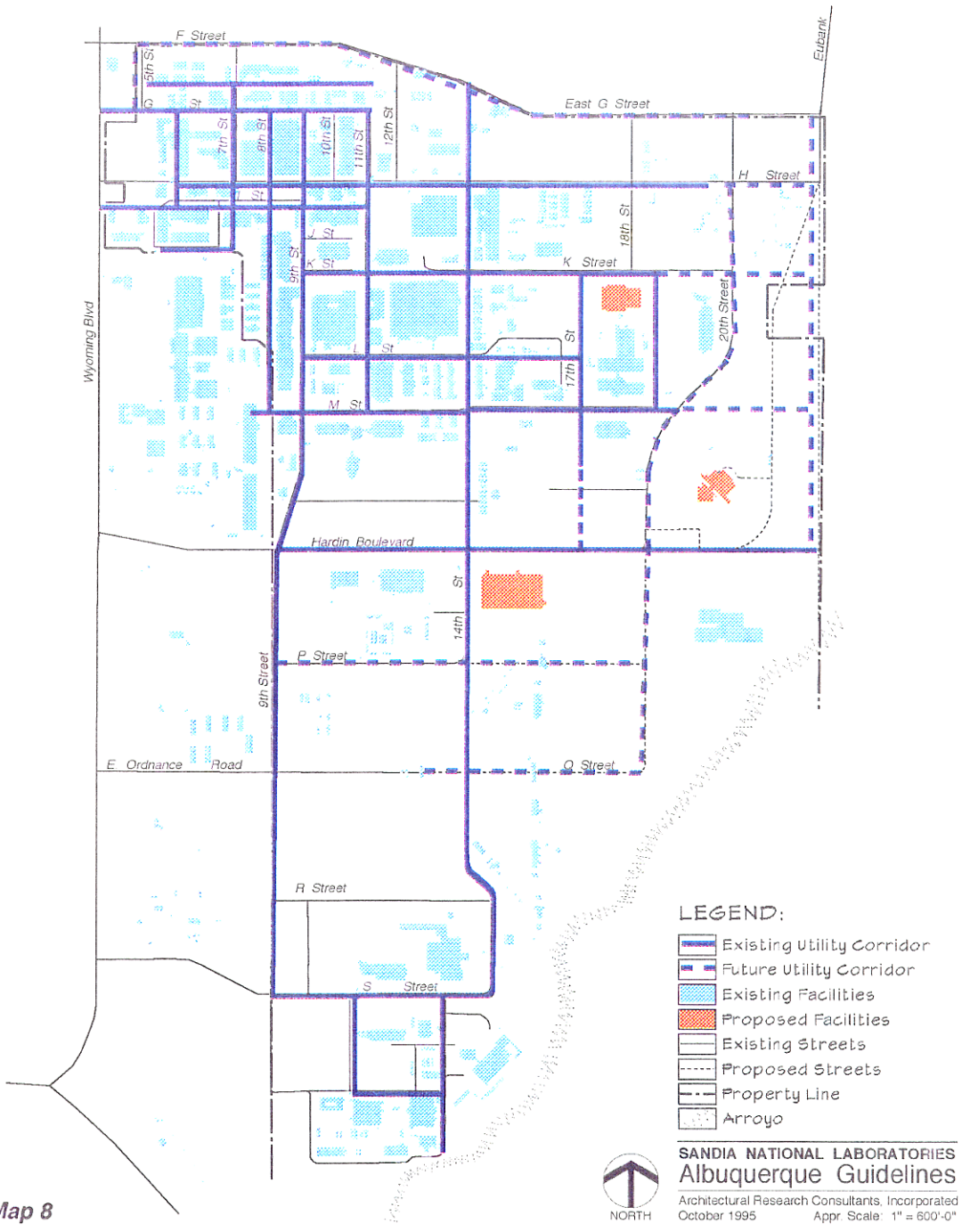
Map 7

SITE UTILITIES



SANDIA NATIONAL LABORATORIES
Albuquerque Guidelines
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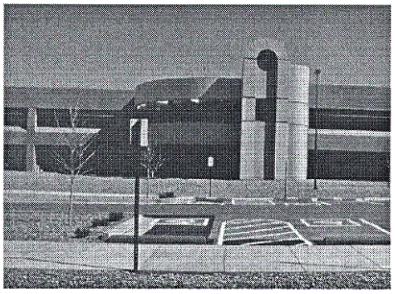
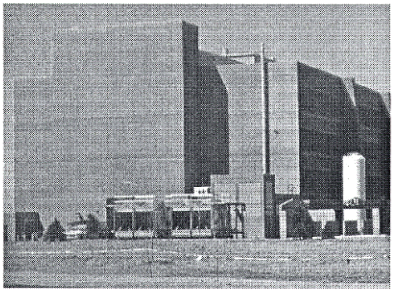
Map 8

7. Architectural and Visual Character



Building designs should express a science and technology image. The Microelectronics Development Laboratory is a good example of the image that SNL wishes to promote.



The 'clone' building design should be discouraged.

Map 9 shows zones of Architectural and Visual Character

An overall architectural image that expresses "science and technology" will be encouraged in all new and redevelopment building activity.

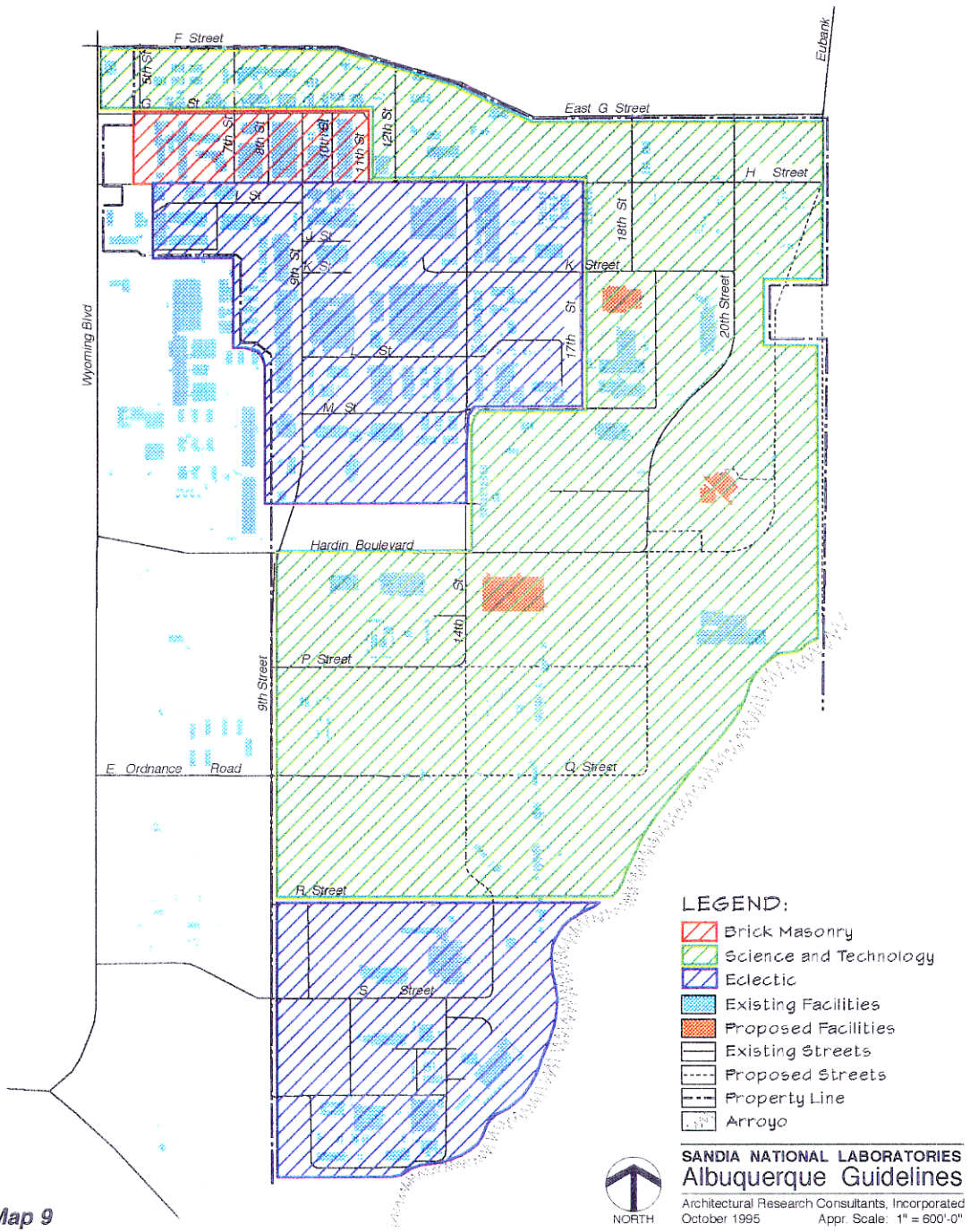
Buildings will reflect a unique architectural and visual character appropriate for its developmental history as defined by:

- *architectural context and style*
- *materials*
- *color*
- *height*
- *massing*
- *setbacks*
- *other features.*

Landscaping will provide a common unifying element to the campus. The landscape will reinforce a pedestrian-oriented environment and emphasize low maintenance native plants and materials.

New buildings will be constructed and existing buildings renovated to reduce the dissimilarity of styles, forms, materials and colors.

ARCHITECTURAL AND VISUAL CHARACTER



Map 9

III.

Design Guidelines

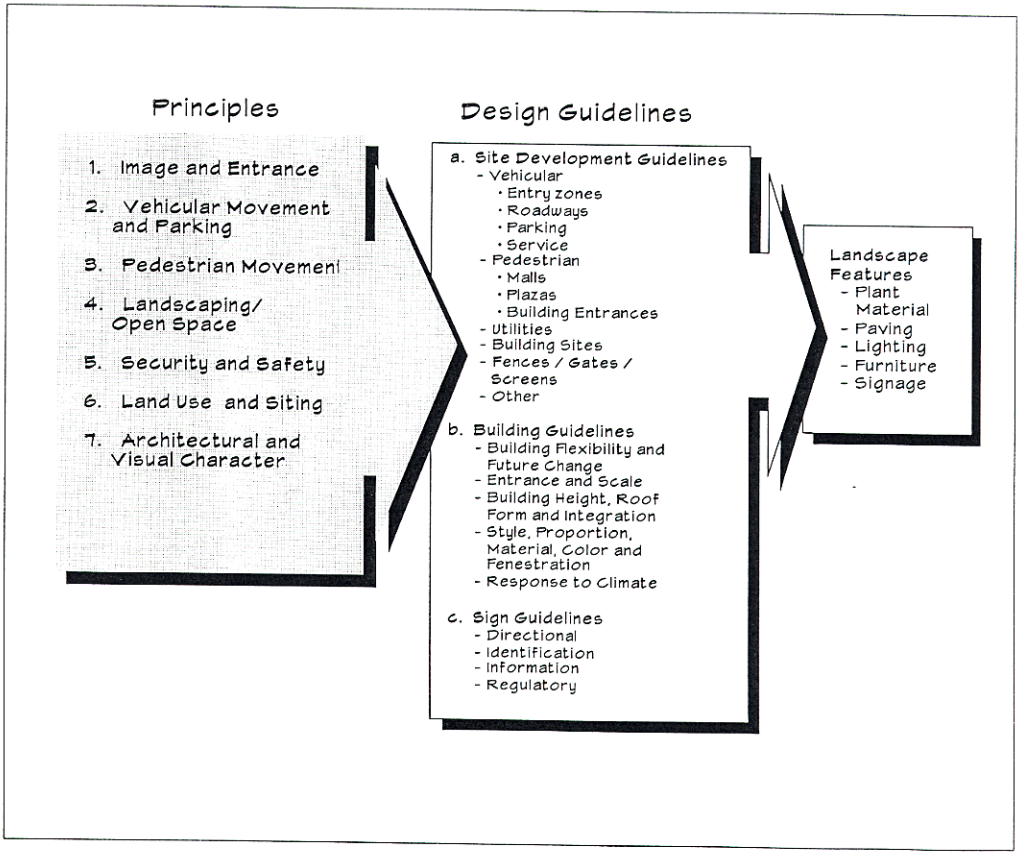
A. Introduction

Based on the overall planning principles, specific design guidelines are provided for:

- Site design
- Building design
- Exterior and interior signage.

The intent of the guidelines is to convey quality and character of desired physical development or redevelopment. Key ideas are illustrated whenever possible. Detailed specifications, if appropriate, are found in appendices.

Each category of guideline is described in the following sections.



III.a.

Site Development Guidelines

Site Design Guidelines
- ✓ Vehicular
  - Entry Zones / Perimeter Edges
  - Roadways
  - Parking
  - Service / Emergency
- ✓ Pedestrian
  - Malls
  - Plazas
  - Building Entrances
- ✓ Fences / Gates / Screens
- ✓ Utility Corridors
- ✓ Building Sites
- ✓ Landscape Features

Introduction

Eleven generic elements have been defined that are the major building blocks of any site planning and design effort. They include:

1. Entry Zones and Perimeter Edges
2. Roadways
3. Parking
4. Service Access / Emergency
5. Pedestrian 'Malls' and Sidewalks
6. Plazas
7. Building Entry Courts
8. Gates / Fences/ Buffers
9. Utility Corridors
10. Building Sites
11. Landscape Features
    - Plant Material
    - Paving
    - Lighting
    - Furniture
    - Signage (described in detail in III.C. Sign Guidelines)

The nature of each element will be described and illustrated. Please note that minimum dimensions and other requirements may have to be adjusted to accommodate existing conditions.

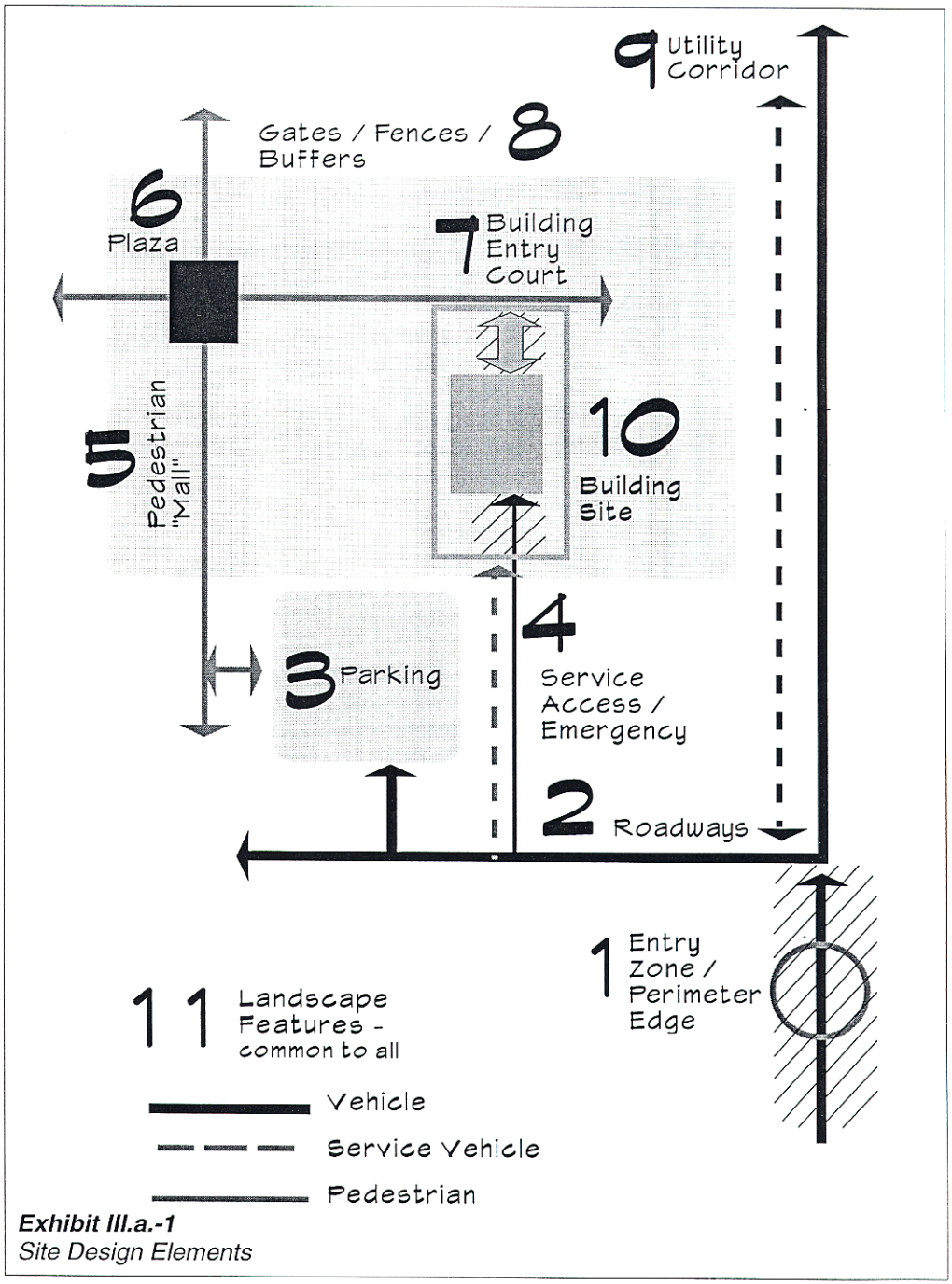


Exhibit III.a.-1
Site Design Elements

1. Entry Zones / Perimeter Edges

1.1 Introduction/Goals

This is the zone where a visitor has the first contact with SNL/NM. The intent is to provide a positive first impression and clear identification and directional signage.

Entry zones are characterized by:
- Divided roadways with landscape medians
- Landscaped roadway edges
- Monumental and directional signage

1.2 Requirements

1.2.1 Paving:
See Roadways, Pedestrian malls and sidewalks.

1.2.2 Plant Material:
a. Roadways: Street trees
b. Medians: Accent trees, groundcover.
c. Other: See 11.2.1.

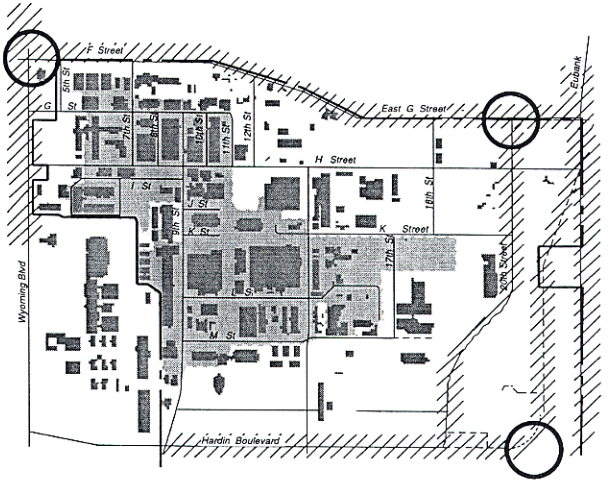
1.2.3 Lighting:
Street lighting, sign lighting

1.2.4 Furniture:
None

1.2.5 Signage:
I-1 type, major entrance. See III.C.

Entry zones will be developed at the following intersections:
- *Wyoming and F Street*
- *East G Street and 20th Street*
- *Eubank extension near 20th Street (future)*

Landscape perimeter edges will be developed along the loop road



See Exhibit III.a.-2

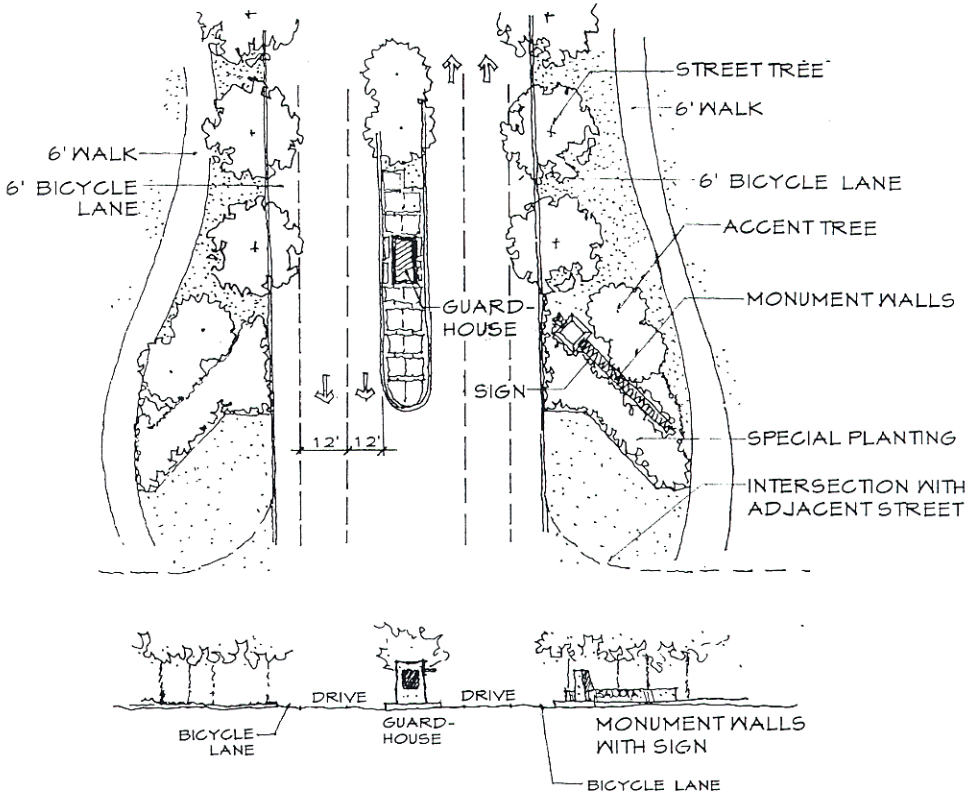


Exhibit III.a.-2
Entry Zone - NTS

2. Roadways

2.1 Introduction/Goals

There are three types of roadways:

- Arterial Roads (serving as the 'loop' access road for SNL/NM)
- Local Roads
- Service Roads

The intent of roadway design is to:

- provide clear and safe vehicular pathways.
- separate and buffer pedestrians and bicycles from vehicular traffic.
- provide a unifying and cohesive visual appearance through use of landscape elements.
- encourage a continuous off-road pedestrian and bicycle path system.
- facilitate emergency response.

Service and Emergency Access is discussed in 4. Service Access

Map 10 identifies Existing Roadways.

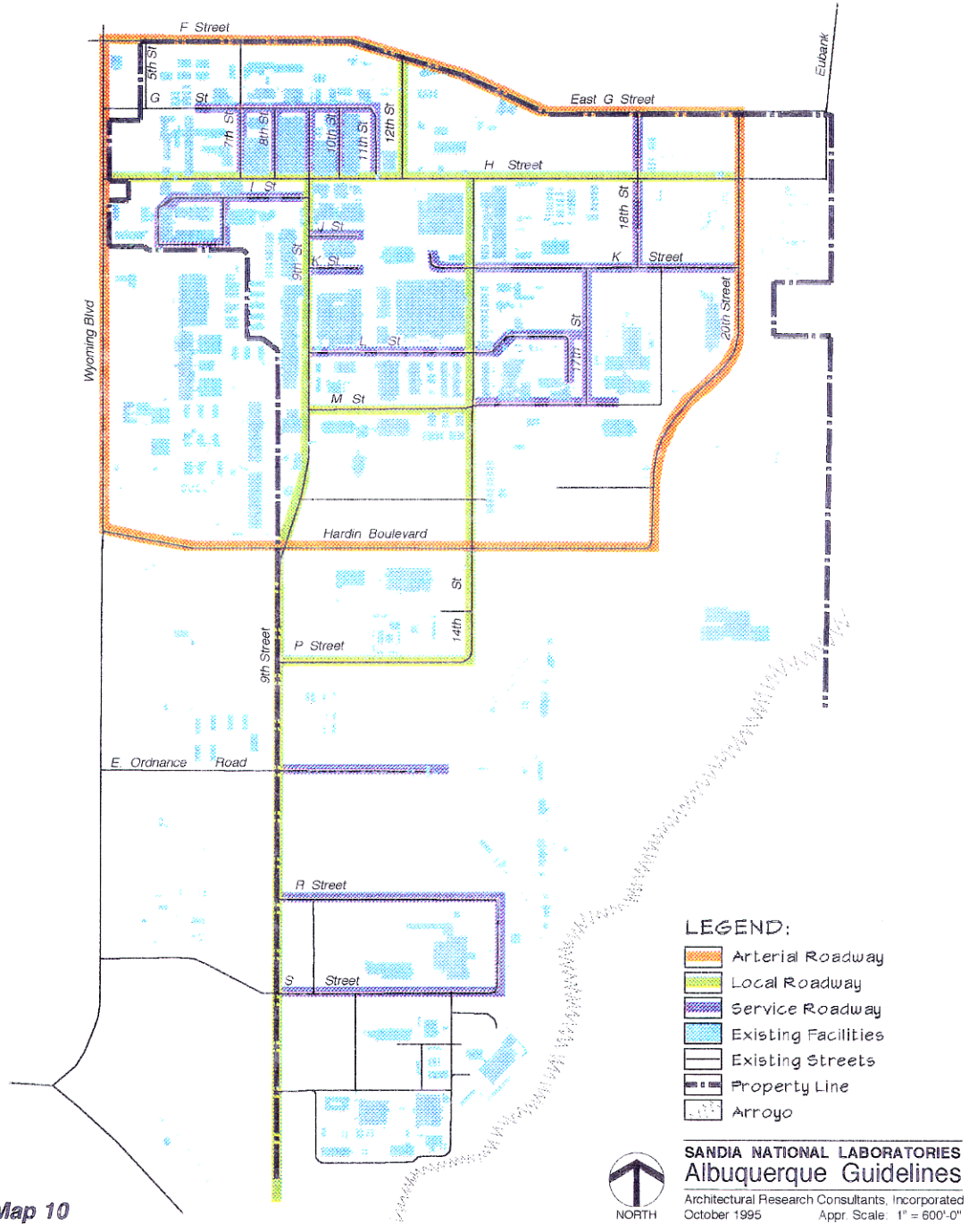
2.2 Requirements

2.2.1 General

A. Emergency and Fire Protection
   1. Minimum width of roads
      - 24 feet with no parking on either side of roadway,
      - 30 feet with parallel parking on one side of roadway,
      - 36 feet with parallel parking on both sides of roadway.
   2. The minimum width of fire lanes is 20 feet.
   3. Provide curb cuts that are at least 2 feet wider than secondary road or fire lane on each side of intersection.
   4. The grades of roads, street, and fire lanes is no more than 4.5 percent:
      - 1 to 3 percent downward slope for 100 feet from intersection for secondary road or fire lane intersecting with a main road.
      - 0.5 percent slope for drainage of roadway to prevent pooling of water.

B. Sidewalks, Curb and Gutter
   1. Streets at SNL/NM should have a sidewalk, curb and gutter.
   2. Sidewalks will be handicapped accessible as per ADA and UFAS requirements.

EXISTING ROADWAYS



Map 10

2.2.2 Arterial Roadways

Arterial Roadways are major perimeter circulation corridors intended to carry high traffic volume and serve as the 'loop' road around to Tech Area 1.

The arterial roadways include:

- *F Street*
- *East G Street*
- *Hardin Boulevard (formerly O Street)*
- *Twentieth Street*
- *Ninth Street Connection between Technical Areas I and IV*
- *Wyoming Boulevard from F street to Hardin Boulevard*

See Exhibit III.a.-4 for Arterial Roadway illustration.

2.2.2.1 Paving/Requirements

a. Provide two to four traffic lanes (total roadway width 24 to 48 feet). Four traffic lanes, turning lanes, and a 12 foot minimum median separating the lanes of traffic are desirable when space is available.
b. Provide clear sight-lines at all intersections to a view between three and eight feet above the gutter line and within a triangular area determined by projecting curb lines out points 35 feet distant from the corner of the intersection (see Exhibit III.a.-3).
c. Provide 6-8 foot-wide minimum bicycle lanes.
   1. Design in accordance with Class II, "Guide for Bicycle Paths," and UFAS.
   2. Provide connections to existing and future pathways leading off-site.
   3. Consider shared bicycle and automobile lanes except in remote areas or where roads are used exclusively for emergency and maintenance vehicles.
d. Maintain a minimum of 20 feet on each side of the road from parking areas, fences, and other site improvements for landscaping and walkways.
e. Where possible, maintain a minimum of 60 feet from buildings.
f. Design streets to intersect at right angles as nearly as practical consistent with topography and sound design. The acute angles at intersections for all street shall be 80 degrees or greater.
g. Intersections of streets along arterial streets are to be minimized.
h. Provide turn lanes at major intersections.
i. Minimize driveways or parking lot entries on arterial roadways. Locate intersection of drives no less than 150 feet from an intersection.
j. Provide pullouts along arterial bus routes at bus stops. If not possible, clearly designate bus stop. Design turning radii per AASHTO criteria for buses.

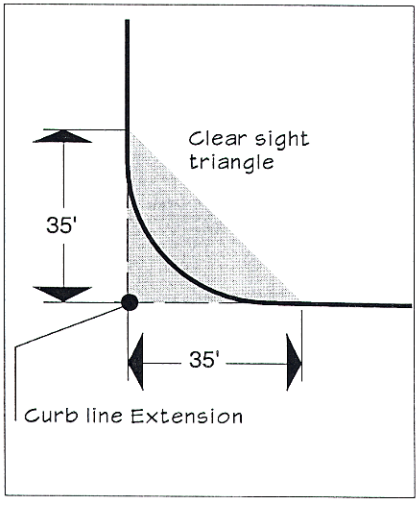


Exhibit III.a.-3
Clear Sight Triangle

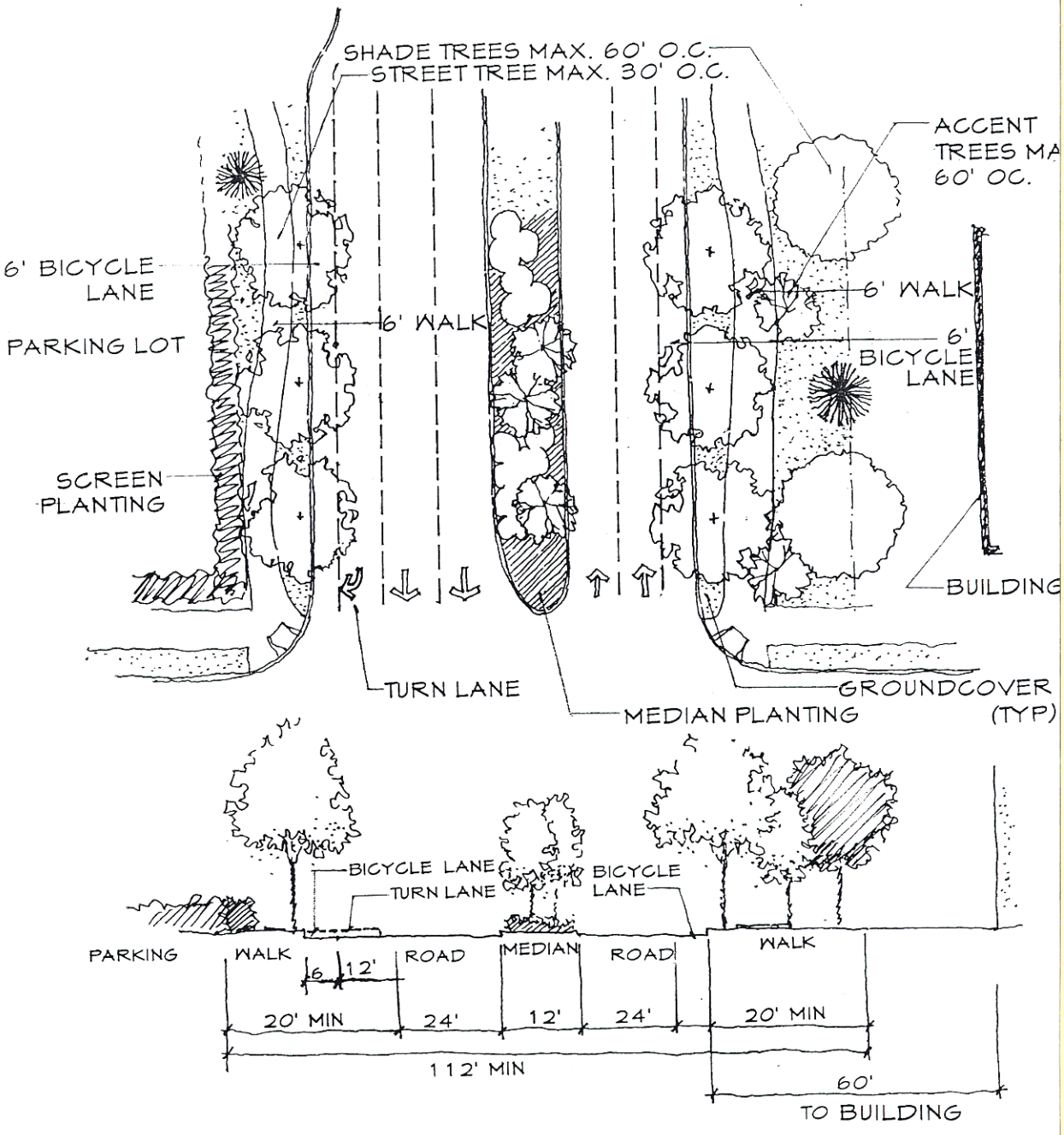


Exhibit III.a.-4
Arterial Roadway - NTS

2.2.2.2 Landscape Features:

a. Streets: Provide street trees on a regular pattern (e.g., 30' on-center) adjacent to Technical Areas and on the major loop road system. Provide natural landscaping outside of Tech Areas.
b. Medians: accent trees and ornamental shrubs and ground cover adjacent to Tech I Areas. Provide nature landscaping outside of Tech Areas.
c. Parking lots: Provide screening or berming.
d. Other: See 11.1.

2.2.2.3 Signage:

Provide D2, D3, and D4 directional signs at intersections, parking lot driveways, and security checkpoints consistent with KAFB traffic control signals. See III.c.

2.2.2.4 Lighting:

Street and pedestrian lighting. See 11.2.3.

2.2.2.5 Furniture

Seating, trash receptacles and shade structures at bus stops. See 11.2.4.

2.2.3 Local Roadways

Local roadways are access routes between large groups of buildings or test areas within the site. Existing local roadways do not always allow sufficient room for buffer areas and should be retrofitted when new construction allows.

2.2.3.1 Paving/Requirements

a. Provide two traffic lanes, total roadway width 24 feet.
b. Provide 6-8 foot wide minimum bicycle lanes on at least one side of roadway.
c. Provide a minimum of 20 feet on each side of the road from parking areas, fences, and other site improvements for landscaping and pathways.
d. Provide a minimum of 40 feet from buildings.
e. Provide driveways or parking lot entries a minimum of 100 feet apart and aligned on

See Exhibit III.a.-5 for local roadway illustration.

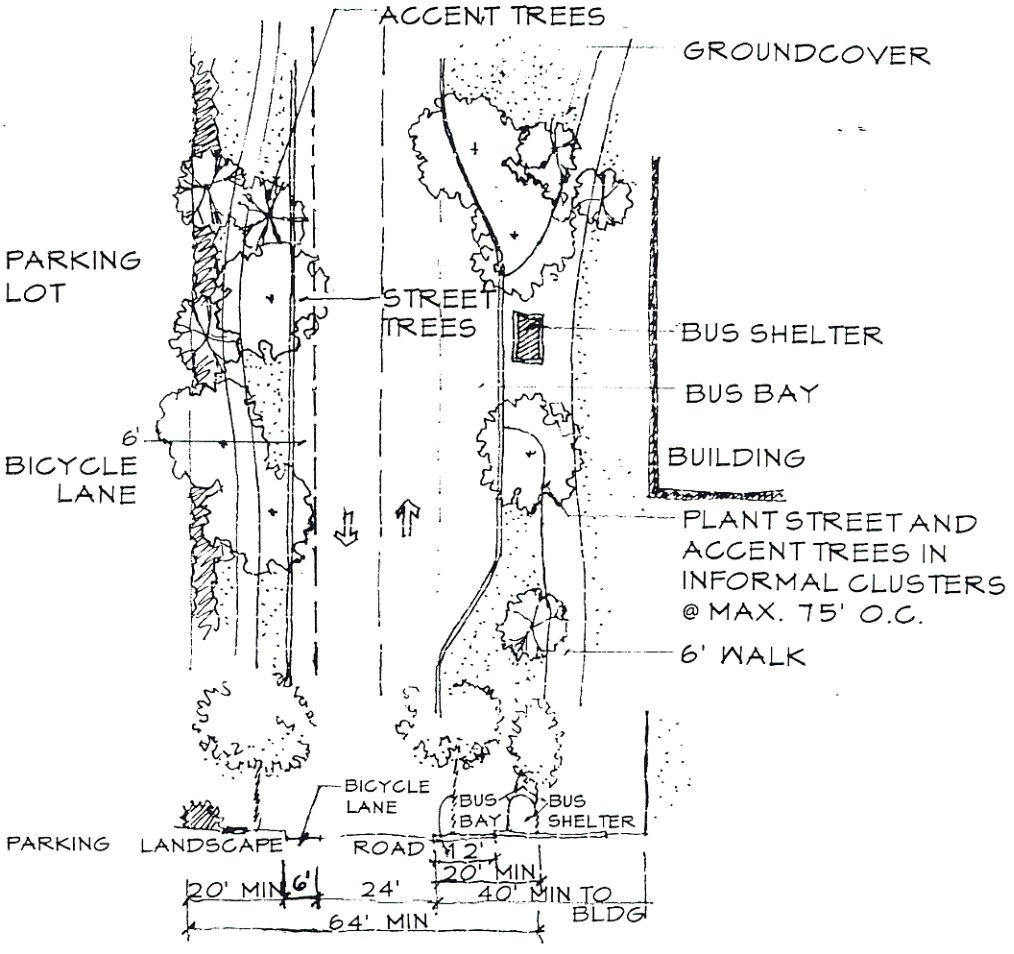
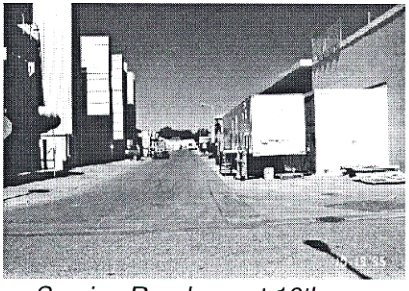


Exhibit III.a.-5
Local Roadways- NTS

Examples of existing local roads include:

- *H Street*
- *M Street*
- *9th Street*
- *12th Street*
- *14th Street.*
- *G Street*
- *L Street*
- *K Street*
- *17th Street*
- *Vehicular Portion of 11th Street in Technical Area I*
- *Miscellaneous Roadways within Technical Area IV*



Service Roadway at 10th Street, North of H Street.

Examples of existing service roads include:

- *K Street (west of 17th Street)*
- *V Street*
- *9th Street (north of H Street)*
- *10th Street*

See Exhibit III.a.-6 for an illustration of service roadways.

opposite sides of the road when possible.

f. Provide pullouts if possible along collector bus routes for bus stops.

2.2.3.2 Plant Material:

a. Plant street trees and accent trees in informal clusters at 75' o.c. max.
b. Other: See 11.2.1.

2.2.3.3 Signage:

D2, D3, D4 directional signs at intersections, parking lot driveways, and security checkpoints consistent with KAFB traffic control signals. See 3.2.4.

2.2.3.3 Lighting:

Street lighting. See 11.2.3.

2.2.3.4 Furniture

Seating, trash receptacles and shade structures at bus stops. See 11.2.4.

2.2.4 Service Roadways

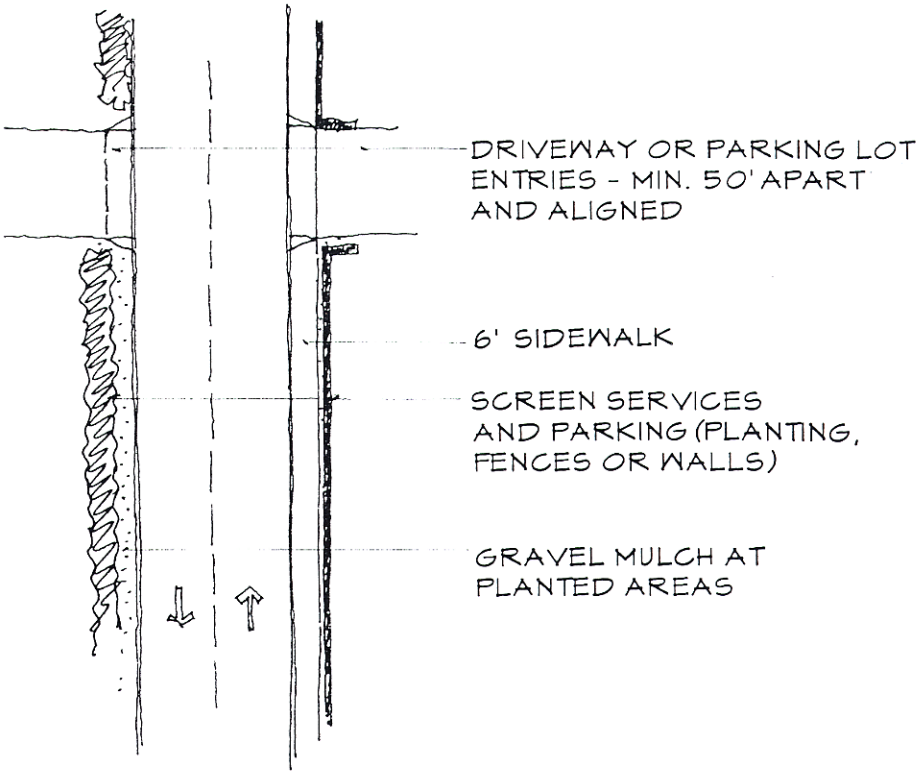
Service roadways provide access to individual buildings or service areas within a tech area.

2.2.4.1 Requirements

a. Provide one (as a one-way) to two traffic lanes, total roadway width 20-24 feet.
b. Provide 6 foot-wide minimum sidewalk on at least one side.
c. Provide driveways or parking lot entries a minimum of 50 feet apart and align on opposite sides of the road when possible.
d. Carts (EZ-Go's) may be used for short distances within technical areas. Cart parking should be provided to serve a building or groups of buildings.

2.2.4.2 Plant Material:

a. Groundcover: Gravel mulch.
b. Provide screening (if space is available) adjacent to parking lots, service yards, trash areas, storage yards, transformers, etc.



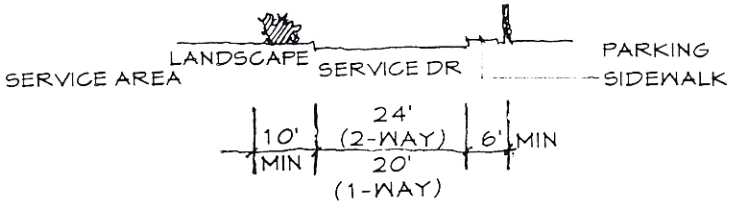


Exhibit III.a.-6
Service Drive- NTS

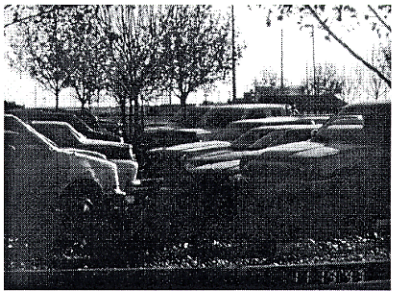
c. Other: See 11.2.1.

2.2.4.3 Signage:
D4 directional signs at intersections. See IIIc.

2.2.4.4 Lighting:
Street lighting and pedestrian. See 11.2.3.

2.2.4.5 Furniture
None.

3. Parking Lots



Smaller, interconnected landscaped parking lots.

...will replace very large non-landscaped parking lots.

See Exhibit III.a.-8 for an illustration of Parking Lots.

3.1 Introduction/Goals

The general intent of the parking lot guidelines is to:

- Locate employee parking lots on the periphery of limited access areas to reduce vehicular traffic within the technical areas and to prevent vehicle/pedestrian conflict.
- Provide landscaping at on-grade lots to mitigate heat and glare.
- Provide buffer areas around parking lots for tree massing to decrease visual impact, and provide shade.

3.2 Requirements

3.2.1 Requirements

a. Parking Spaces
   Types, sizes and numbers of required parking spaces are shown on Exhibit III.a.-7.
b. One-way, 60 degree orientation parking lots are preferred.
c. Set back new parking areas a minimum of 40 feet from adjacent buildings and roadways. Locate new buildings and roadways a minimum of 40 feet from existing parking lots.
d. Provide 24-foot minimum parking lot driveway for two-way traffic. Use two 12 foot lanes with 12 foot center median at major new parking lots.
e. Provide driveways with sufficient visibility for safe entrance and exit of motorists in accordance with AASHTO guidelines for intersection visibility. Provide clear sight-lines at the driveway intersection to a view between three and eight feet above the gutter line and within a triangular area determined by projecting curb lines out points a minimum of 11 feet distant from the corner of the intersection.
f. Provide ingress and egress stack space for three cars minimum (approximately 60 feet) at lots greater than 100 total spaces.
g. Pave permanent parking areas with asphalt paving.
h. Provide concrete curbs and gutters at the

	Width - Feet	Length - Feet	Angle - Degrees	Number - Per 100 Spaces	Location
Standard Car	9	18	60		
	9	20	90		
	9	24	Parallel		
Handicapped Accessible	13	20		*	Near Entrances
EZ-GO Cart	9	6			
Motorcycle	4	8		2	
Medical	-	-		1	Near Entrances
Van*	-	-		5	Near Entrances
Car Pool	-	-		5	Near Entrances
Visitors	-	-			Near Entrances
Gov. Officials	-	-			Near Entrances
Bicycles	2	6		10	Near Entrances

Number of Parking Spaces for general building planning	.75 per	occupant or 1 per 1,000 net assignable feet whichever is greater
Bicycles:	1 per	10 occupants or 1 per 10,000 net assignable feet whichever is greater

*** Note:** *(1991 NM Building Code - this is slightly more stringent than UFAS)*

Total Spaces	1 - 25	26 - 35	36 - 50	51-100
No. of Handicapped Accessible	1	2	3	4

Total Spaces	101-300	301-500	501-800	801-1000
No. of Handicapped Accessible	8	12	16	20

Universal' accessible space is 11' x 20' plus 5' aisle. Two spaces can share aisle.

*Universal space accommodates vans and passenger vehicles.

Exhibit III.a.-7
Parking Requirements

perimeter of permanent parking areas.

i. Provide an 8-foot minimum sidewalk width within or adjacent to parking lots.

j. Carts may be used for short distances within technical areas. Cart parking will be provided to serve a building or groups of buildings with access from service roads.

k. Emergency Access
   - The minimum width of parking lot lanes and curb cuts used for fire department apparatus

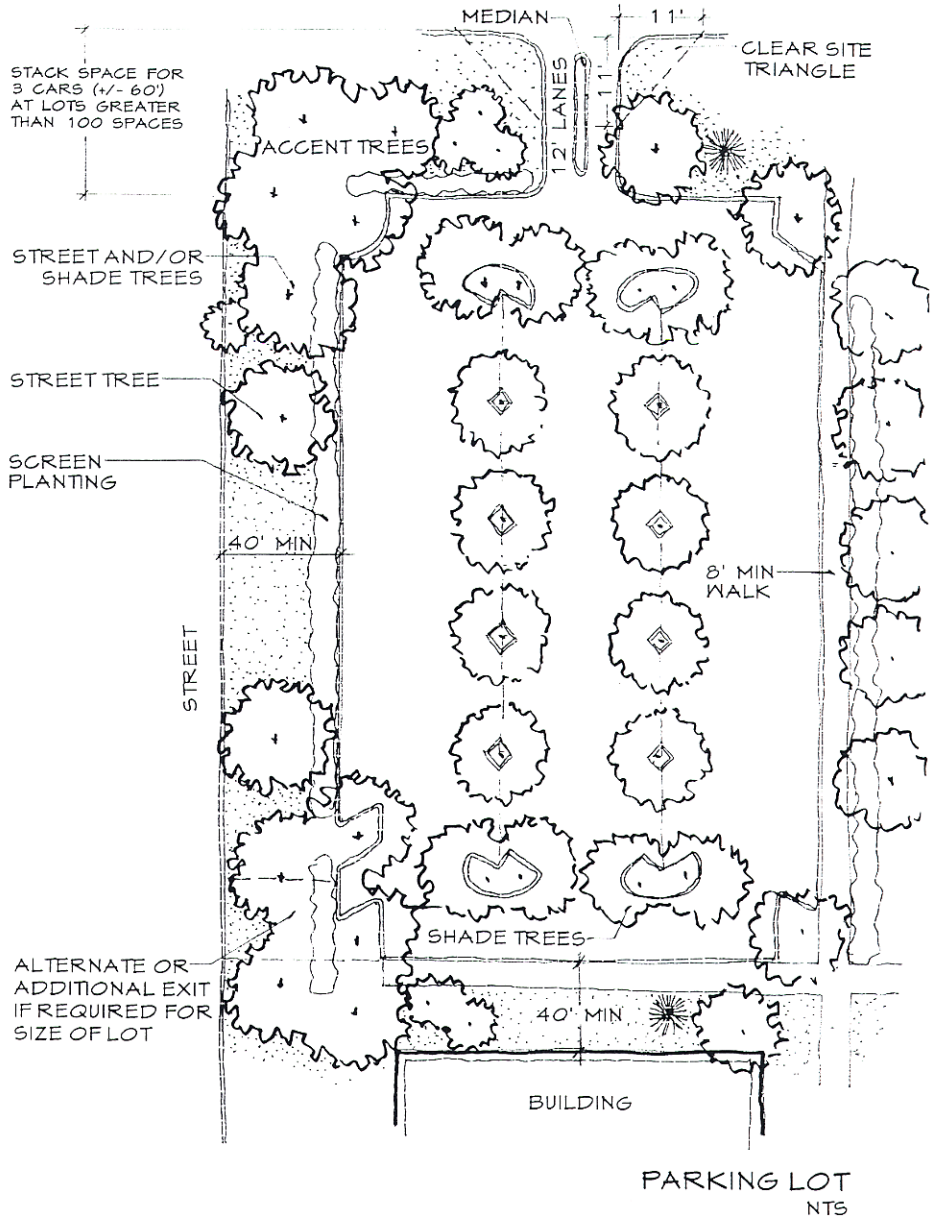


Exhibit III.a.-8
Parking Lot- NTS

access is at least 2 feet wider than secondary road or fire lane on each side of intersection.

- Provide a minimum of 20 feet clear width between rows of parked vehicles.

3.2.3 Plant Material:

a. Parking lot islands: Provide one tree for every 12 spaces.
b. Incorporate end-of-row islands a minimum of 5 feet wide in large parking areas to define vehicular circulation. Do not obstruct sight lines as defined by clear sight triangle criteria.
c. Provide 20-feet-wide minimum parking medians in new lots for every six parking rows. Landscape with recommended street trees.
d. Drain parking lots into storm sewers (wherever available). Do not drain parking lots into landscape areas, tree pits, or planters.
e. Screen parking areas from surrounding buildings and roadways with planted earth berms, trees, shrubs, and/or walls. Do not allow walls, berms, or plants in buffer areas to interfere with clear sight lines at intersections.
f. Other: See 11.2.1.

3.2.4 Signage:

D4, I3 and R1. See III.c.

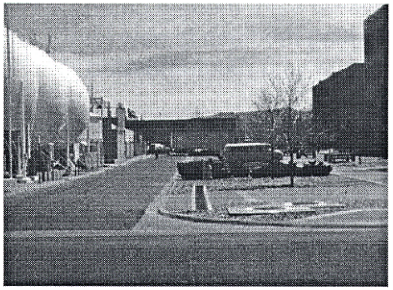
3.2.5 Lighting:

Parking lot lighting and pedestrian lighting. See 11.2.3.

3.2.6 Furniture

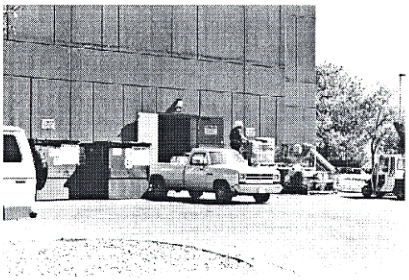
Seating, trash receptacles and shade structures at bus stops. See 11.2.4.

4. Service Access/ Emergency



Service access.

Required Fire Protection requirements are noted in the standards at appropriate sections.



Service area east of Building 821.

See Exhibit III.a.-9 for an illustration of Building Service Areas.

4.1 Introduction/Goals

Service roadways provide access to individual buildings or service areas within a tech area. The general intent of the service and emergency guidelines is to:

- Separate service and emergency traffic from other vehicular and pedestrian modes of traffic. Please note that in some cases Service/Emergency access overlaps with pedestrianways. See Section 5.
- Provide a distinct service entrance and designated service zone at the rear of each building site accessible by service, delivery, maintenance and emergency vehicles.
- Encourage shared service areas among buildings whenever practical.
- Develop and design designated pedestrian malls, service roads, etc. as "fire lanes" per NFPA 1141.

4.2 Requirements

4.2.1 Paving/Requirements

a. Locate trash container/dumpster, bottle storage, recycling bins and other service related items in designated service areas or approved side yards. Screen when visible to arterial roadways, malls and sidewalks. Use design criteria for trash enclosures.
   1. 142 square feet minimum
   2. Solid masonry walls, a minimum of 5 feet high, finished to be compatible to adjacent buildings.
   3. Bollards to protect wall

b. Provide service access to building a minimum of 12 feet wide with appropriate dock or turnaround for vehicles anticipated. Do not locate service access next to main entries.

c. Accommodate fire apparatus access, positioning and turnaround per NFPA 1141 as modified by the City of Albuquerque and SNL Department 7734.

d. Emergency vehicles and service/trash vehicles may share the same roadway.

e. Provide 20-foot-wide minimum emergency access to buildings.

Each building site should have designated areas (as appropriate) for:

- ✓ Waste
  - sanitary waste
  - chemical waste
  - rad waste
  - recyclables
- Delivery
- ✓ - delivery (material, supplies)
  - property reapplication
- ✓ Tank farms
  - LN2, O2, Ar, H2 tanks
  - gas bottle storage
- ✓ Building Infrastructure
  - sub-stations/transformers
  - storage sheds
  - satellite dishes
  - cooling towers
- ✓ People
  - smoking

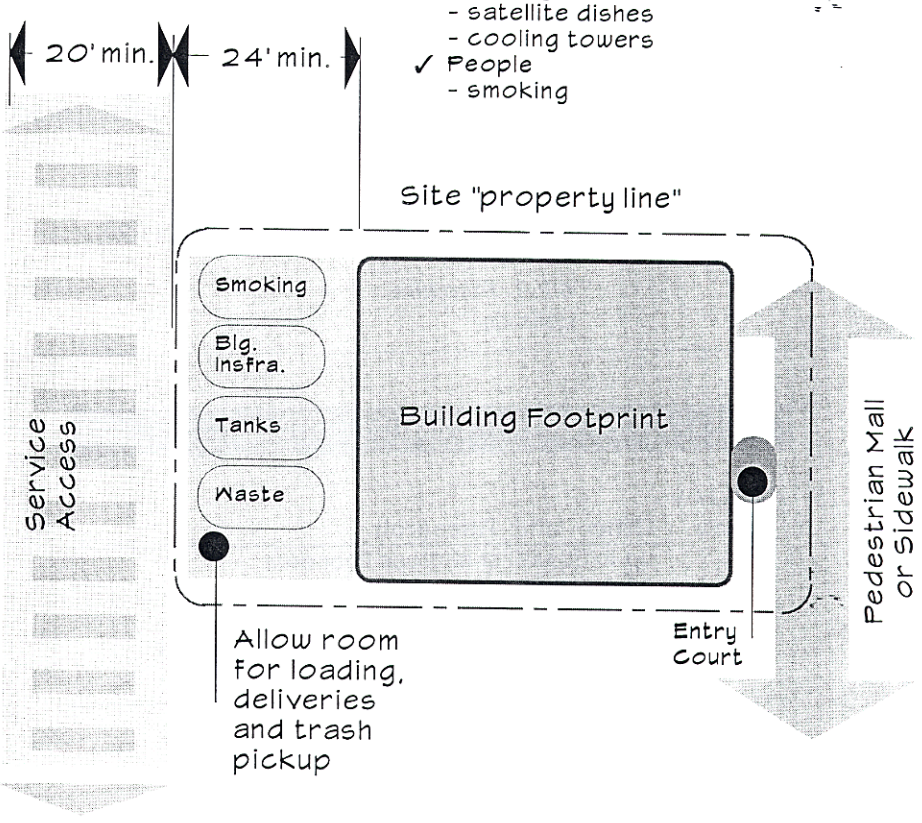


Exhibit III.a.-9
Building Service Areas

f. Provide a 16 foot minimum vertical clearance above emergency access routes.
g. Design turning radii per AASHTO criteria for vehicles anticipated.
h. Provide off-street loading spaces as per Exhibit III.a.-10.

4.2.3 Plant Material:
a. Street trees as practical (at 50' on-center).
b. Groundcover: Gravel mulch.
c. Provide screening (if space is available) adjacent to parking lots, service yards, trash areas, storage yards, transformers, etc.
d. See 11.2.1.

4.2.4 Signage:
D4 directional signs at intersections consistent with KAFB traffic control signals. See III.c.

4.2.5 Lighting:
Street lighting and pedestrian. See 11.2.3.

4.2.6 Furniture
Bollards.

Off-Street Loading Spaces

# of Vehicle Spaces	**Office and Research**
1	up to 30,000 sf of gross floor area
2	30,000 to 100,000 sf of gross floor area
1	each additonal 100,000 sf to 500,000 sf
1	each additional 200,000 sf over 500,000 sf
	Industrial
1	up to 30,000 sf of gross floor area
2	30,000 to 50,000 sf of gross floor area
3	50,000 to 100,000 of gross floor area
1	each additonal 100,000 sf or fraction thereof

Exhibit III.a.-10
Off-Street Loading Spaces

f. Provide a 16 foot minimum vertical clearance above emergency access routes.
g. Design turning radii per AASHTO criteria for vehicles anticipated.
h. Provide off-street loading spaces as per Exhibit III.a.-10.

4.2.3 Plant Material:
a. Street trees as practical (at 50' on-center).
b. Groundcover: Gravel mulch.
c. Provide screening (if space is available) adjacent to parking lots, service yards, trash areas, storage yards, transformers, etc.
d. See 11.2.1.

4.2.4 Signage:
D4 directional signs at intersections consistent with KAFB traffic control signals. See III.c.

4.2.5 Lighting:
Street lighting and pedestrian. See 11.2.3.

4.2.6 Furniture
Bollards.

Off-Street Loading Spaces

# of Vehicle Spaces	**Office and Research**
1	up to 30,000 sf of gross floor area
2	30,000 to 100,000 sf of gross floor area
1	each additonal 100,000 sf to 500,000 sf
1	each additional 200,000 sf over 500,000 sf
	Industrial
1	up to 30,000 sf of gross floor area
2	30,000 to 50,000 sf of gross floor area
3	50,000 to 100,000 of gross floor area
1	each additonal 100,000 sf or fraction thereof

Exhibit III.a.-10
Off-Street Loading Spaces

5. Pedestrian Malls and Sidewalks

The 11th Street mall is an excellent example of a pedestrian mall.

Major mechanical and electrical equipment should be screened from pedestrian malls and sidewalks.

See Exhibit III.a.-11 for an illustration of Pedestrian Malls.

5.1 Introduction/Goals

Pedestrian malls and sidewalks are the major pedestrian pathways within Tech Area I. The general intent of the Pedestrian Mall and sidewalk guidelines are to:

- Encourage pedestrian access to all facilities.
- Provide a safe, pleasant and accessible pedestrian route of travel within Tech Area I.
- Separate, as practical, pedestrian traffic from vehicular modes of travel.
- Accommodate emergency, security and maintenance vehicle access.

5.2 Requirements

5.2.1 Paving/Requirements

a. Provide a minimum width of 36' for major pedestrian malls.
b. Provide a minimum width of 12' for major pedestrian sidewalks and 6' for secondary sidewalks.
c. Pedestrian sidewalks (secondary) should be a minimum of 6 feet wide and accessible to the disabled per UFAS and ADA guidelines.
d. Separate and clearly mark pedestrian and bicycle paths. Provide bicycle dismount areas where necessary to ensure pedestrian safety.
e. Separate pedestrian paths and vehicular roads with bollards or guardrails at congestion points, e.g., at security gates. Provide accessible pedestrian access at congestion points per ADA and UFAS.
f. Design guardrails, ramps, handrails, and stairs per UFAS, ADA, and UBC.
g. Emergency / Fire Lanes
    - Where walking malls are used to meet the requirement of fire department apparatus access, they shall be considered to be fire lanes (Minimum width of 20 feet) and designed accordingly.
    - Provide at least 16 foot vertical (overhead) clearance to wires, overpasses guard-gate canopies, tree limbs, etc. in fire lane.
    - Provide gates with break-away locks, or break-away plastic bollards (posts) as barriers

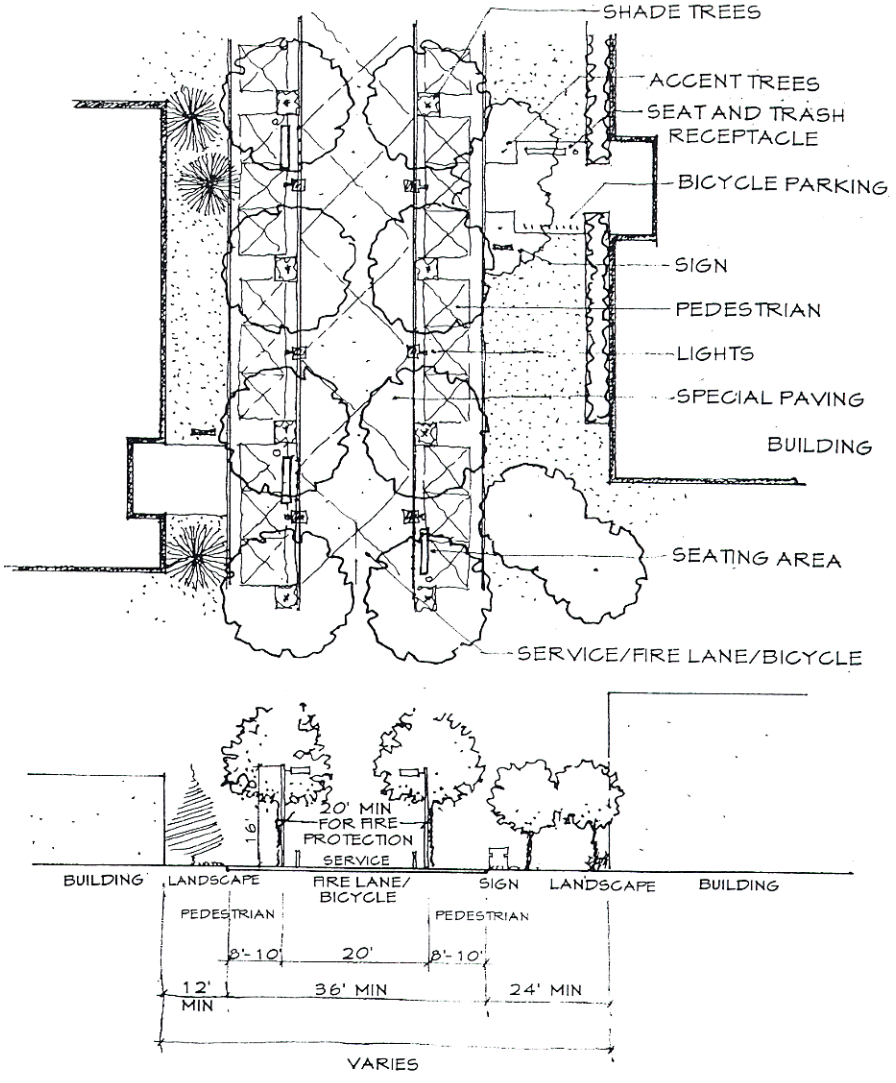


Exhibit III.a.-11
Major Mall- NTS

across any vehicular access, as required.

- Trees, landscaping structures, etc. shall be installed and maintained to allow passage of largest fire apparatus.
- Allow a minimum of 10 feet and not more than 50 feet fire lane to adjacent structures.

5.2.2 Plant Material:

a. Provide shade trees at 16-25' on-center with accent trees.
b. Groundcover: rock or bark mulch, grass and shrubs.
c. Other: See 11.2.1.

5.2.3 Signage:

Provide D5 directional signs. See III.c.

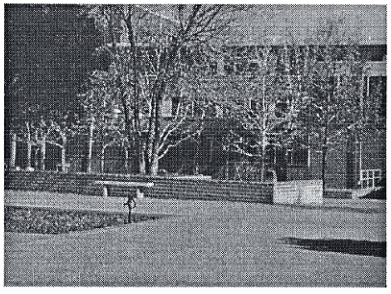
5.2.4 Lighting:

Provide Street lighting and pedestrian. See 11.2.3.

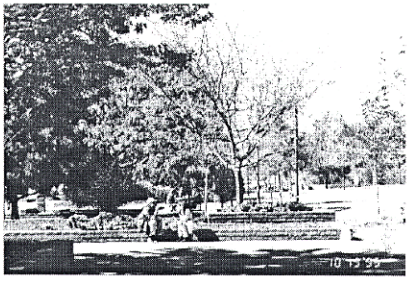
5.2.5 Furniture

Provide seating, tables and trash receptacles. See 11.2.4.

6. Pedestrian Plazas



Pedestrian plaza at the Technical Library.



Pedestrian plaza north of Building 880.

See Exhibit III.a.-12 for an illustration of Pedestrian Plazas.

6.1 Introduction/Goals

Pedestrian plazas are outdoor spaces located at or near major buildings or the intersection of pedestrian malls. The general intent of the Pedestrian Plaza guidelines is to:

- To provide a safe and pleasant outdoor area for informal and formal events as well as casual interaction.
- Provide a visual focal point for site development.
- Accommodate emergency, security and maintenance vehicle access.

6.2 Requirements

6.2.1 Paving/Requirements

a. Size and location of plaza areas vary. Illustrations show major and minor plazas.
b. Design guardrails, ramps, handrails, and stairs per UFAS, ADA, and UBC.
c. Special pavers should be used to provide visual focus.
d. Consider use of fountains, amphitheaters, special seating, plantings and shade structures to differentiate plaza areas.
e. Emergency / Fire Lanes
   - Where pedestrian plazas are used to meet the requirement of fire department apparatus access, they shall be considered to be fire lanes (Minimum width of 20 feet) and designed accordingly.
   - Provide at least 16 foot vertical (overhead) clearance to wires, overpasses guard-gate canopies, tree limbs, etc. in fire lane.
   - Barriers across access, if any, to be gates with break-away locks, or break-away plastic bollards (posts).
   - Trees, landscaping structures, etc. shall be selected, installed and maintained to allow passage of largest fire apparatus.
   - Allow a minimum of 10 feet and not more than 50 feet fire lane to adjacent structures.

6.2.2 Plant Material:

a. Street trees, shade trees and accent trees.
b. Groundcover: Gravel or bark mulch and shrubs.
c. Other: See 11.2.1.

6.2.3 Signage:

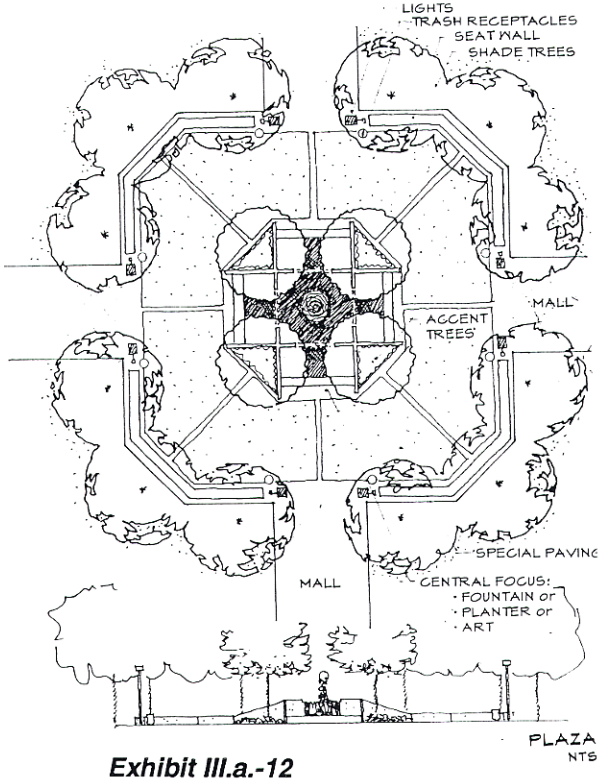
Provide D5 directional signs . See III.c.

6.2.4 Lighting:

Provide pedestrian lighting. See 11.2.3.

6.2.5 Furniture

Provide seating, tables, trash receptacles, kiosks and shade structures. See 11.2.4.



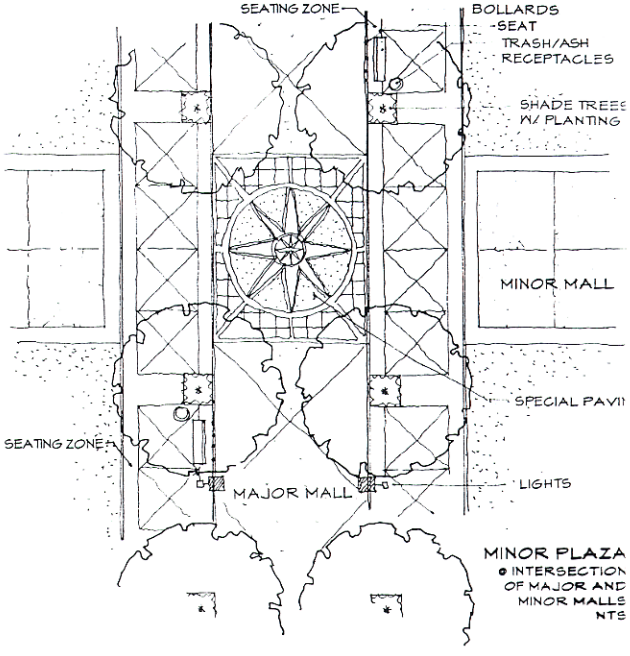
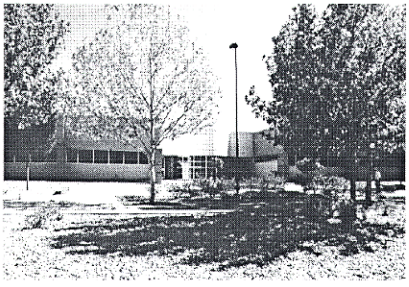


Exhibit III.a.-12
Plazas - NTS

7. Building Entry Courts



Examples of building Entry courts.

See Exhibit III.a.-13 for an illustration of Building Entry Courts.

7.1 Introduction/Goals

Building Entry Courts provide the link between individual building design and site design. The general intent of the Building Entry Court guidelines is to:

- Connect a permanent building entrance to the adjacent pedestrian malls, sidewalks and parking.
- Provide pedestrian amenities such as seating, tables, shade etc.
- Provide an area to park bicycles.
- Provide an area for clear building identification.
- Accommodate emergency, security and maintenance vehicle access.

7.2 Requirements

7.2.1 Paving/Requirements

a. Provide minimum width of 12 feet and a minimum setback of 24 feet.
b. See 11.2.2 for paving guidelines.

7.2.2 Plant Material:

a. Accent trees
b. Groundcovers: Rock mulch and shrubs.
c. See 9.2.2.

7.2.3 Signage:

Provide I-2 building identification signs. See III.c.

7.2.4 Lighting:

Provide street lighting and pedestrian. See 11.2.3.

7.2.5 Furniture

Provide seating, trash receptacles and bicycle racks at Entry Courts. Consider trash receptacles and bicycle racks at other major entry points. See 11.2.4.

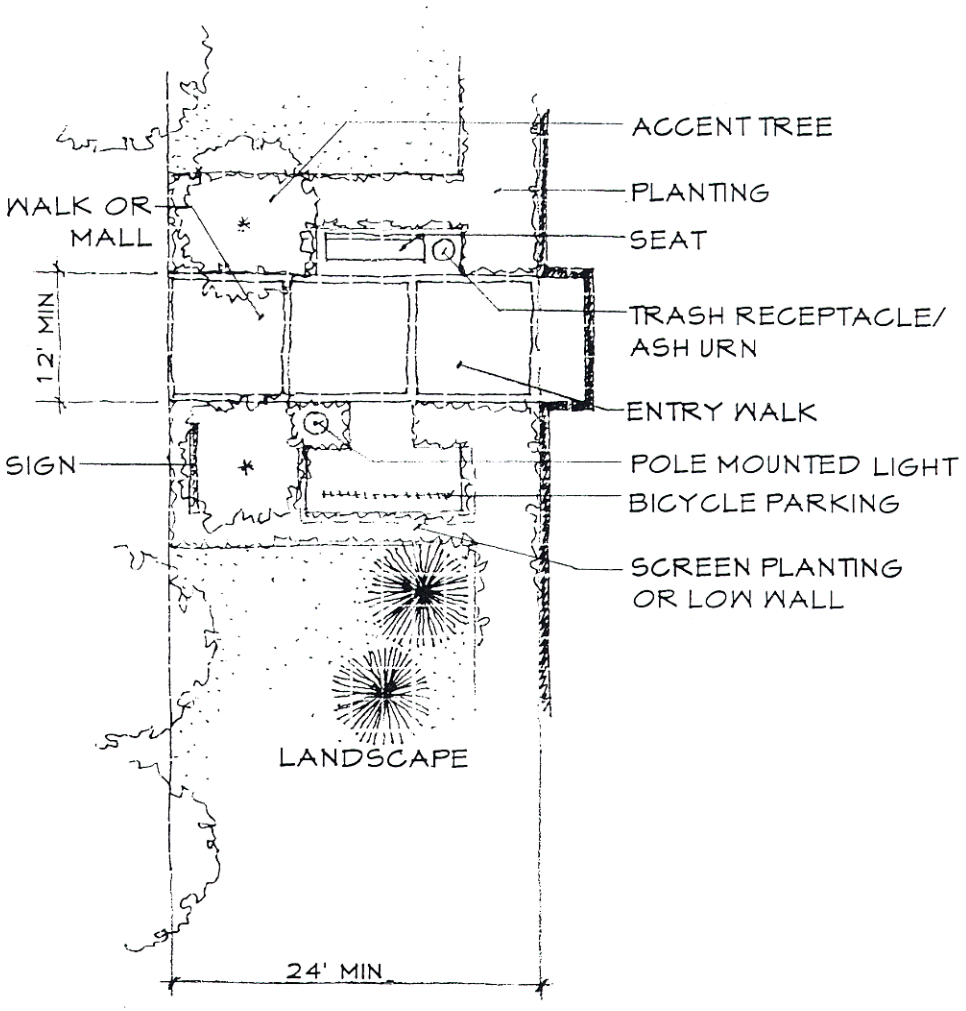
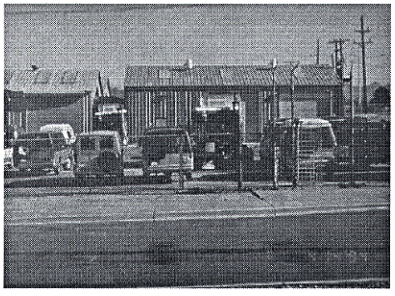


Exhibit III.a.-13
Building Entry Court - NTS

8. Fences / Screens / Gates

Perimeter security will be designed to minimize the 'keep out' visual impact.



Perimeter security will also be redesigned to support a pedestrian-oriented environment.

Landscaping may be provided in juxtaposition to limited access area perimeter fencing on the limited access area side of the fence.

8.1 Introduction/Goals

There are four types of fencing/screening at SNL, New Mexico:

- Limited access (secured or classified)
- Assets protection
- Visual
- Safety / hazardous.

The first two types of fencing are considered security fencing. Security fencing keeps the site secure from intruders and must be easily patrolled and maintained. The third type of fencing is used to screen visually poor areas. The last type of fencing is to protect personnel from hazards.

8.2 Requirements

8.2.1 Requirements

a. Preferences for fences, screening and gates per type of use are shown on Exhibit III.a.-14.
b. Design limited access area fences of chain link or an approved alternative a minimum of 8 feet high. Maintain a twenty-foot clear zone on the unsecured side of the fence for surveillance.
c. In areas of low to moderate visual prominence, provide tech area fences with 3-strand, 12-inch minimum barbed wire topping.
d. In areas of moderate to high visibility, provide vertical steel rail fencing, masonry or concrete walls.
e. Encourage the use of alternate security fencing such as masonry walls or metal railing instead of chain link fencing at major pedestrian gateways to provide a more welcoming atmosphere.
f. Gate Design
    1. Gate design should match the style of adjacent fences walls or buildings. Use of chain link gates are discouraged except when part of a chain link fence.
    2. Metal, plastic or wood slats will not be permitted in existing chain link fences.
    3. Gates at service (trash, storage, etc.) area are to be a minimum of 33% opaque.
    4. Gates at security areas are not to be opaque.

5. All gates are to be of steel manufacture.

g. Whenever Tech Area boundaries are modified, new fence, screening and wall guidelines apply.

h. Integrate fencing around visually prominent site areas with buildings. Design walls to match building colors and textures, and/or use buildings as part of the security perimeter.

i. Design screen walls similar in style to existing materials. Screen wall heights depend on items to be screened.

	Security*	Visual: Screen Walls	Visual: Edges/Visual Buffers	Safety: Safety / Buffers
More ↓ Preference ↓ Less	1. Building Envelope 2. Walls (8' min. height) a. Masonry b. Concrete 3. Fences (8' min. height) a. Welded Wire Fabric b. Chain Link 4. Gates (8' min. height) a. Limited Access Chain Link/Motor Driven b. Asset Protection Steel Chain Link	1. Walls a. Masonry b. Concrete 2. Gates Steel-Opaque	1. View Corridors 2. Open Spaces 3. Berms	1. Land Use 2. Fences / Gates (8' min. height) a. Welded Wire Fabric (in Tech Areas I, IV) b. Chain Link (in Tech Area III, V) 3. Building Envelopes

*Limited Access and Asset Protection

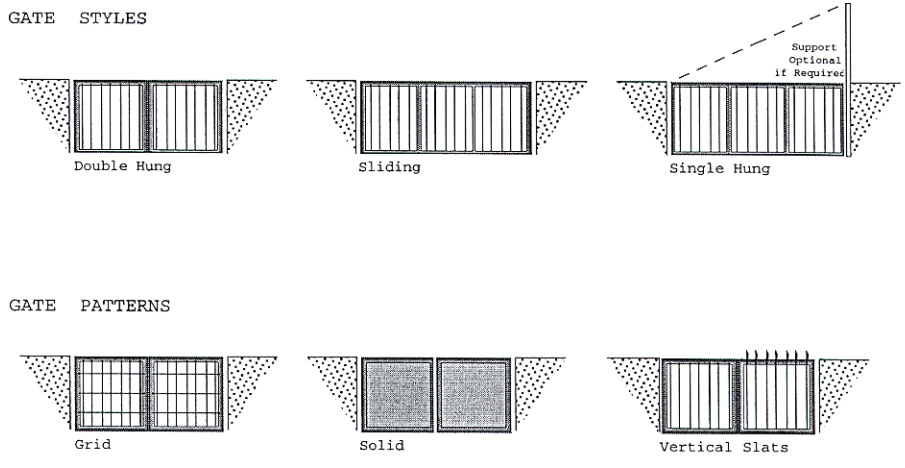
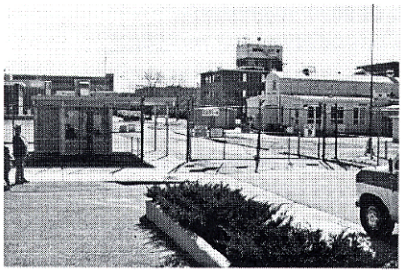
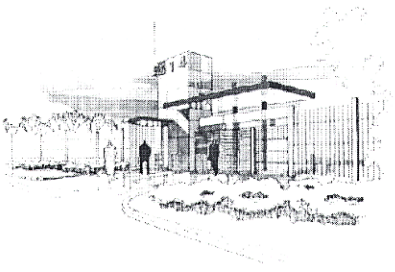


Exhibit III.a.-14.
Fencing, Screening and Gates Preferences



Existing gates will be upgraded...



...to improve sense of arrival.

j. Locate fencing to allow fire department access and fire hose placement.
k. Use screening to mitigate areas of poor visual quality while maintaining security needs. Plant materials can also be utilized for screening.
l. Screen storage yards, maintenance yards, delivery areas, outside testing and equipment storage areas, and building mechanical system equipment.
m. Equipment screens should be designed to provide ventilation to equipment.

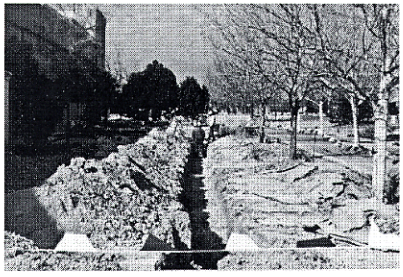
8.2.2 Plant Material:
a. Varies based on use.
b. See 11.2.1.

8.2.3 Signage:
Provide R1, R2, R3 regulatory signage. See III.c.

8.2.4 Lighting:
Provide as per DOE and Security requirements. See 11.2.3.

8.2.5 Furniture
Not applicable.

9. Utility Corridors



Landscaping must be integrated into utility corridors to allow access for repair or replacement.

9.1 Introduction/Goals

The intent of the Utility Corridor Guidelines is to:

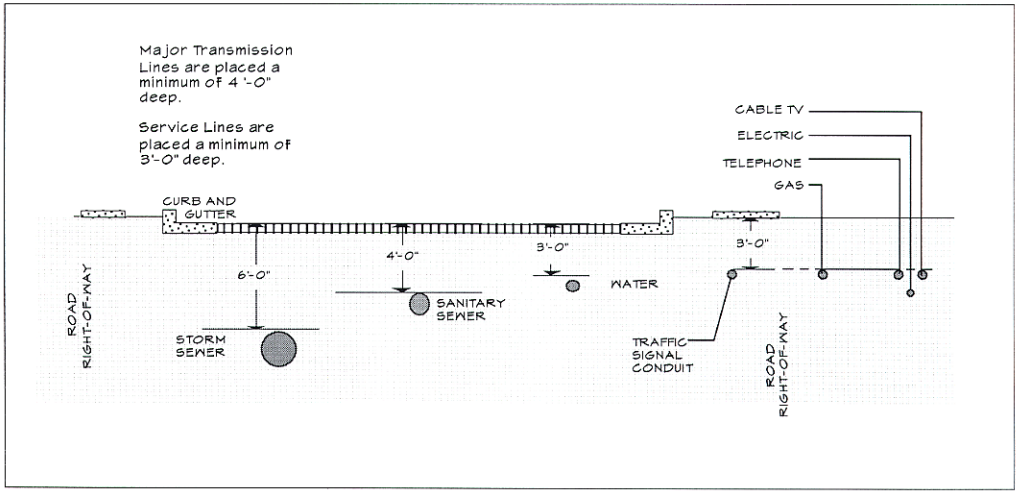
- Integrate utility development with future building siting.
- Promote an organized system of utility line location that anticipates and allows access for maintenance and periodic update and replacement.
- Decrease visual clutter by encouraging underground utility placement.
- Integrate with roads and pedestrianways whenever practical.

9.2 Requirements

9.2.1 Requirements/Paving

a. Utilities should follow designated underground utility corridors whenever possible. Generally, these trenches follow road alignments except where existing utility distribution make it impractical.
b. Where possible, utilities should share common trenches.
c. Utilities should be placed in the corridor in a predetermined underground order, both horizontally and vertically.
d. Paving material should allow easy access and be easily replaced.
e. Utility corridors should avoid landscaped areas.

Exhibit III.a.-15
Utilities Corridor - NTS



9.2.2 Plant Material:

a. See Roadways and service drive requirements. Planting material should be selected to avoid overhead utility lines and roots that may interfere with access and maintenance of utility lines.
b. Other: See 11.2.1.

9.2.3 Signage:

R4. See III.c.

9.2.4 Lighting:-

Provide as per Roadway requirements. See 11.2.3.

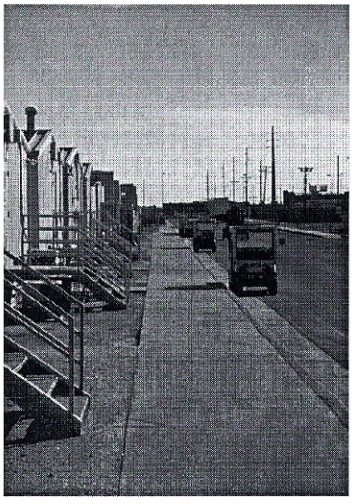
9.2.5 Furniture

Not applicable

10. Building Sites

10.1 Introduction/Goals

The intent of the Building Site guidelines is to promote building planning that is integrated and harmonious with site development guidelines. Building site guidelines provide for both permanent and temporary buildings.



Building site guidelines promote better integration of Mobile Offices and Transportables into overall site development.

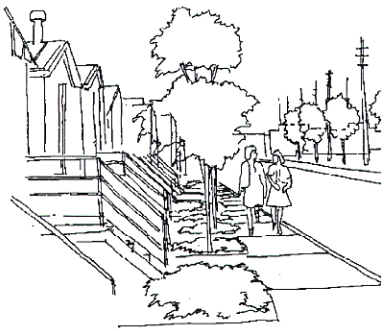
- **Permanent building sites** accommodate buildings that are major capital investments and are intended to last more than 30 years.
- **Temporary buildings** including Mobile Offices (MO's) and Transportables (T Buildings) are intended to serve a short-term use and may be moved to a variety of sites during their useful life. In general, acquisition and continued use of temporary buildings is discouraged.

10.2 Requirements

10.2.1 Requirements

a. Permanent Buildings
   1. Permanent building placement will follow setbacks from the street and other buildings as guided by regulatory and safety requirements and this document.
   2. Permanent buildings will be connected to pedestrian malls and pathways by an entry court (see 7. Entry Courts).

b. Portable Buildings
   1. Portables will be located in areas zoned for their use as identified in the District Zoning Plan.
   2. Portable building placement will follow the minimum distances as shown on Exhibit III.a.-16.
   3. Linking portable structures together is encouraged whenever site and program permits.
   4. Provide a minimum of 6 foot pathway from the sidewalk to the portable structure.
   5. Provide an ADA accessible access to each portable structure or groups of structures as appropriate.
   6. Groups of portable buildings will be sited to



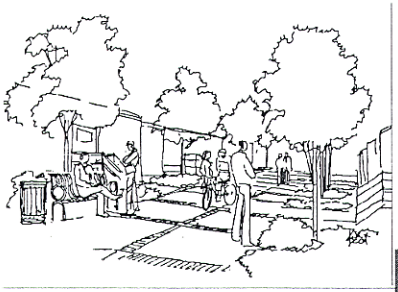
See Exhibit III.a.-16 for Building Site illustration.

allow sufficient space to create interior courtyards and pedestrian pathways that link to nearby sidewalks and / or malls (see 10.2.2 Plant Material).

c. Accessory and Storage Buildings
Accessory and storage buildings (not Transportainers) will be designed to match the primary buildings that they serve.

d. Fire / Emergency Access
1. Provide at least one properly arranged access for any building.
   - At least two properly arranged ways of access for any building over 15,000 square feet ground area,
   - At least two properly arranged means of access for building over 30 feet high or three stories in height,
   - Ability to position aerial fire apparatus

Mobile Offices and Transportables can be arranged to create interior courtyards.



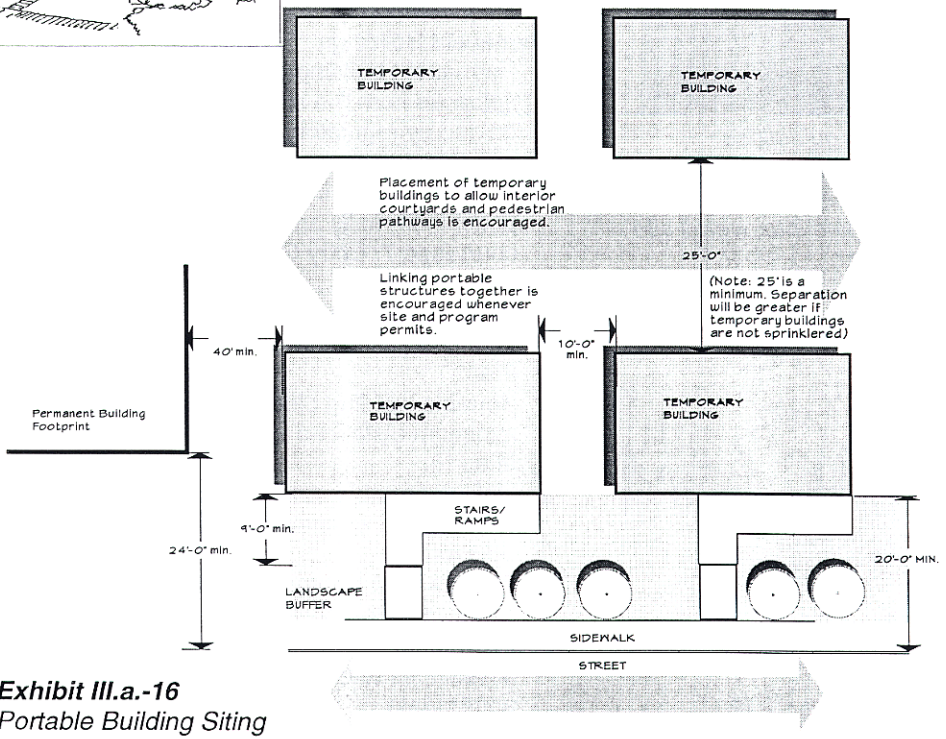


Exhibit III.a.-16
Portable Building Siting

(ladder, bucket, water-tower, etc.) for rescue operation parallel to windowed walls of four-story or high buildings, on at least one side and preferably on two sides of building.

- Trees, landscaping structures, etc. shall be selected, installed and maintained to allow passage of largest fire apparatus.

2. Provide a minimum of 10 feet and not more than 50 feet distance from road or fire lane to the building.

10.2.2 Plant Material:

a. Vacant and bare earth areas are discouraged. Development of the site with some form of plant material or pavement is encouraged.
b. Permanent Buildings
   1. Varies based on scale and location use.
   2. Emphasis is placed on landscape of pedestrian pathways, gathering areas and areas disturbed by construction.
c. Portable Buildings
   While extensive landscape development is not recommended a simple landscape buffer or simple courtyard development is encouraged at temporary buildings to humanize the overall working environment.
d. Other: See 11.2.1.

10.2.3 Signage:

Provide I2. See III.c.

10.2.4 Lighting:-

See 5. Pedestrian Malls and 7. Building Entry Courts.

10.2.5 Furniture

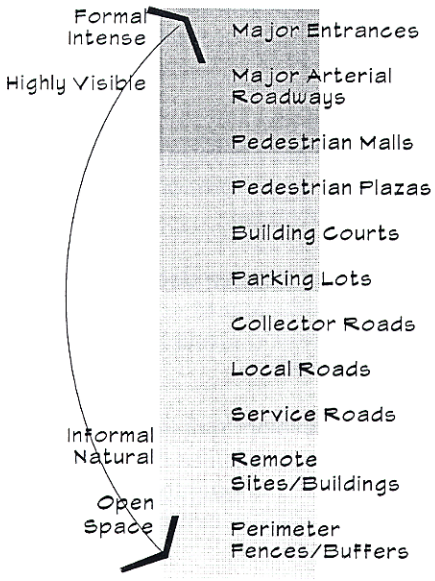
See Building Entry Courts.

11. Landscape Features

11.1 Introduction/Goals

This section provides information on site design elements with broad application including:

- Plant material
- Paving/hardscape
- Lighting
- Site Furniture



Landscape features will be applied to each site element as described in the previous sections. The overall concept will seek to provide the highest intensity and formal application to areas of greatest visibility and pedestrian use (e.g., site entrances, major roadways, pedestrian malls and plazas). Landscape features will be applied in a less intense and more natural manner in areas of less pedestrian use and visibility (e.g., collector roadways, service roads, remote perimeters).

11.2 Requirements

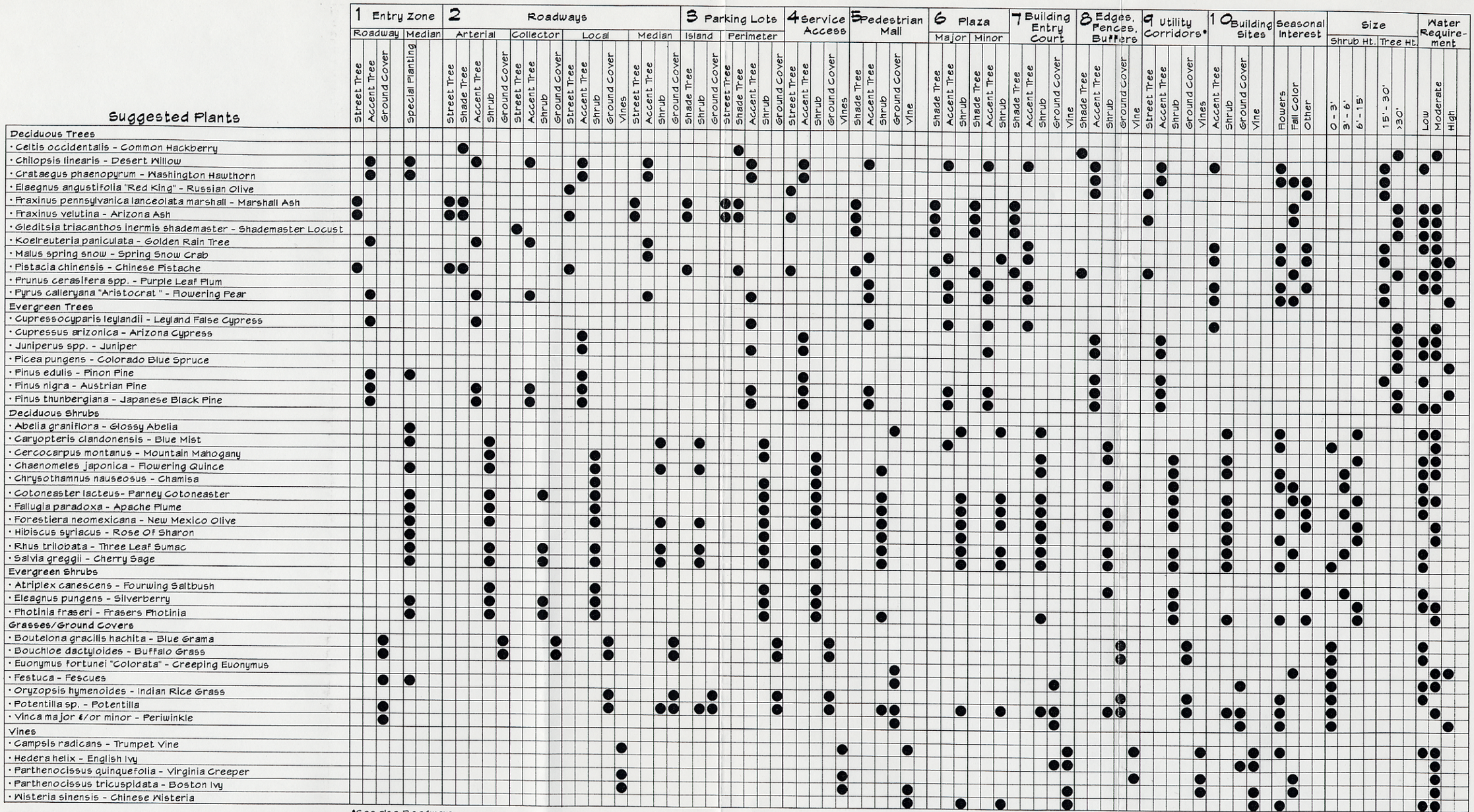
11.2.1 Plant Material

a. Plant List
   Suggested plant materials for different applications is shown on the Plant Material Matrix, Exhibit III.a.-17. A list of plants appropriate for the Albuquerque climate is provided in Appendix E. Use of low and moderate maintenance plant material is encouraged.

b. Allergies
   There are numerous ornamental and native plants within the Albuquerque area that cause allergic reactions in people. When selecting plants for future landscape improvements care should be given to minimizing the use or placement of major allergic causing plants in areas of high public use. (See Appendix E).

   Maintenance requirements at SNL will vary according to landscape zones).

   1. Formal and more dense through building courts:



*See also Roadways

Exhibit III.a.-17
Landscape Matrix

Due to the more formal and high-use nature of these areas, maintenance will be required. Maintenance will include pruning, mowing, trash removal, sweeping, fertilizing and irrigation.

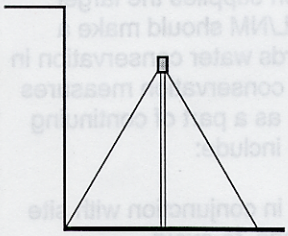
2. Informal and natural (parking lots, roads).
These areas require less maintenance due to the informal design scheme as well as the use of plants that require minimal care. Monitor irrigation systems to minimize water use, pruning, and trash removal.
3. Open Space:
These areas require low maintenance for planting in outlying areas and buffer where there will be little traffic and no formal planting. Schedule periodic clean-up, mowing of native grass, monitor bubbler heads and irrigation lines.

c. Water Conservation
Whether obtained from the City water system or from local wells, water is being drawn from the same finite resource which supplies the larger community; therefore SNL/NM should make a strong commitment towards water conservation in landscape design. Water conservation measures which can be undertaken as a part of continuing landscape improvements include:

1. Design planting plans in conjunction with site layout and grading plans, to avoid oddly-shaped or steeply-graded planting areas which are difficult to irrigate efficiently.
2. Design planting plans in conjunction with irrigation systems to recognize differing water requirements of various plants.
3. Use plants that require low to moderate water for growth and survival (see suggested plant list).
4. Minimize areas of high water use turf.

11.2.2 Paving

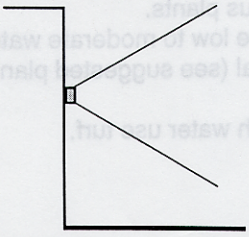
a. Hardscape includes building entry plazas, seat walls, raised planters, and paving used at walkways, outdoor spaces, and transition areas.
b. Provide paving materials that clearly differentiate between pedestrian and vehicular traffic. Visual separation cautions users that they are sharing space with other types of traffic, bus stops, building entries, and other mixed activity areas.
c. In buffer and natural areas use asphalt or crusher fines paths where there is a high amount of pedestrian use.
d. In remote or temporary use areas, use asphalt paths or crusher fines for pedestrian circulation.
e. Use interlocking concrete pavers in areas where frequent utility access is anticipated.
f. Provide handicap access as an integral part of any paved surface with slopes not to exceed UFAS and ADA guidelines.
g. Design paved areas to accommodate emergency vehicle and fire department apparatus access per NFPA 1141.
h. Raised planters and seat walls may be used to emphasize and encourage the use of outdoor space and reduce required maintenance and trash removal. Raised planters may also be used to accommodate grade changes.
i. General recommendations for paving applications are shown on the Paving matrix, Exhibit III.a.-18.



Pole mounted exterior lights are preferable...

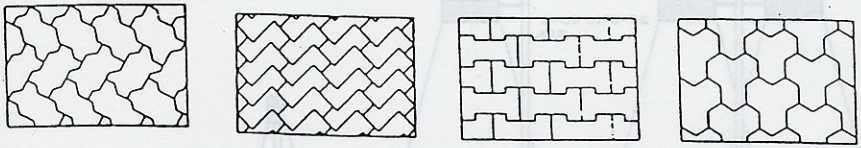
11.2.3 Lighting

a. Pole-Mounted Fixtures: 20-40 feet high in parking lots and roadways, 16 feet on walkways, on tapered round steel poles designed to withstand extreme (110 mph) wind loads. "Cut-off" type fixture (i.e., one that reflects light downward and out, rather than upward), bronze, box-type, similar to existing fixtures used in the M Street parking lot (Exhibit III.a-19)
b. Use color-corrected, high-pressure sodium lamps for exterior lighting.
c. Provide ability to turn exterior lights on/off by a central timer, photo cell and/or motion sensor.
d. Recommended lighting levels and measurement procedures are described in the *Illumination*

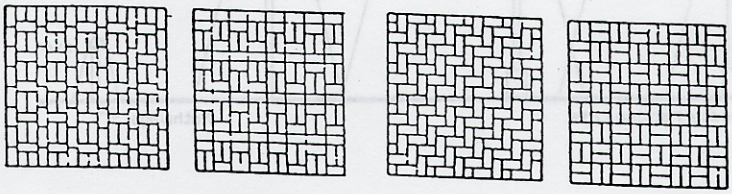


...to surface mounted exterior lights.

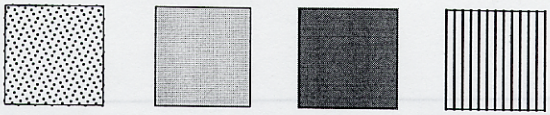
Interlocking Concrete Pavers



Masonry Pavers



Textured Concrete



Suggested Paving Materials	1 Entry Zone: Roadway	1 Entry Zone: Bike Path	1 Entry Zone: Bike Path Edge	1 Entry Zone: Walk	2 Roadways: Roadway	2 Roadways: Bike Path	2 Roadways: Bike Path Edge	2 Roadways: Walk	3 Parking Lots: Parking Area	3 Parking Lots: Walk	4 Service Access: Roadway	4 Service Access: Walk	5 Pedestrian Mall: Service/Emerg.	5 Pedestrian Mall: Walk	6 Plaza: Major: Plaza	6 Plaza: Minor: Plaza	7 Building Entry Court: Entry Paving	7 Building Entry Court: Bicycle Parking	8 Edges, Fences, Buffers: Bike Path	8 Edges, Fences, Buffers: Walk	9 Utility Corridors: Utilities	10 Building Sites
Crusher Fines			●				●		●													
Asphalt	●	●			●	●			●		●								●			
Broom Finish Concrete		●		●		●		●		●		●	●			●	●	●		●		
Exposed Aggregate				●				●					●	●		●						
Interlocking Concrete Pavers													●	●	●		●	●			●	
Concrete or Masonry Pavers													●	●	●		●	●			●	
Specialty Paving Compacted Gravel													●		●		●					

Exhibit III.a.-18
Paving Material Matrix

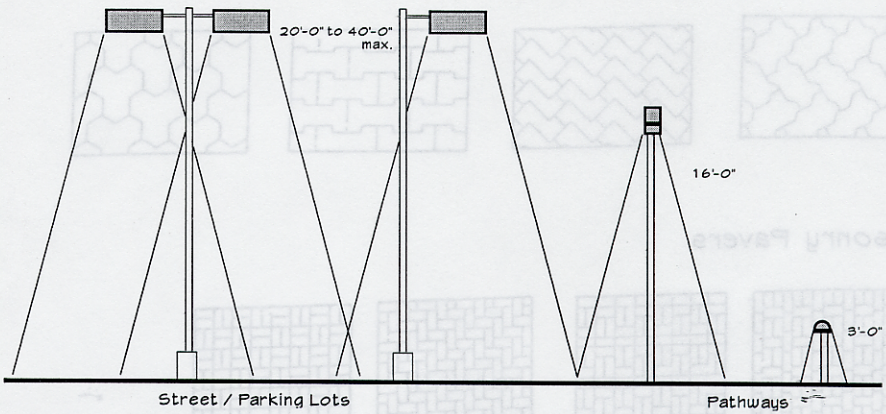


Exhibit III.a.-19
Exterior Lighting - Not to Scale

Engineers Society (IES) Manual.

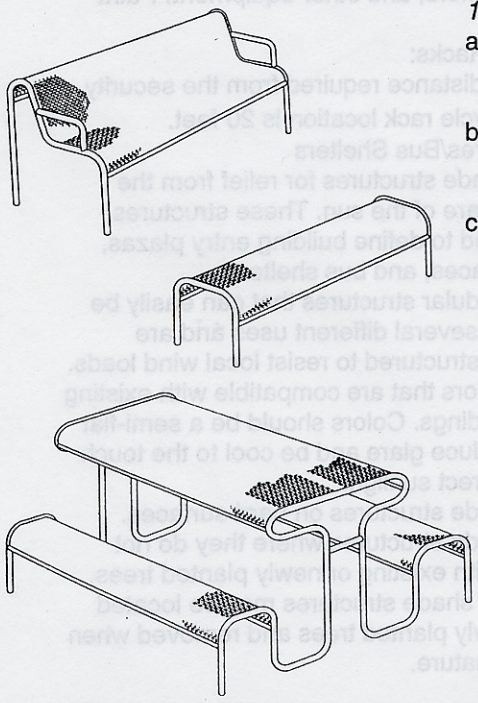
e. Lighting for building exteriors, sidewalks, parking lots and roadways are shown on Exhibit III.a-20.
f. Wall Fixtures on buildings and at entrances should be compatible with the architectural style and security requirements.
g. Use motion detectors on lights at entries with infrequent nighttime use.
h. Where lighting is provided for security reasons, coordinate lighting levels and locations with SNL security personnel and IES Handbook.
i. Use up-lighting to accent signs and other landscape features in primary areas with night use.
j. Keep light fixtures in planting areas 1 foot minimum from edge of paving. In walls or raised planters, use wall lights.

Recommended Lighting Levels*

Category	Lux	Footcandles	Notes
Building Entrances	50	5.0	Active
Sidewalks in Tech Area (average level)	22	2.0	Mounting Height 16 feet
Open Space Walkways	6	0.6	Mounting Height 16 feet
Parking Areas (Medium Activity)	6	0.6	
Major Arterial (intermediate)	15	1.4	
Local (intermediate)	6	0.6	
Service (intermediate)	4	0.4	

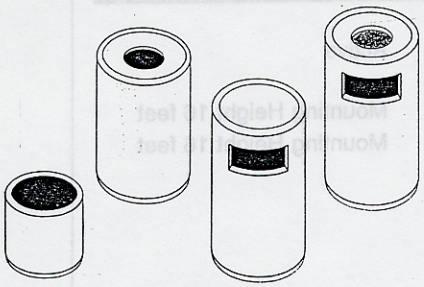
*Source: IES Lighting Handbook

Exhibit III.a-20
Lighting Levels



11.2.4 Site Furniture

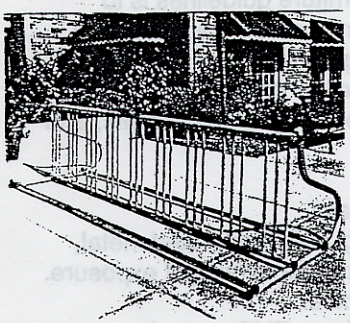
a. The intent of the site furniture guidelines is to promote a consistent and coordinated style and colors within a set geographic area
b. Locate site furniture to allow emergency and fire department access to buildings, fire hydrants, and connections.
c. Benches/Tables
   1. Standard Bench/Seats:
      6 feet minimum long, PVC perforated metal, able to withstand extreme ultraviolet exposure.
   2. Standard Picnic Tables:
      - 6 feet minimum long, PVC-coated perforated metal.
      - Provide handicap access to at least one side of tables, where possible and practical. Install tables on concrete pads with concrete walkways to general use sidewalks. Place picnic tables in shady locations wherever possible.



d. Outdoor Telephone Booths:
Locate in high public use areas, e.g., security gates. Locate in the shade and in supervisable locations. The booths are to be a standard metal and glass design, pedestal or wall mounted.

e. Ash/Trash Receptacles
Style to match tables and benches.

f. Bollards
1. PVC/Wood Bollards:
Provide PVC or wood Bollards that are removable and can break away for emergency/service vehicle access to discourage vehicular traffic on pedestrian walkways.
2. Metal Bollards:
   - Locate removable metal bollards at pedestrian entries not used for emergency access but where service access is required.
   - Use 4-inch, impact-resistant fixed metal bollards that are filled with concrete at service area, building corners, screen walls, transformers, and other equipment. Paint yellow.



g. Fixed Bicycle Racks:
The minimum distance required from the security fencing for bicycle rack location is 20 feet.

h. Shade Structures/Bus Shelters
1. Provide shade structures for relief from the heat and glare of the sun. These structures may be used to define building entry plazas, outdoor spaces, and bus shelters.
2. Specify modular structures that can easily be adapted to several different uses and are sufficiently structured to resist local wind loads.
3. Choose colors that are compatible with existing or new buildings. Colors should be a semi-flat finish to reduce glare and be cool to the touch where in direct sunlight.
4. Locate shade structures on hard surfaces.
5. Locate shade structures where they do not compete with existing or newly planted trees. Temporary shade structures may be located next to newly planted trees and removed when the trees mature.

6. Locate bus shelters at designated bus stops.
7. Locate shade structures to allow emergency vehicle access per NFPA 1141.

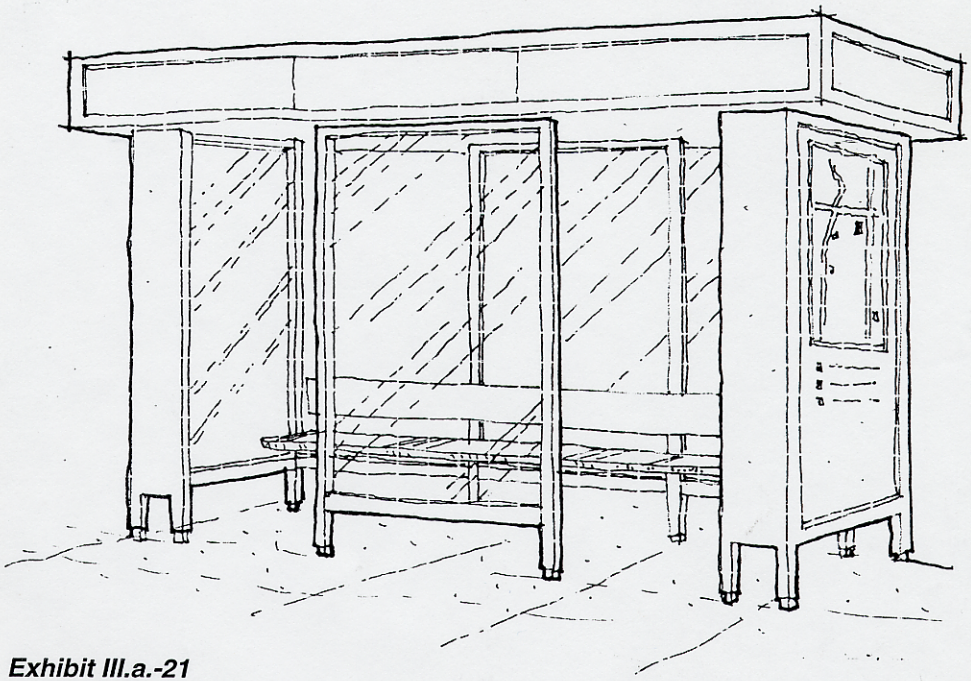


Exhibit III.a.-21
Bus Shelter

III.b.

Building Guidelines

- ✓ Building Flexibility and Future Change
  - Simple forms
  - Large Floor Plates
  - Internal Flexibility
  - Planned Expansion
- ✓ Entrance and Scale
  - Entrances
  - Pedestrian Scale
- ✓ Building Height, Roof Form and Integration
  - Height
  - Roofs
  - Integration
- ✓ Style, Proportion, Material, Color and Fenestration
  - Style
  - Proportion
  - Materials
  - Color
  - Fenestration
  - Glazing
- ✓ Response to Climate
  - Daylighting
  - Orientation

Introduction

The goals of architectural guidelines are to:

- Define a palette for future architectural design at SNL/NM.
- Provide architects and engineers guidance in solving project specific design problems.
- Provide a basis for evaluating proposed design solutions.

There is a significant diversity of architectural forms, materials and styles at SNL/NM that result from incremental planning and development over the years. Within this diversity, however, there are areas of some visual similarity.

These guidelines capitalize upon existing elements of visual continuity by promoting consistency and integration of facilities to their neighbors and within a larger framework of roadways, pedestrian areas and landscape.

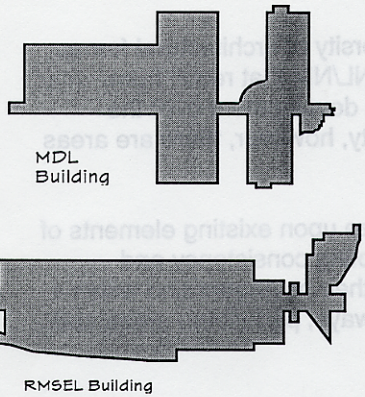
The building guidelines provide a simple system to direct future building projects by encouraging:

- consistent palette of materials and colors.
- similar building heights and roof forms.
- sensitive response to the climate.
- readily identified building entrance.
- emphasis on building flexibility and accommodation of future change.

Guidelines to achieve architectural continuity are described in the following five categories:

- Building Flexibility and Future Change
- Entrance and Scale
- Building Height, Roof Form and Integration
- Style, Proportion, Material, Color and Fenestration
- Response to Climate

1. Building Flexibility and Future Change



The simpler rectilinear forms of the Microelectronics Development Laboratory (MDL) are preferable to the more complex forms of the Robotics Manufacturing Sciences Engineering Laboratory (RMSEL)

With changing missions and the programmatic needs continually changing, the need for buildings to be flexible and accommodate change is paramount. Mechanisms for doing this include the following:

1.1. Simple Forms

Simple rectilinear forms with clear or long spans, are desired because these forms tend to accept change and growth more readily than buildings of complicated form.

1.2. Large Floor Plates

Building floor plates should be as large as practical commensurate and proportionate with land availability to facilitate horizontal organizational communication and change. (See Exhibit III.b-1).

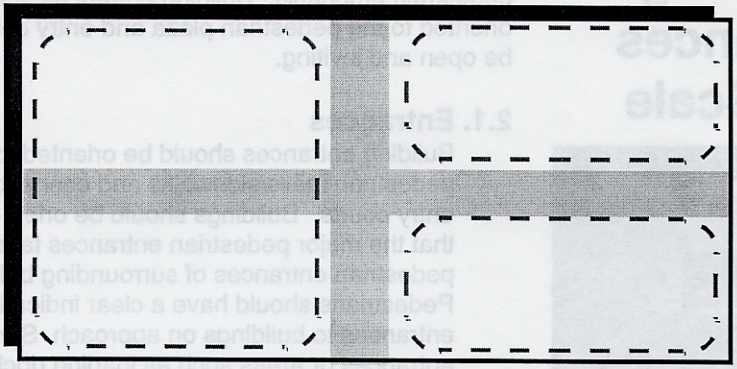
1.3. Internal Flexibility

Building systems should be designed to accommodate internal reconfiguration with minimal obstructions. Structural systems should minimize interior columns and load bearing walls, mechanical and electrical systems should minimize the number of interior vertical chases.

1.4. Planned Expansion

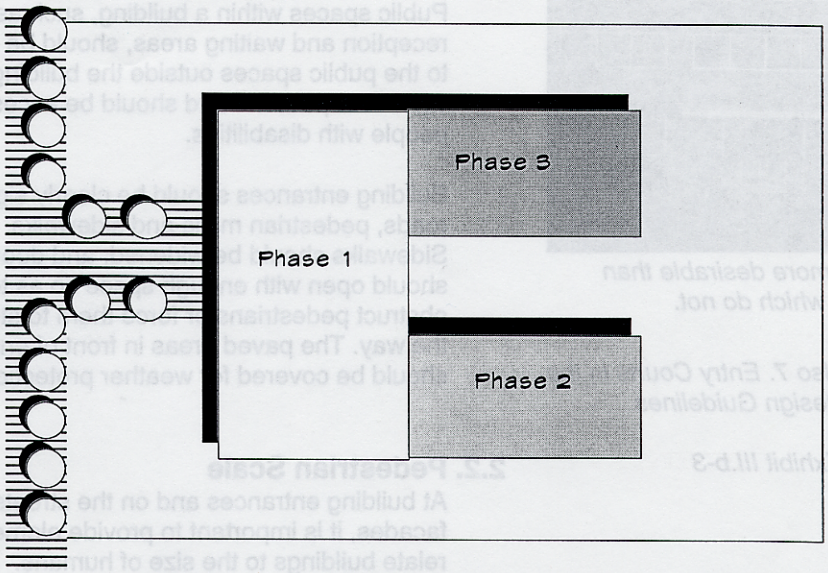
As siting permits, each future building should allow for horizontal growth. Vertical growth, by adding one or more floors, is typically more difficult and expensive to achieve due to impacts on user functions within the building, building mechanical systems, and changing structural design criteria.

Early phases should be designed as the first step to a larger aggregate of buildings. Each phase should be resolved to appear as complete (See Exhibit III.b-2).



Large floor plates with clear spans promote building flexibility

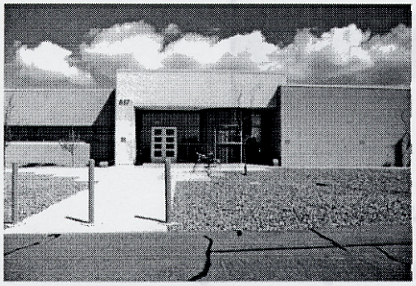
Exhibit III.b-1
Floor Plates



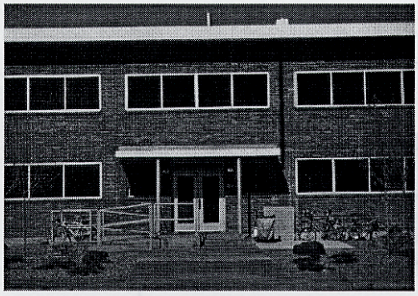
Plan each building phase so it appears to be visually complete

Exhibit III.b-2
Planned Expansion

2. Building Entrances and Scale



Building forms which reinforce the location of building entrances...



...are more desirable than forms which do not.

See also 7. Entry Courts in the Site Design Guidelines

See *Exhibit III.b-3*

The ground level of buildings should have a pedestrain emphasis. Building entrances should be oriented to the pedestrian plaza and entry court and be open and inviting.

2.1. Entrances

Building entrances should be oriented to pedestrian malls/sidewalks and connected by entry courts. Buildings should be oriented such that the major pedestrian entrances face major pedestrian entrances of surrounding buildings. Pedestrians should have a clear indication of the entrances to buildings on approach. Service entrances or areas such as loading docks face the service entrances or areas of adjacent buildings.

Entrances to buildings should be well lit and within security constraints, be transparent.

Public spaces within a building, such as reception and waiting areas, should be oriented to the public spaces outside the building whenever possible and should be accessible by people with disabilities.

Building entrances should be clearly signed from roads, pedestrian malls and sidewalks. Sidewalks should be widened, and doorways should open with enough space so as to not obstruct pedestrians or force them to step out of the way. The paved areas in front of entrances should be covered for weather protection.

2.2. Pedestrian Scale

At building entrances and on the streetscape facades, it is important to provide elements that relate buildings to the size of humans. While buildings may be up to 75 feet high, it is possible to break these larger masses to smaller elements through sensitive use of building materials, window articulation and building massing.

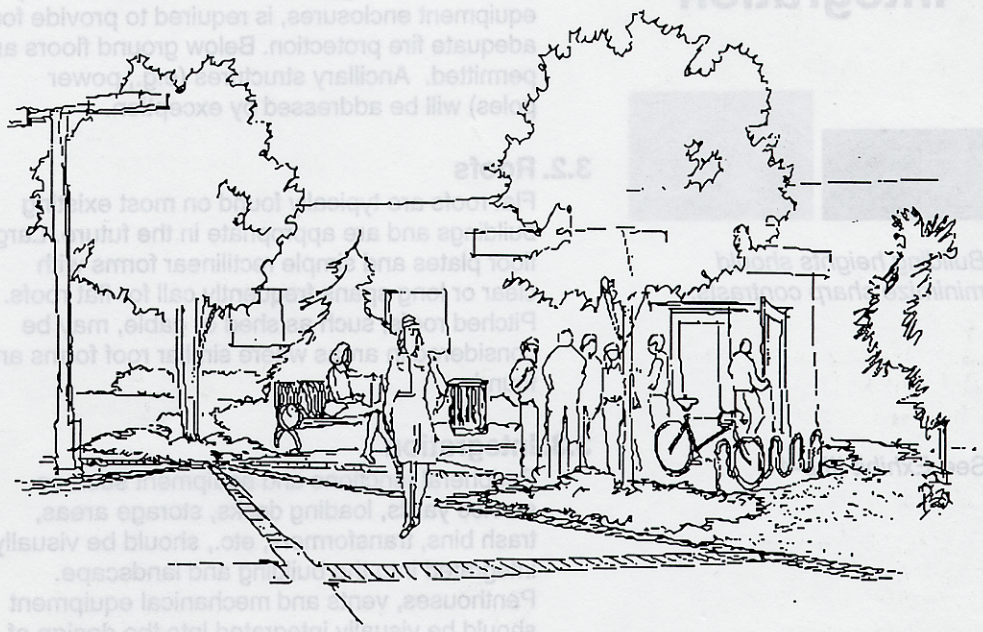
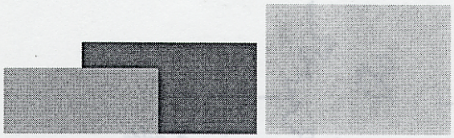


Exhibit III.b-3
Building Entrance Examples

3. Building Height, Roof Form and Integration



Building heights should minimize sharp contrasts.

See *Exhibit III.b-4*

Heights of buildings and roof forms can be used to promote an overall sense of cohesiveness of buildings. It also provides an opportunity to focus attention to certain key buildings or areas.

3.1. Building Height

A maximum allowable height of 75 feet above ground, including penthouses or other roof top equipment enclosures, is required to provide for adequate fire protection. Below ground floors are permitted. Ancillary structures (e.g., power poles) will be addressed by exception.

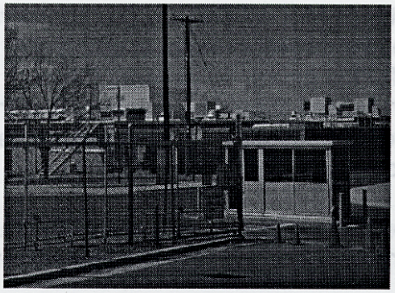
3.2. Roofs

Flat roofs are typically found on most existing buildings and are appropriate in the future. Large floor plates and simple rectilinear forms with clear or long spans frequently call for flat roofs. Pitched roofs, such as shed or gable, may be considered in areas where similar roof forms are found.

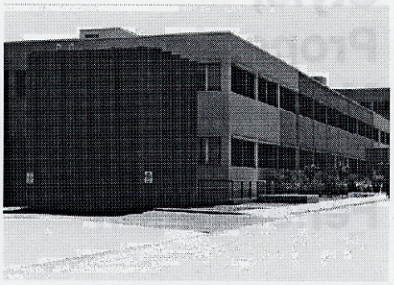
3.3. Integration

Peripheral functions and equipment such as service yards, loading docks, storage areas, trash bins, transformers, etc., should be visually integrated into the building and landscape. Penthouses, vents and mechanical equipment should be visually integrated into the design of building facades.

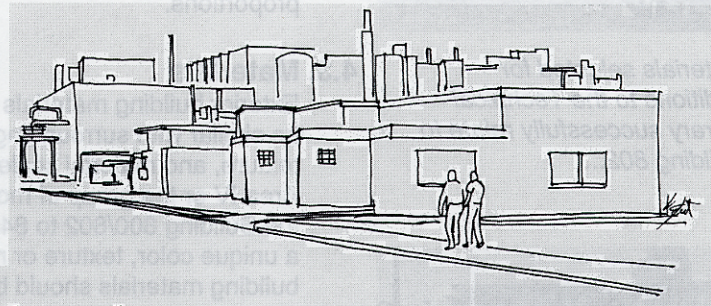
Peripheral equipment should be located along service corridors. Screen walls and landscape materials should be used to help integrate equipment into the overall site whenever practical.



Mechanical and electrical systems should be either integrated into building design...



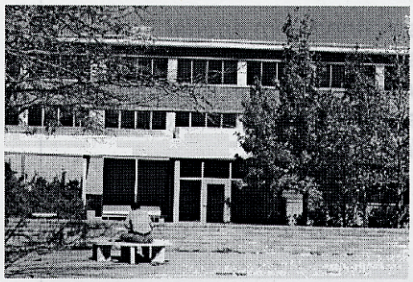
...or screened from arterial roads, pedestrian malls and major sidewalks as in the case of the cooling tower north of Building 836.



Screen walls and landscape materials should be used to help integrate equipment into the overall site whenever practical.

Exhibit III.b-4
Integration

4. Style, Proportion, Material, Color and Fenestration



Materials selected for additions to the Technical Library successfully relate to Building 802...

...while materials selected for the Employee Services Department do not.

4.1. Style

The importance of a uniform architectural style has not been stressed in the past and is not proposed for the future. In general, future architectural styles should be compatible with existing architectural styles and should express an image of 'science and technology.'

Literal expression of the pueblo and territorial architectural styles of New Mexico should not be made.

4.2. Proportion

Large floor plates and building height limits should generate building forms that are more horizontal than vertical in expression. Proportions created by massing, structure and fenestrations should reinforce horizontal proportions.

4.3. Materials

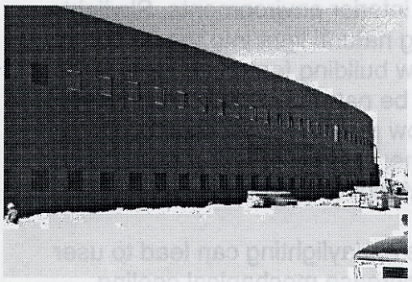
Exterior building materials should be selected to be similar with surrounding buildings in color, texture, and material scale. Locations such as Area IV or the group of mostly brick buildings in the Building 800/802 to 840 area, are defined by a unique color, texture or material scale. Similar building materials should be used in these areas.

Exterior building materials that are found on the site and may be considered in new construction include: precast concrete, poured-in-place concrete, stucco and masonry, including concrete masonry units and brick masonry.

4.4. Color

Colors should be selected to be homogeneous with surrounding buildings. Building exterior colors should be light to medium values, not dark, with hues in the pale red, gray, and beige range.

Accent colors may be used. Vivid accent colors should be confined to proportionally small surface areas.



Fenestration at Robotics Manufacturing Science Engineering Laboratory.

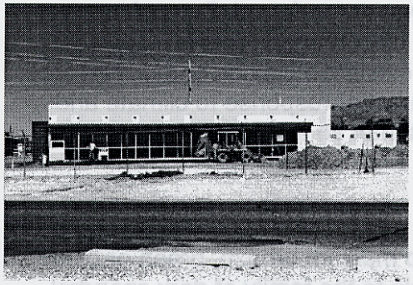
4.5. Fenestration

Opaque walls with separate or independent recessed windows are preferred. Extensive curtain walls are discouraged. This is consistent with most of the existing buildings at SNL/NM and is typically a better response to climate and energy concerns than an all-glass, curtain wall building system.

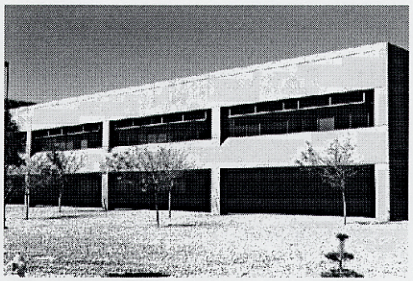
4.6. Glazing

Clear and light to medium bronze, green or blue glass is preferable to the family of dark spandrel or reflective glasses.

5. Response to Climate



Solar shade and tombe wall at the Photovoltaic System Support Laboratory.



Arcade and light shelf at the Microelectronic Development Laboratory.

5.1. Daylighting

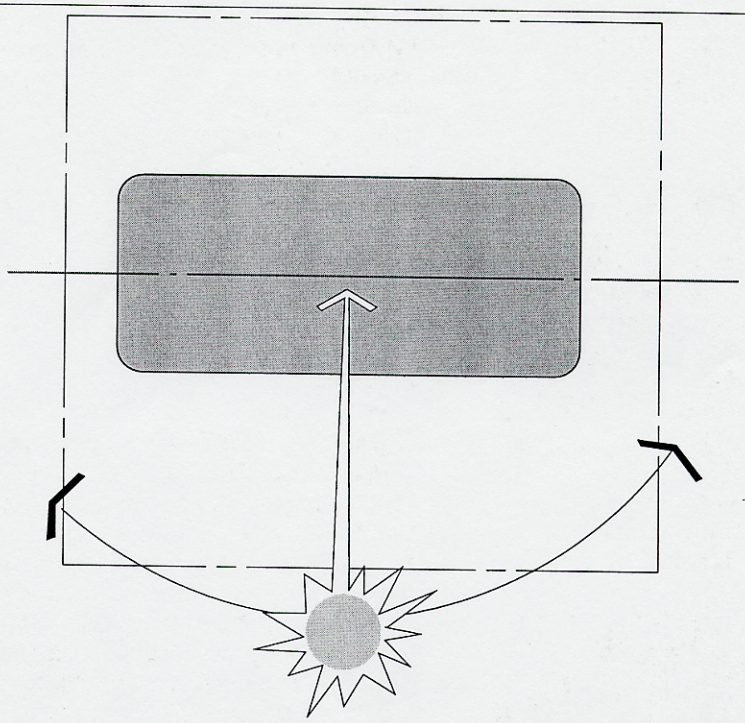
Daylighting from windows, clerestories, skylights, atriums, etc. is encouraged to reduce daytime artificial lighting and increase user satisfaction with interior environments. Skylights and atriums bring natural light into the center of a building, narrow building footprints allow more interior space to be naturally lit, windows close to the ceiling allow greater penetration of daylight and higher floor-to-ceiling glazing allow more light into interior work spaces.

Uncontrolled use of daylighting can lead to user discomfort and increase mechanical cooling requirements. Buildings should be designed to "shade themselves". Windows should have appropriate sun shading devices. Roof overhangs, recessed windows, awnings and arcades are all devices which can be used to create shade on the face of a building and reduce heat gain. Automated or user control of interior lighting, both natural or artificial, should be provided to maintain user comfort while reducing lighting energy costs.

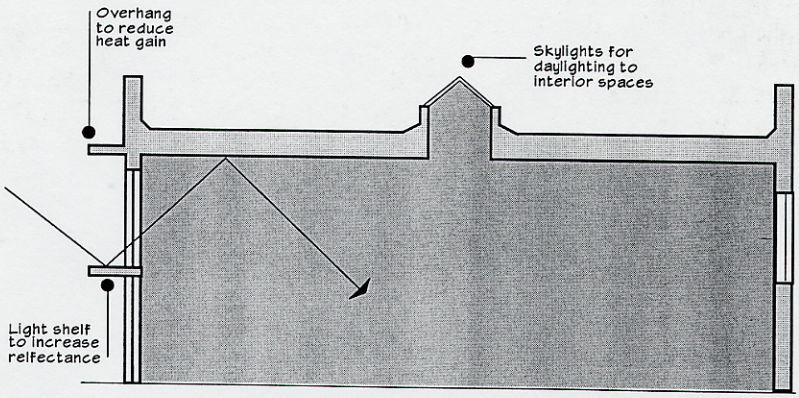
5.2. Orientation

For the Albuquerque climate, buildings oriented with the longitudinal axis of building in the east/west direction will typically have lower energy costs than buildings oriented with the longitudinal axis of building in the north/south direction.

See *Exhibit III.b-5*

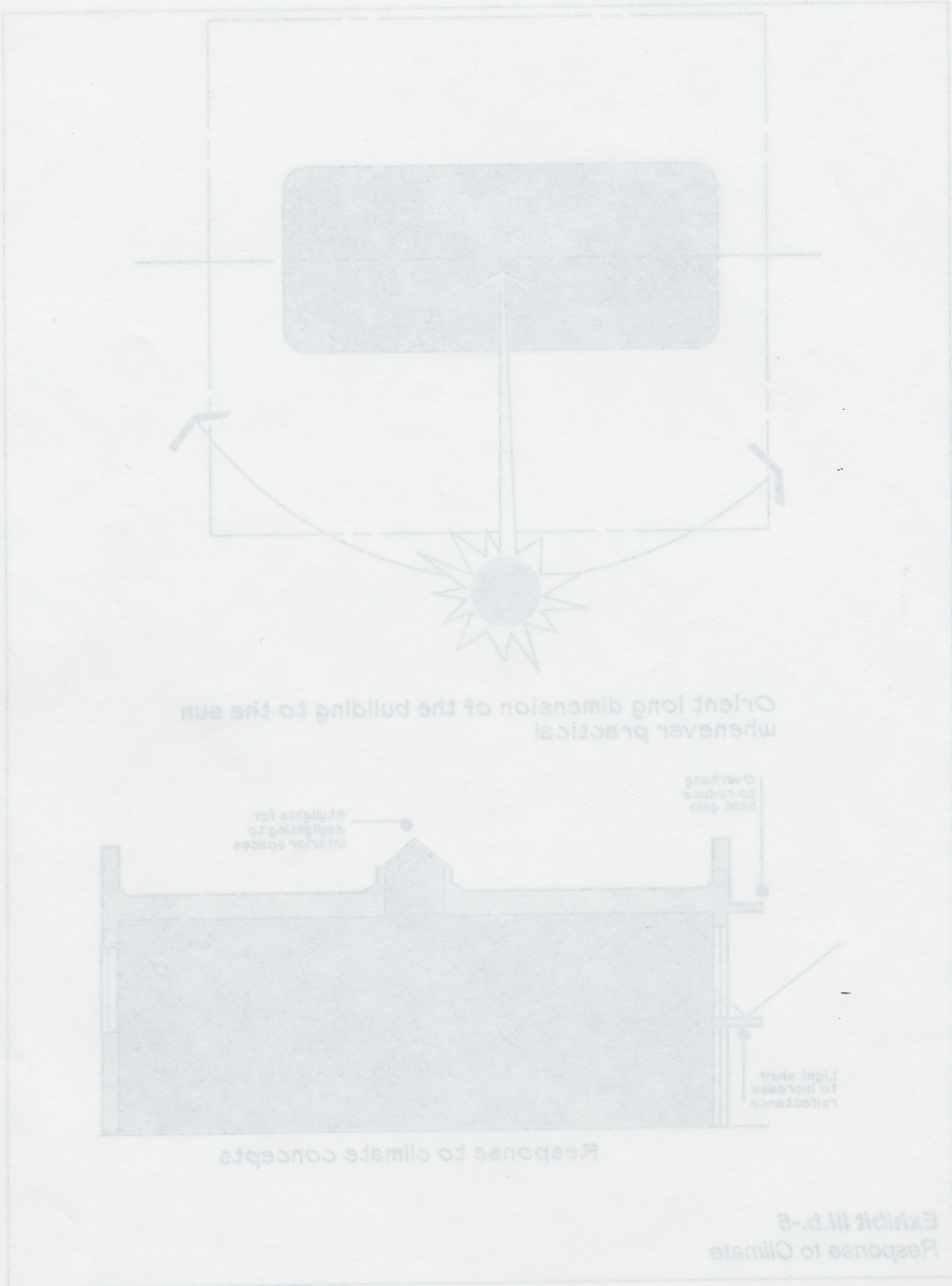


Orient long dimension of the building to the sun whenever practical



Response to climate concepts

Exhibit III.b.-5
Response to Climate



III.c.

Sign Guidelines

Signage Guidelines
- ✓ Site (exterior)
  - Identification
  - Directional / Informational
  - Regulatory
- ✓ Building (interior)
  - Identification
  - Directional / Informational
  - Regulatory

Existing signs will gradually be replaced with new compliant signs.

Introduction

Signs are the most visible, and frequently, the first elements of the SNL corporate identify to be seen by visitors, employees and the general public. Whenever seen, they should relate to, and be consistent with the other visual communications from SNL and follow existing Department of Energy (DOE) graphic standards. Application of corporate signature, color, signature and consistent grid system of design provide image continuity and differentiate visually the SNL campus from adjacent KAFB facilities.

Goals of the SNL campus signage system are:

- To improve the function and visual quality of SNL as a research environment while promoting better interaction between SNL and the public.
- Provide a framework for better information transmissions between existing and new facilities within an unified visual context.
- Promote new development that expresses an image of "science and technology".

Guidelines are presented for site (exterior) and building (interior signage).

1.0. Exterior Signage General Guidelines

1.1. Sign Categories

Consistent and repeated use of the Department of Engergy (DOE) Guidelines and SNL signature on signage applications will reinforce the boundaries of the SNL campus and separate it from its KAFB neighbor. The following sign categories should display the DOE and SNL signature as part of their text:

- Off-Site Directional
- Main-Site Identification
- Site Directional
  - Primary
  - Secondary
- Facilities/Area Identification
- Gate/Building Identification

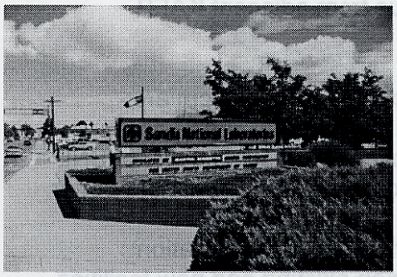
- Parking Lot Identification
- Service Informational

1.2. DOE Signature

The DOE signature should be used in accordance with the DOE Design Guide dated October 1977. (See Appendix D).

1.3. SNL Signature

Whenever the SNL signature is used on signage it should follow these guidelines:



Use of the Lockheed Martin logo will be discontinued.

a. Use only one of the two approved orientations in the SNL graphics standards guidelines
b. Always place the DOE signature in primary location.
c. Always place the SNL signature under the DOE signature in the same color area (preferably DOE blue, PMS 280).
d. Use signature on a field (area) to be equal to or greater than the minimum isolation area established in existing graphics standards guidelines.

1.4. SNL Signature with Multiple Information

Whenever multiple information, directional or regulatory signage is required, all informational text used on SNL signage is constructed from Univers 67 or Univers 57 type fonts. All upper case or upper and lower case construction is acceptable, but signage such as multi-directional, informational and regulatory is restricted to upper and lower case construction. These fonts are not to be used on traffic control or traffic regulator devices.

Signage such as traffic control devices, traffic regulatory and restricted access should not display additional graphic information other than approved highway traffic standards. Posts, mounting devices and hardware however, should conform to the approved signage color palette and will support a consistent campus identification for SNL.

The various sign types and their general siting are shown on Exhibit III.c.-1. Examples of recommended signs follow.

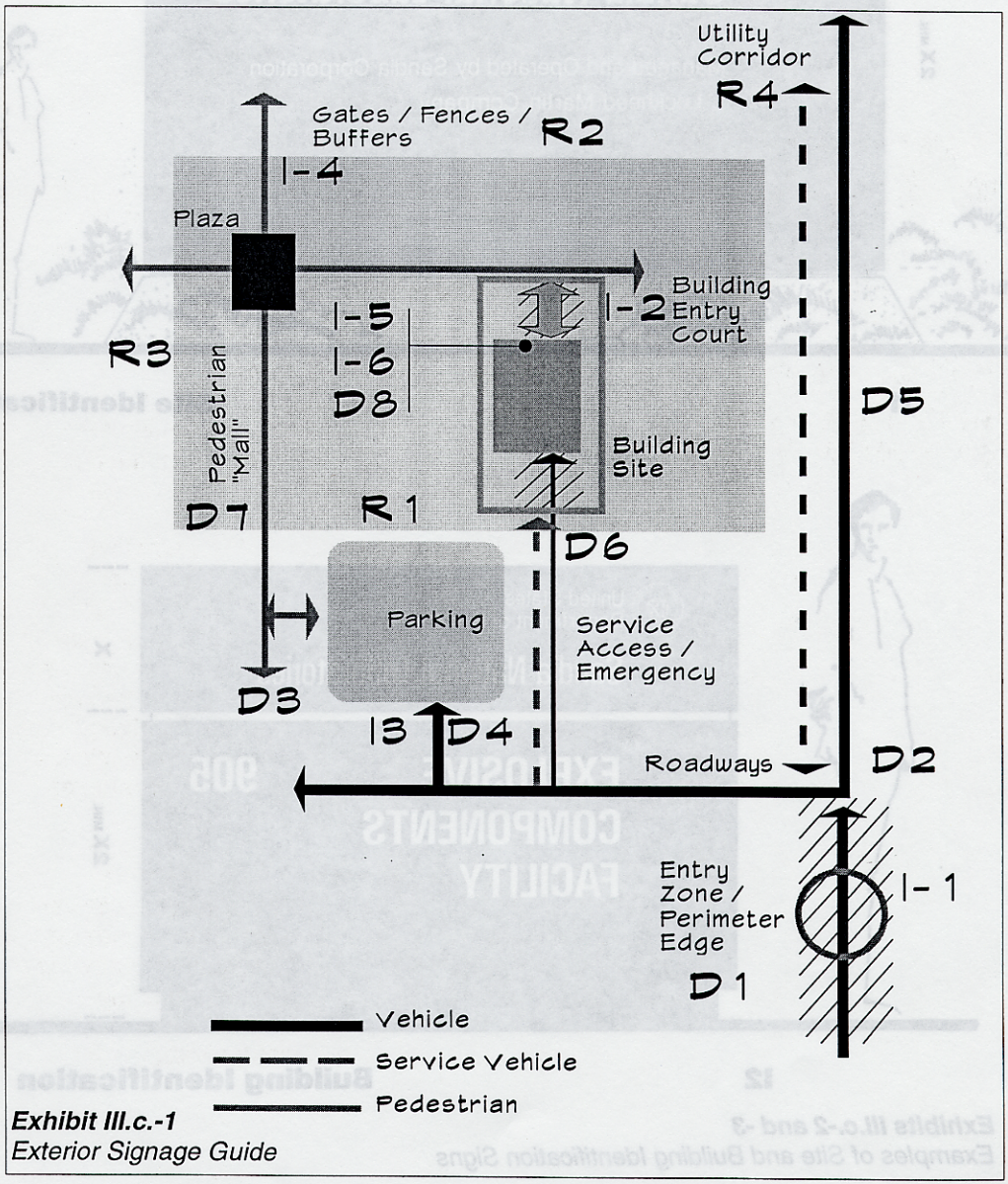
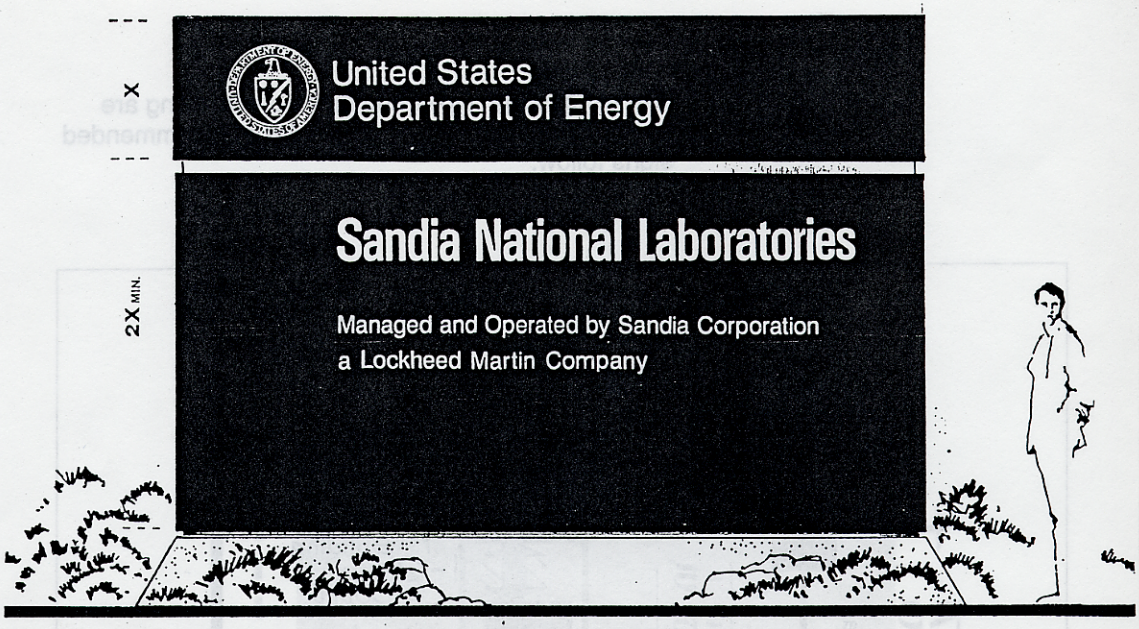
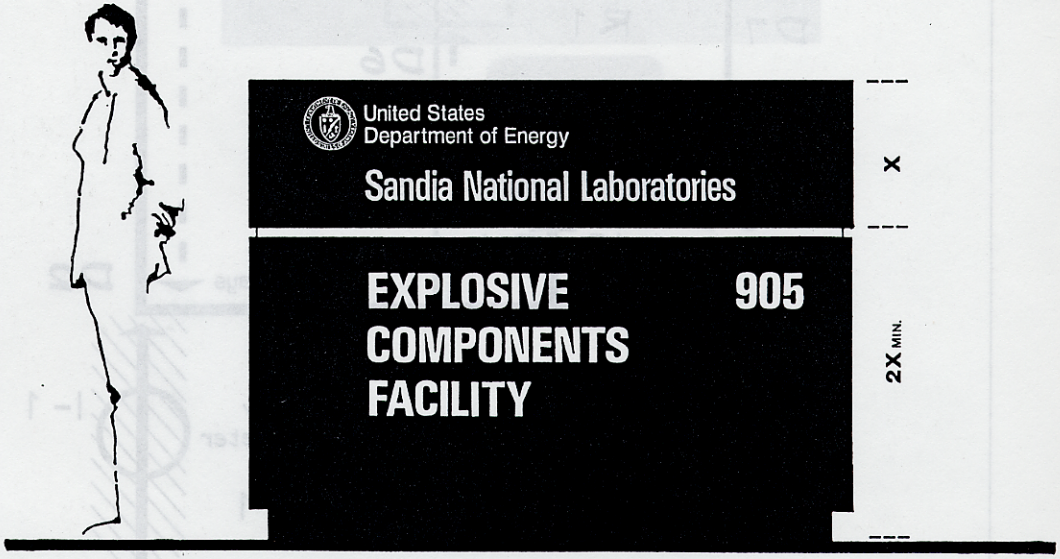


Exhibit III.c.-1
Exterior Signage Guide

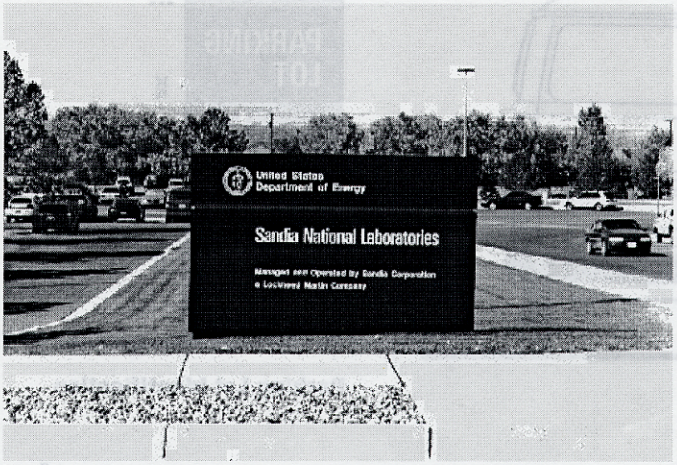


I1 **Site Identification**



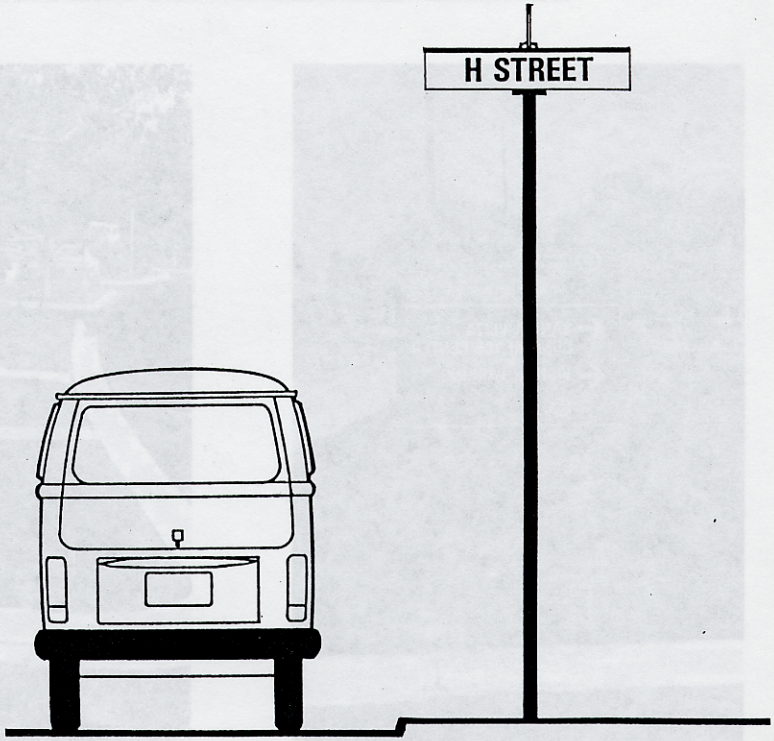
I2 **Building Identification**

Exhibits III.c.-2 and -3
Examples of Site and Building Identification Signs



Signs complying with the proposed standards at the BDM Complex.

I3 **Parking Lot Identification**

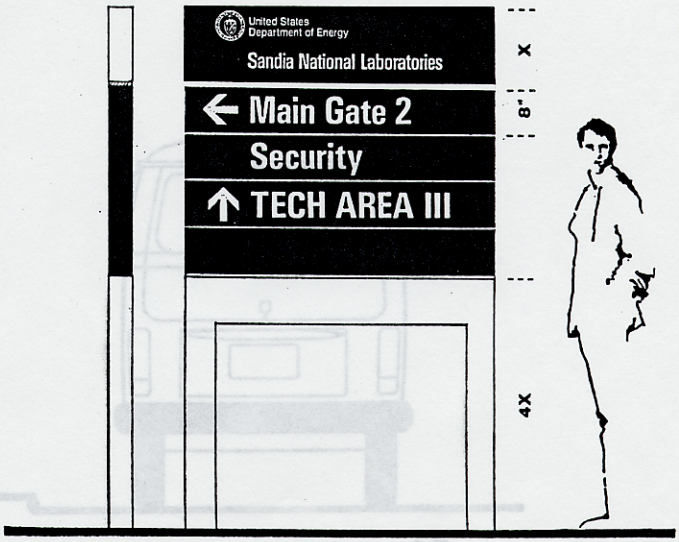


I4 **Street Identification**

Exhibits III.c.-4 and -5
Examples of Parking Lot and Street Identification Signs

D1

Off-Site Directional
Vehicular



D2

Site Directional
Vehicular

Exhibits III.c.-6 and -7
Examples of Off-Site and On-Site Vehicular Directional Signs

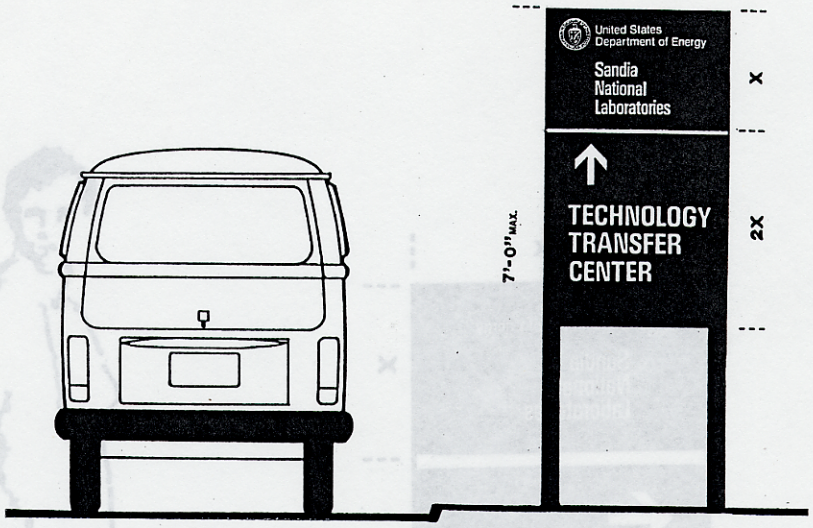
D3

Secondary Site Directional Vehicular

D4

Parking Lot Directional

Exhibits III.c.-8 and -9
Examples of Secondary-Site Vehicular and Parking Lot Directional Signs



D5

Secondary
Site Directional
Vehicular

D6

Secondary
Site Directional
Vehicular

Exhibits III.c.-10 and -11
Examples of Secondary-Site Vehicular Directional Signs

D7

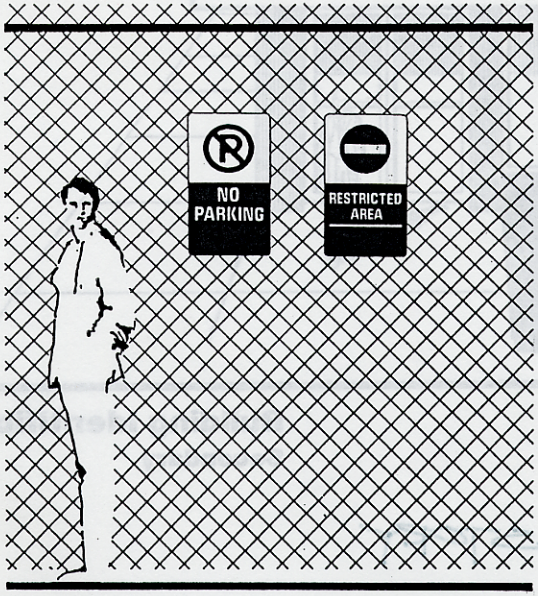
Informational/Directional
Pedestrian

Exhibit III.c.-12
Example of Pedestrian Informational / Directional Sign

R1 R2

Informational/Regulatory

Pedestrian



R3

Regulatory

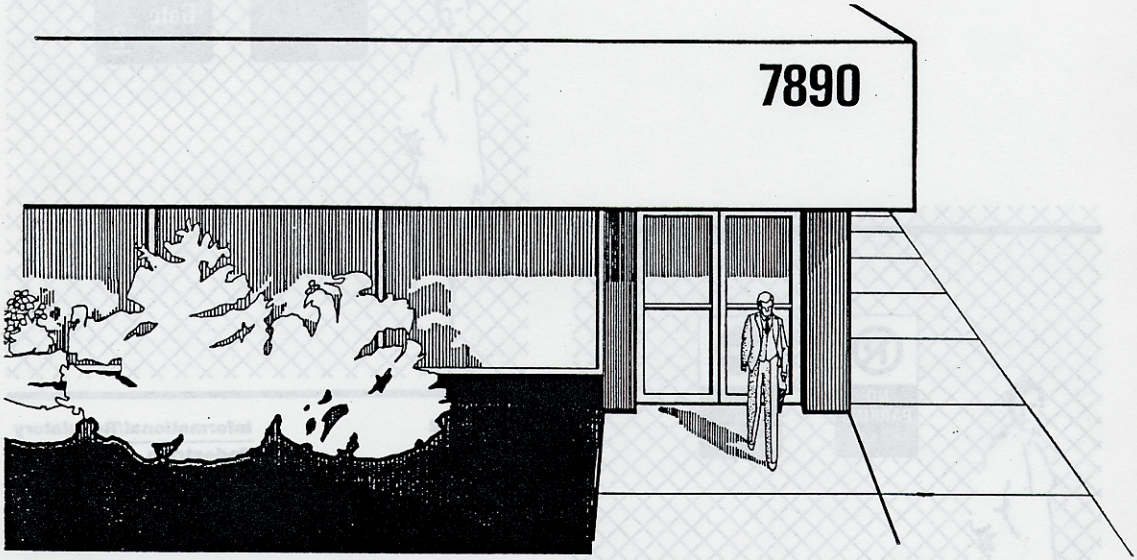
Vehicular

R4

Regulatory

Exhibits III.c.-13, -14 and -15

Examples of Informational / Regulatory Signs (Pedestrian and Vehicular)



I5

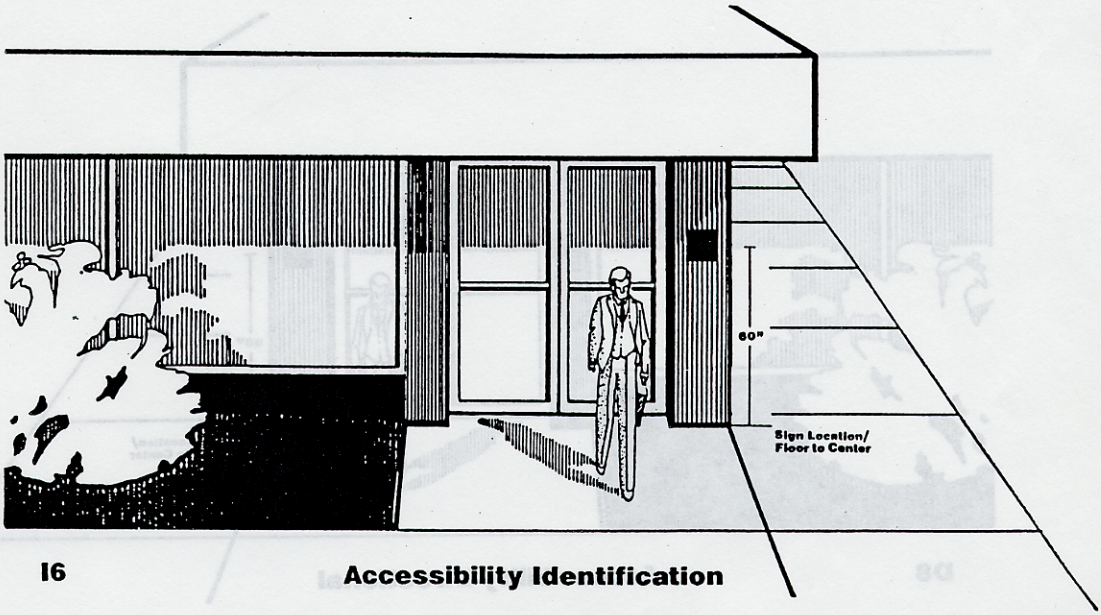
Building Identification
Secondary

SHOULD MULTI-STORY BUILDINGS

- 3 & 4 STORIES 16"
- 1 & 2 12

Exhibit III.c.-16
Example of Secondary Building Identification Sign

1/2 SIZE



I6 **Accessibility Identification**

Exhibit III.c.-17
Example of Accessibility Identification Sign

2.0. Interior Signage - General Guidelines

2.1. Sign Categories

Consistent use of form, color, and location in interior signage will produce an informative system and reinforce the "science and technology" image from facility to facility. The wide range of architectural environments on the SNL campus may not allow a consistent color palette to be used, so the physical form, type styles used and graphic presentation may become very important in creating the "visual thread" that unifies the SNL campus. The following sign categories should display these physical qualities, while considering the Americans With Disabilities Act (ADA) signage guideline to the maximum extent possible:

- Building Directories
- Building Directional
- Facilities Identification Service
- Identification
- Regulatory/Restrictive

2.2. Finish and Contrast:

All interior letters and numbers are to be a minimum contrast to background of 70%. Non-glare or low-glare finishes are to be used. Whenever possible light characters on a dark background are preferred.

2.3. Tactile/Braille Signs:

All signs designating permanent spaces should have tactile letters and Grade II Braille. The message must be a minimum of 5/8" cap-height and larger for directional information signs. Engraved tactile letters are not acceptable. Polymer plate fabrication of tactile copy and Braille is preferred.

Signs that include symbols must have verbal description and all pictorial symbols must be located in a 6" high area minimum.

Regulatory, Emergency and Restrictive signage must comply. Building directories and directional signs are excluded from Tactile and Braille requirements above but should consider distance of viewing and architectural space.

2.4. Location of Signs:
Interior signs in general are not to be mounted to doors or sliding glass but rather on the wall adjacent to the latch side of the door or opening. Signs must be mounted 60 inches from the floor to the center of the message area. When double doors are used signs are to be located on the nearest adjacent wall.

2.5. Emergency Assistance Signs:
These types of signs along with emergency telephones and directional exit signage are required and should be considered in a campus signage program.

Building requirements and signage necessary for each facility must be identified for individual building evacuation programs.

The various sign types and their general siting are shown in Exhibit III c.-19. Examples of recommended signs follow.

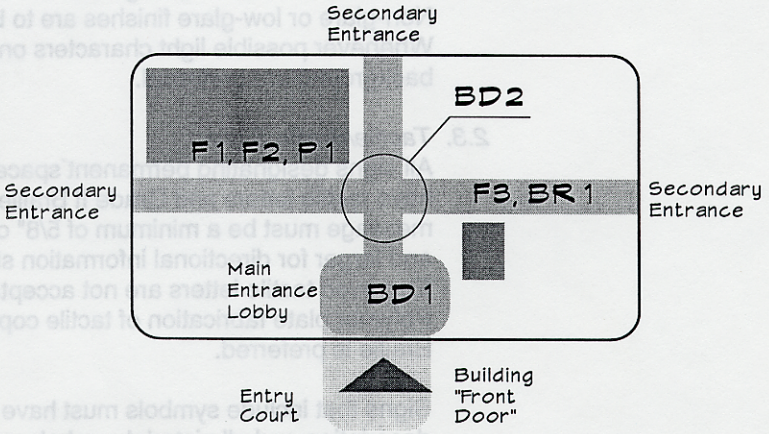
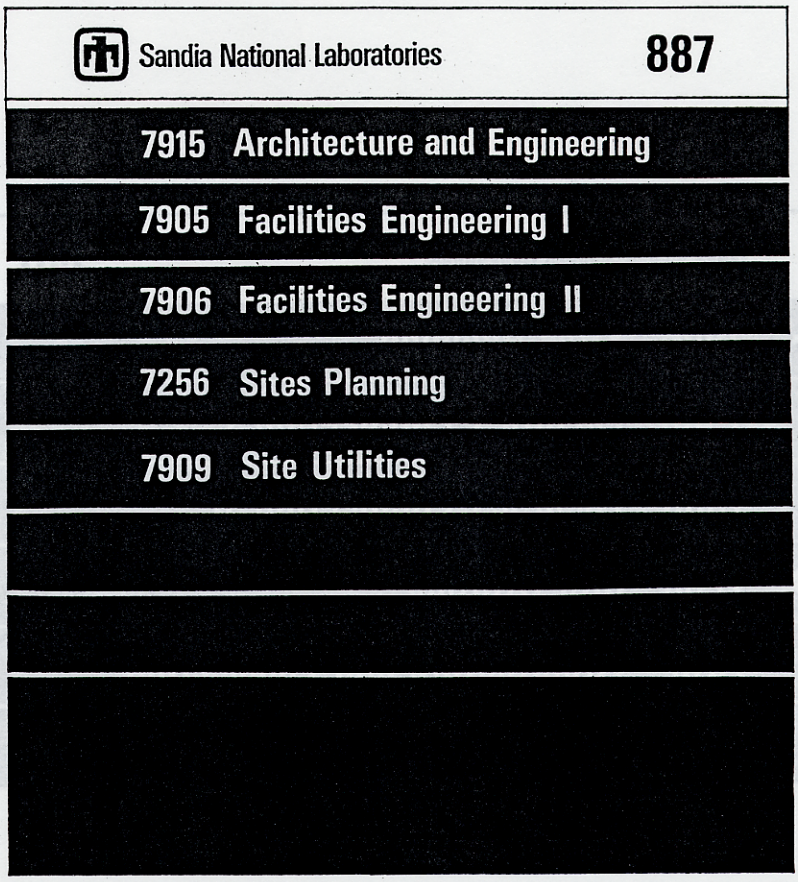
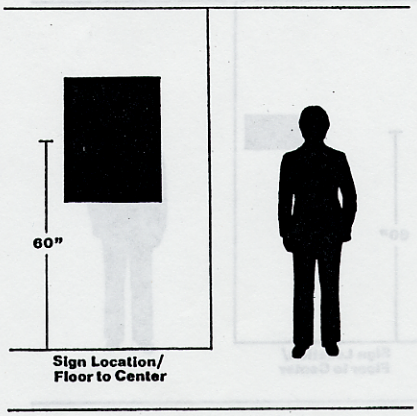


Exhibit III.c.-19
Interior Signage Guide

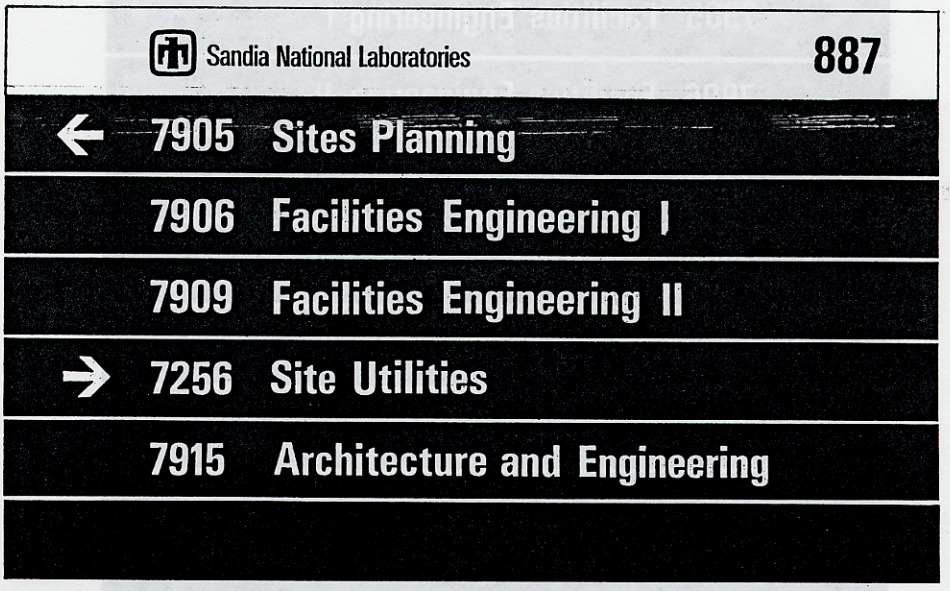


1/4 SIZE

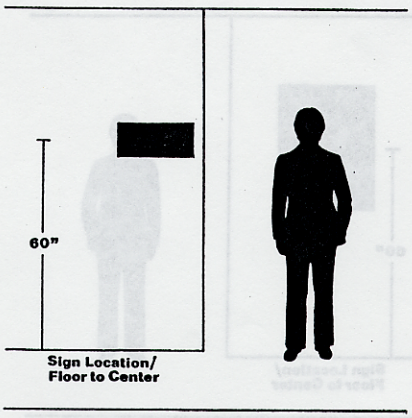


BD1 Building Directory

Exhibit III.c.-20
Example of Building Directory Sign

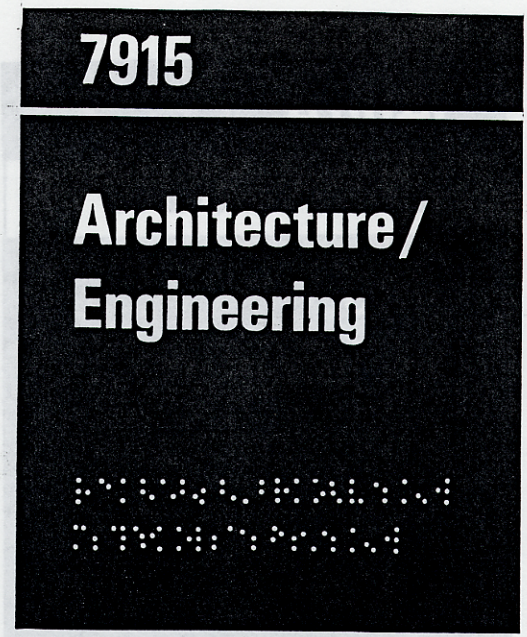


1/4 SIZE

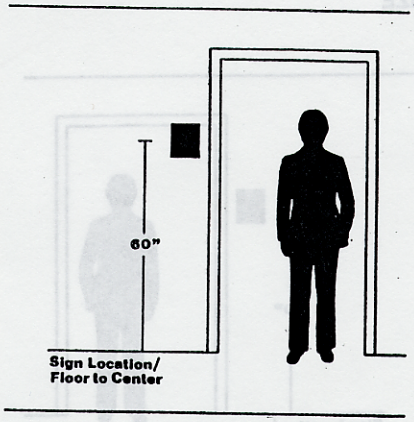


BD2 Building Directional

Exhibit III.c.-21
Example of Building Directory Sign

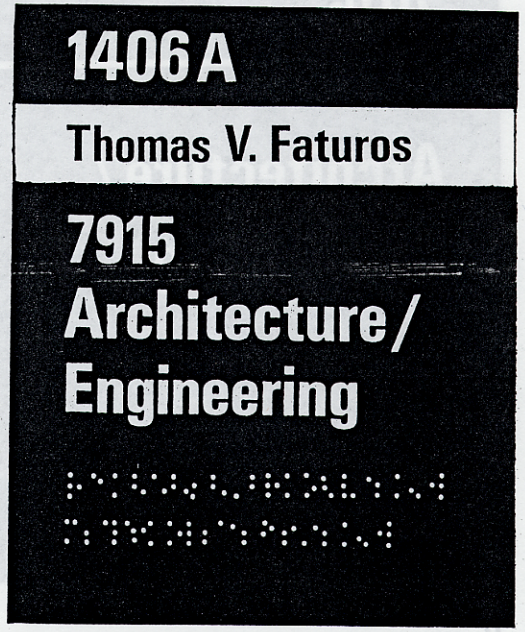


1/2 SIZE

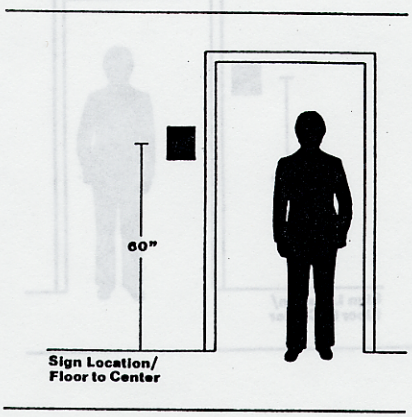


F1 Facilities Identification

Exhibit III.c.-22
Example of Facilities Identification Sign



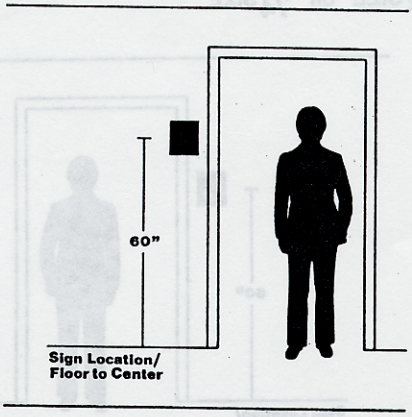
1/2 SIZE



F2 Personnel Identification

Exhibit III.c.-23
Example of Personnel Identification Sign

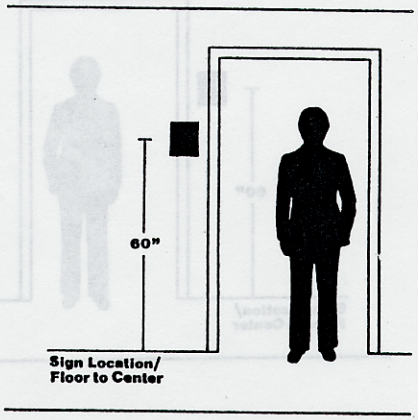
1/2 SIZE



F3 Service I.D.

Exhibit III.c.-24
Example of Service Identification Sign

1/2 SIZE OR 1/4 SIZE

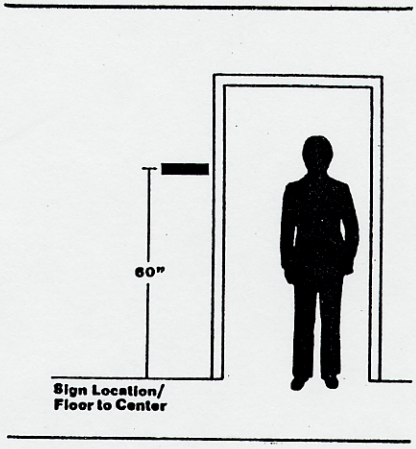


BR1 Regulatory

Exhibit III.c.-25
Example of Regulatory Sign

Jon B. Anderson

1/2 SIZE



P1 Personnel Identification

Exhibit III.c.-26
Example of Personnel Identification Sign

IV. Administrative Process

A. Ownership

Campus Design and Development Guidelines are owned by the Facilities Program Manager. They are maintained by the Campus Development Committee which is comprised of:

- Manager, 7915 Architecture and Engineering Department
- Manager, 7808 Facilities Shared Systems Department
- Manager, 7906 Customer Funded Engineering Department
- Manager, 7909 Site Utilities Department
- Manager, 7912 Sites Planning Department

B. Coverage

Campus Design and Development Guidelines apply to Tech Areas I, II, III, IV and V at Sandia National Laboratories, New Mexico Site. They may be applied to Coyote Test Field and other land use areas as appropriate.

C. Application

All capital and expense funded project covered by the Guidelines will be reviewed by the Committee. This includes:

- Line Item
- Major Renvoation
- GPP
- Customer funded projects
- O&M projects
- Recurring activiites impacting exterior appearance.

D. Use of Guidelines

All projects subject to compliance with these guidelines will be reviewed by the Committee. Projects designed by Departments 7908 and 7911 may be reviewed by the Committee at the discretion of the respective department manager. Projects designed for 7800 will be reviewed as part of the above review process.

The components of the design review process are:

1. Projects will be brought before the Committee at the completion of the conceptual or schematic design stage (nominally 10%).

Design team and project leaders should contact the Committee secretary to schedule project reviews.

2. Design reviews will be accomplished by participatory committee meetings scheduled at the request of the design team leader.

3. Decisions of the Committee will be made by consensus. The 7900 Director will have acceptance/rejection authority when consensus among committee members cannot be reached or when design team and project leaders take exception to the Committee's decision.

4. Design team leaders will obtain committee approval before continuing with design.

5. The 7900 director will select projects for presentation to the Building and Facilities Planning Committee (BFPC).

6. The process owner will be the 7915 Department Manager.

The design review and approval process is shown in Exhibits IV-1 and IV-2.

E. Review and Update of Guidelines

The guidelines will be reviewed and updated on a yearly basis or more frequently if necessary.

1. Requests for update will be submitted to the 7915 Department Manager. The Department Manager will convene the Committee to study the requested changes and make a recommendation to the Facilities Development Center Director, or BFPC program manager.

2. Changes will be approved by the BFPC and integrated into the Campus Design and Development Guideline manual.

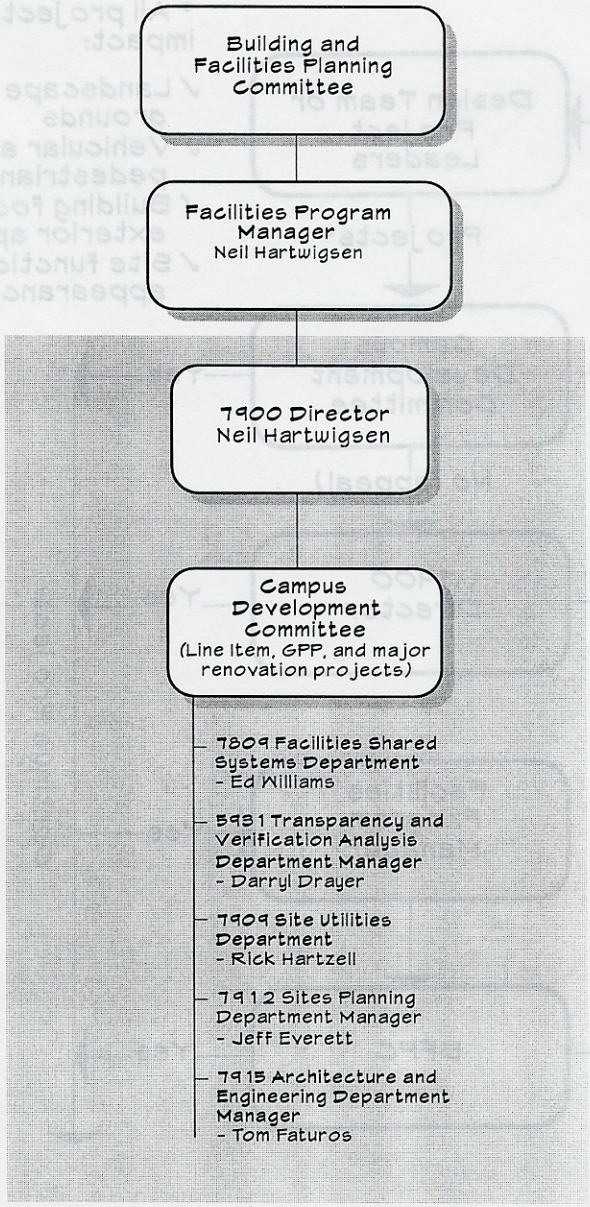


Exhibit IV-1
Design Review Committees

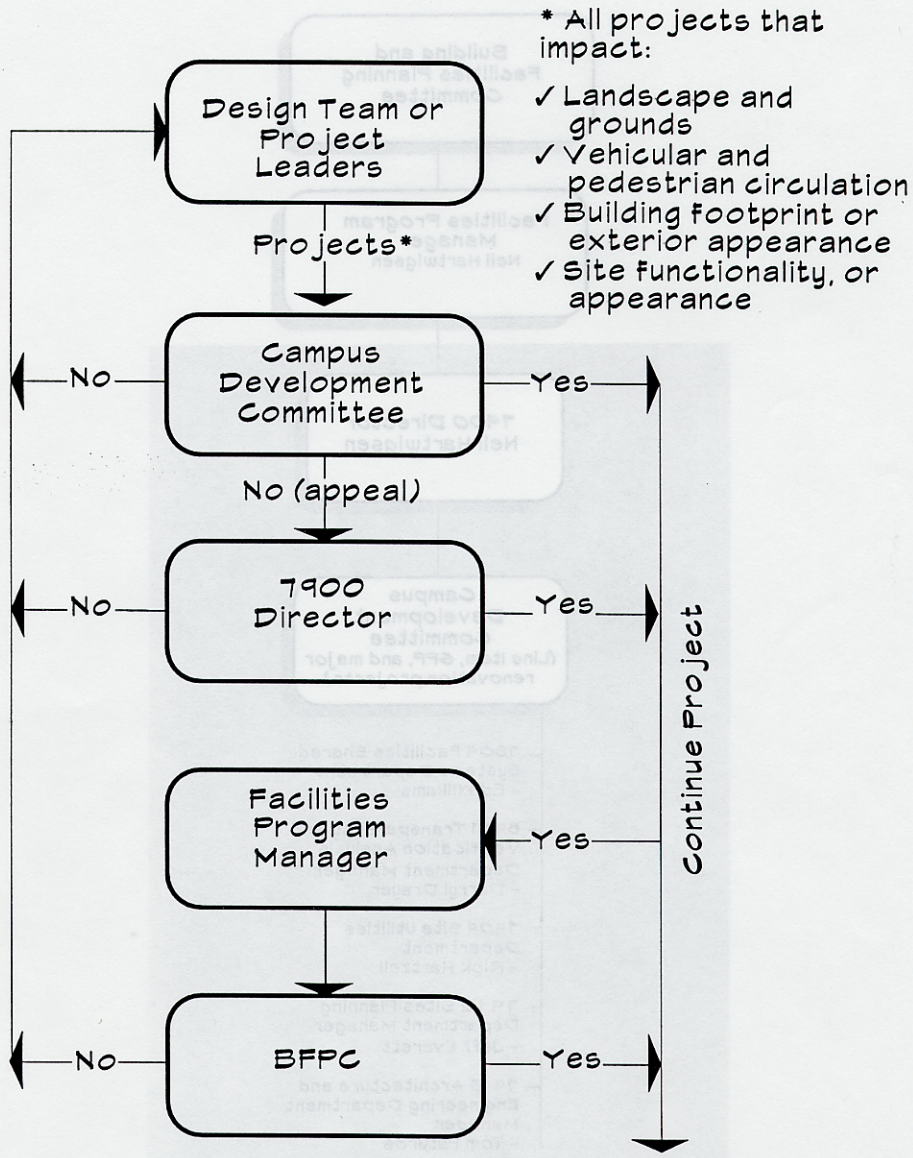


Exhibit IV-2
Design Review Process

V.a

Appendix: Glossary

The following is a glossary of terms used in the Campus Design and Development Guidelines that are not of common usage.

A/E - Architect/Engineer

AASHTO - American Association of State Highway and Transportation Officials

ADA - Americans With Disabilities Act, civil rights legislation.

Ancillary Structures - Any structure that is of secondary use to a primary structure such as mobile storage units, accessory use structure, transportainers and power poles.

Architectural Style - A characteristic form of a certain type of period of history or particular visual expression.

Arterial Roadways - Major perimeter circulation corridors intended to carry high traffic volume and serve as the 'loop' road access to Tech Area 1.

Assets Protection Area - Area where access is controlled to protect property or equipment.

Berm - A bank of earth or landscaped hill, often used to screen undesirable visual elements.

BFPC - Building and Facilities Planning Committee

Bicycle Lane - Bicycle route of travel is shared with vehicular travel.

Bicycle Path - Bicycle route of travel is separate, but adjacent to the roadway.

Bicycle Trail - Bicycle route of travel is separate from roadway, but usually follows a different network than roadways.

Bollard - A free standing post used to direct or obstruct vehicular traffic; or a guard against damage to a wall corner by encroaching traffic.

Building Floor Plates - A horizontal structural component of a floor system.

Clear Sight Triangle - Areas at all intersections where clear sight lines are maintained.

Clerestory - An upward extension of enclosed daylighted space carrying a setback, vertical, windowed wall through the roof slope.

'Clone' Buildings - A building of the same basic design that is site adapted and that are repeated at a number of sites.

District Zoning Plan - A component of the Comprehensive Plan

DOE - Department of Energy

E-Z Go's - Small gas or electric powered carts.

Eclectic - Composed of elements from various sources (e.g., an area of various architectural styles).

Edge - A boundary that is marked by landscape and identification features that clearly identify SNL from its immediate surroundings.

Entry Courts - A design element that provides the link between individual building design and site design.

Facade - A face of a building, usually the front.

Facilities Design Manual - Provides detailed engineering design guidance for SNL projects.

Fenestration - The patterns of windows in a facade.

Fire Lane - A minimum width required to allow access by fire and emergency vehicles.

Flexible Security Zone - An area or building outside the limited access area with security provisions adaptable to specific programmatic needs.

Gable - The upper part of a terminal wall under the ridge of a pitched roof.

Guidelines - A set of ideas that convey quality and character of desired physical development or redevelopment. They include:

1. Entry Zones

2. Roadways
3. Parking
4. Service Access
5. Pedestrian 'Malls' and Sidewalks
6. Plazas
7. Building Entry Courts
8. Gates / Fences/ Buffers
9. Utility Corridors
10. Building Sites
11. Landscape Features

Hardscape - Paving that includes building entry plazas, seat walls, raised planters, and paving used at walkways, outdoor spaces, and transition areas.

IES Manual - Illuminating Engineers Society Manual.

KAFB - Kirtland Air Force Base

Landscape Matrix - Definition of plant materials suggested for use in designated areas.

Limited Access Areas - Areas where access is controlled for security purposes.

Local Roadways - Access routes between large groups of buildings or test areas within the site.

Massing - Architectural relationship between the various masses or volumes of a building or groups of buildings.

MO's - Mobile Offices

NFPA - National Fire Protection Association

Nuclear Weapons Complex (NWC) - The collection of national laboratories and production sites supporting development and maintenance of United States nuclear weapons.

Pedestrian Scale - Elements of a building proportioned to accommodate people walking at the ground level.

Principles - A set of broad ideas that provide a

framework for future new growth and redevelopment of SNL, New Mexico lands

PVC - Poly Vinyl Chloride. A type of polymer.

Safety Zones - Areas established to protect site populations from hazards.

SDP - Site Development Plan, a plan that guides placement of buildings.

Setback - A minimum distance requirement from a building face.

Shed Roof - A roof having only one sloping plane.

SNL- Sandia National Laboratories, all sites.

SNL/NM -Sandia National Laboratories, New Mexico

Spandrel Glass - An exterior wall or application of opaque glass-like material.

Standard Drawings - Drawings adopted by SNL Facilities Engineering for use in construction projects.

Standard Specifications Manual - Specifications adopted by SNL Facilities Engineering for use in construction projects.

T Building - Transportable Building

Tech Area - An area at SNL/NM with designated functional and security requirements. There are five Tech Areas:

Tech Area I- Administration and R&D
Tech Area II- Explosives and Support
Tech Area III - Testing
Tech Area IV - Pulse Power Sciences
Tech Area V - Reactor Sciences

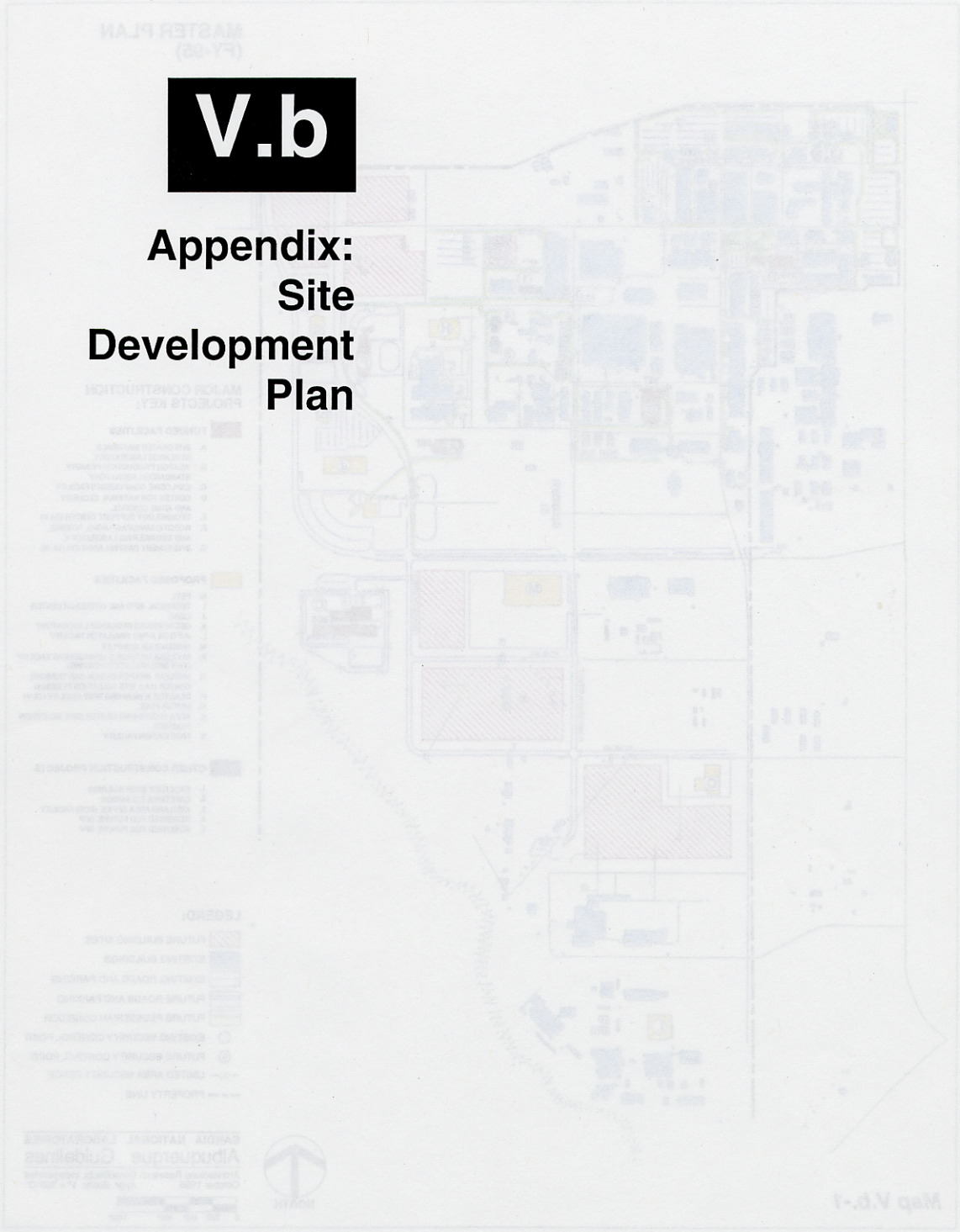
UBC - Uniform Building Code

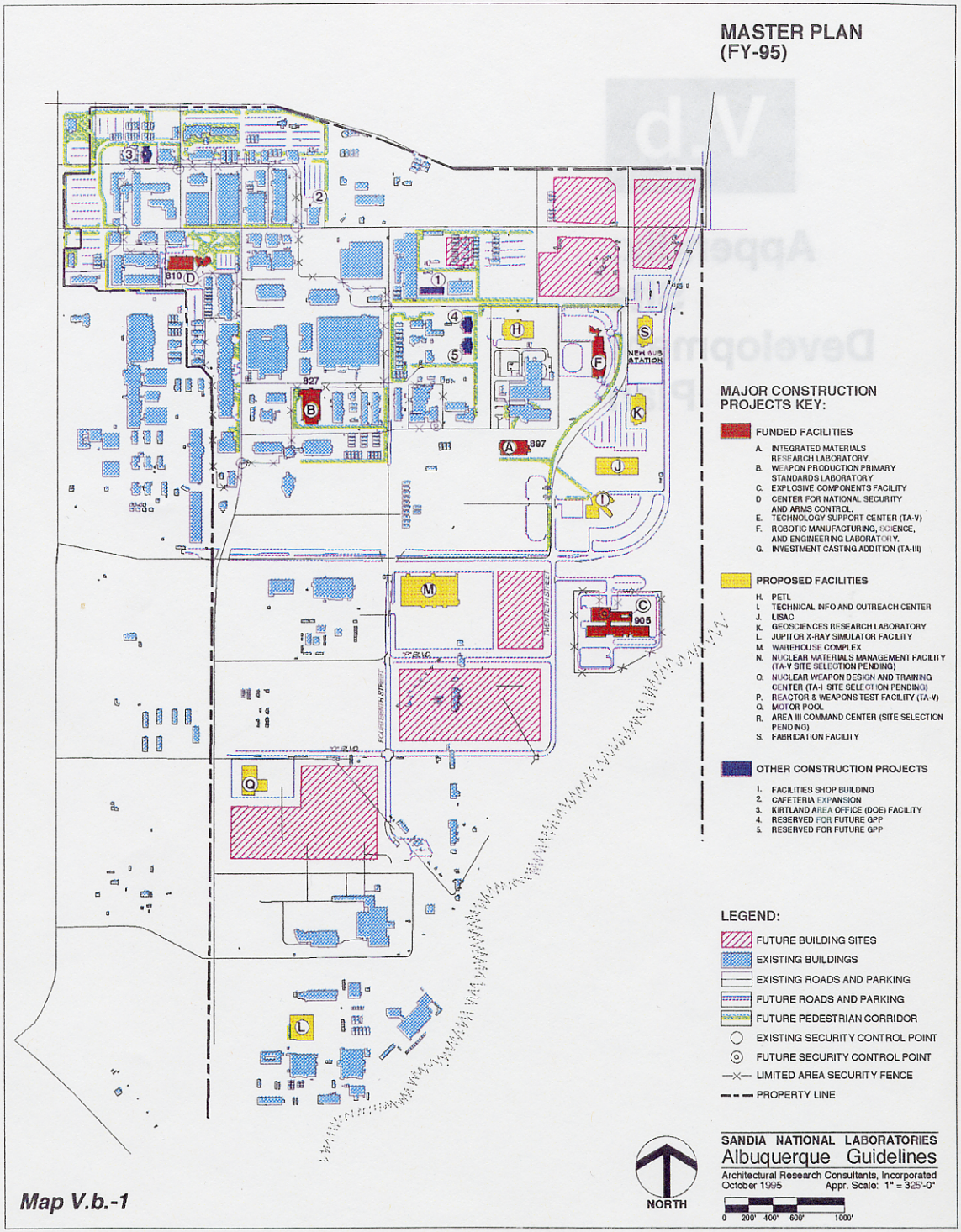
UFAS - Uniform Federal Accessibility Standards

UFC -Uniform Fire Code

V.b

Appendix: Site Development Plan

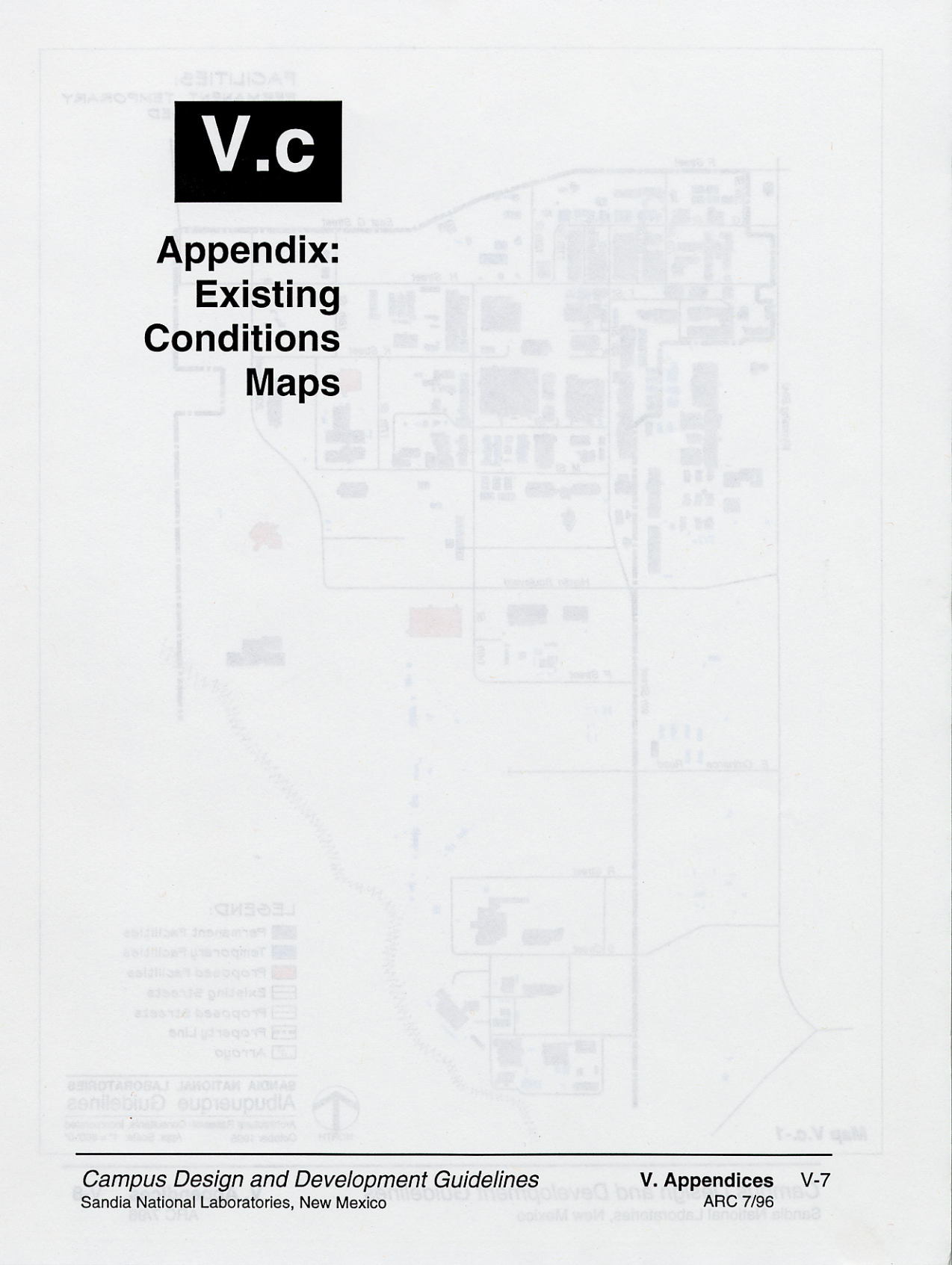


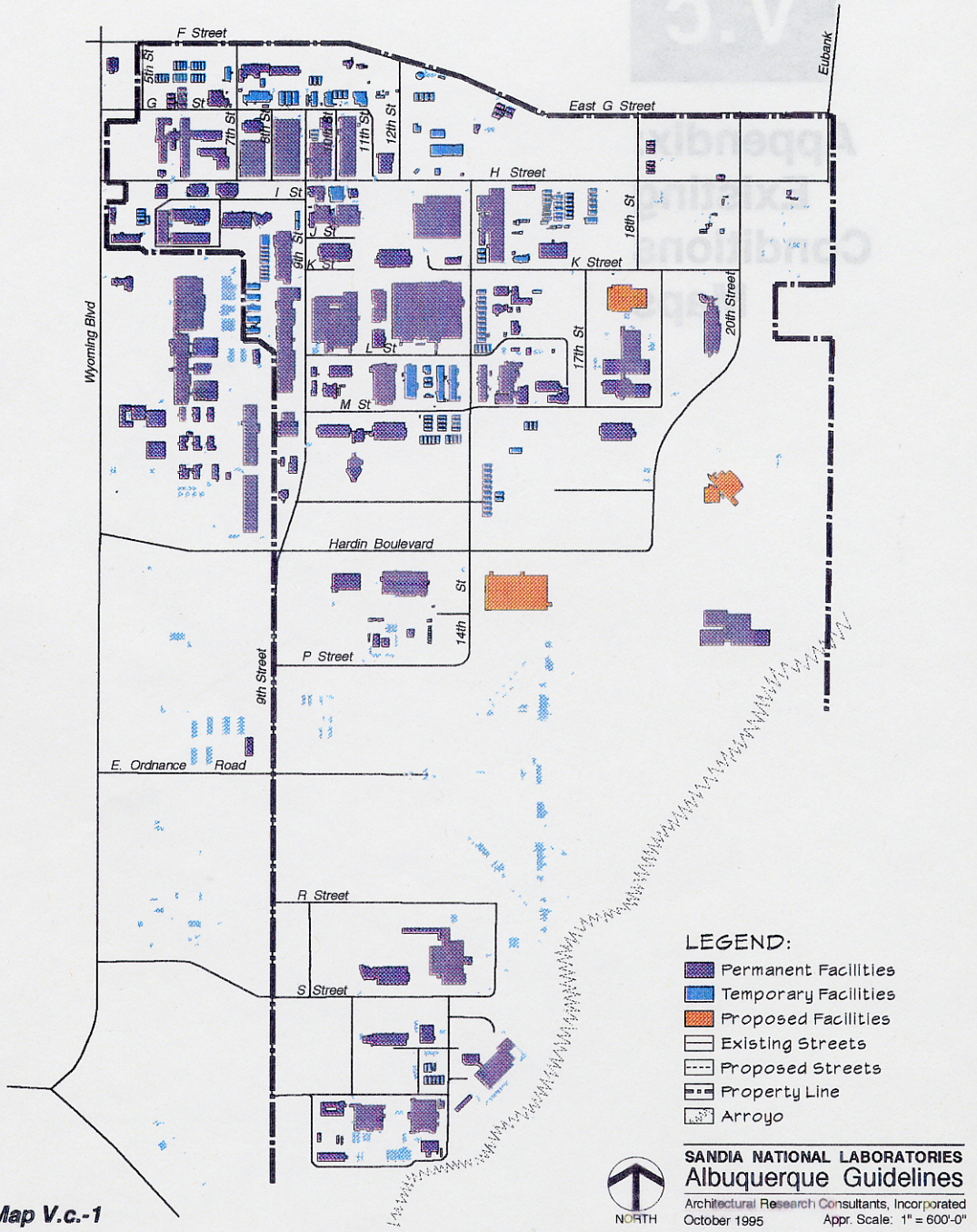

MASTER PLAN
(FY-95)
MAJOR CONSTRUCTION PROJECTS KEY:
FUNDED FACILITIES
A. INTEGRATED MATERIALS RESEARCH LABORATORY.
B. WEAPON PRODUCTION PRIMARY STANDARDS LABORATORY
C. EXPLOSIVE COMPONENTS FACILITY
D CENTER FOR NATIONAL SECURITY AND ARMS CONTROL.
E. TECHNOLOGY SUPPORT CENTER (TA-V)
F. ROBOTIC MANUFACTURING, SCIENCE, AND ENGINEERING LABORATORY.
G. INVESTMENT CASTING ADDITION (TA-III)
PROPOSED FACILITIES
H. PETL
I. TECHNICAL INFO AND OUTREACH CENTER
J. LISAC
K. GEOSCIENCES RESEARCH LABORATORY
L. JUPITOR X-RAY SIMULATOR FACILITY
M. WAREHOUSE COMPLEX
N. NUCLEAR MATERIALS MANAGEMENT FACILITY (TA-V SITE SELECTION PENDING)
O. NUCLEAR WEAPON DESIGN AND TRAINING CENTER (TA-I SITE SELECTION PENDING)
P. REACTOR & WEAPONS TEST FACILITY (TA-V)
Q. MOTOR POOL
R. AREA III COMMAND CENTER (SITE SELECTION PENDING)
S. FABRICATION FACILITY
OTHER CONSTRUCTION PROJECTS
1. FACILITIES SHOP BUILDING
2. CAFETERIA EXPANSION
3. KIRTLAND AREA OFFICE (DOE) FACILITY
4. RESERVED FOR FUTURE GPP
5. RESERVED FOR FUTURE GPP
LEGEND:
FUTURE BUILDING SITES
EXISTING BUILDINGS
EXISTING ROADS AND PARKING
FUTURE ROADS AND PARKING
FUTURE PEDESTRIAN CORRIDOR
EXISTING SECURITY CONTROL POINT
FUTURE SECURITY CONTROL POINT
LIMITED AREA SECURITY FENCE
PROPERTY LINE
NORTH
SANDIA NATIONAL LABORATORIES
Albuquerque Guidelines
Architectural Research Consultants, Incorporated
October 1995 Appr. Scale: 1" = 325'-0"
0 200' 400' 600' 1000'

Map V.b.-1

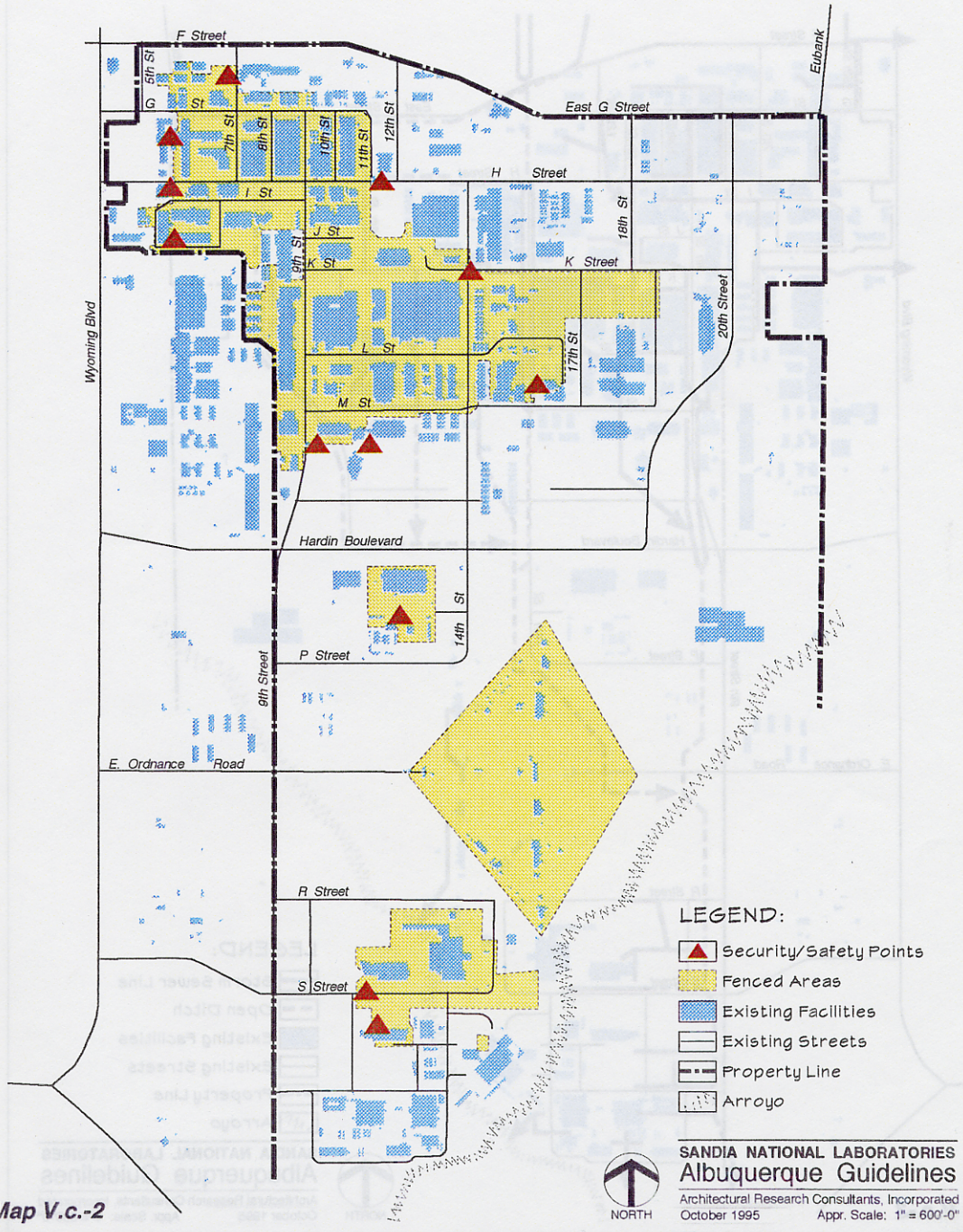
V.c

Appendix: Existing Conditions Maps



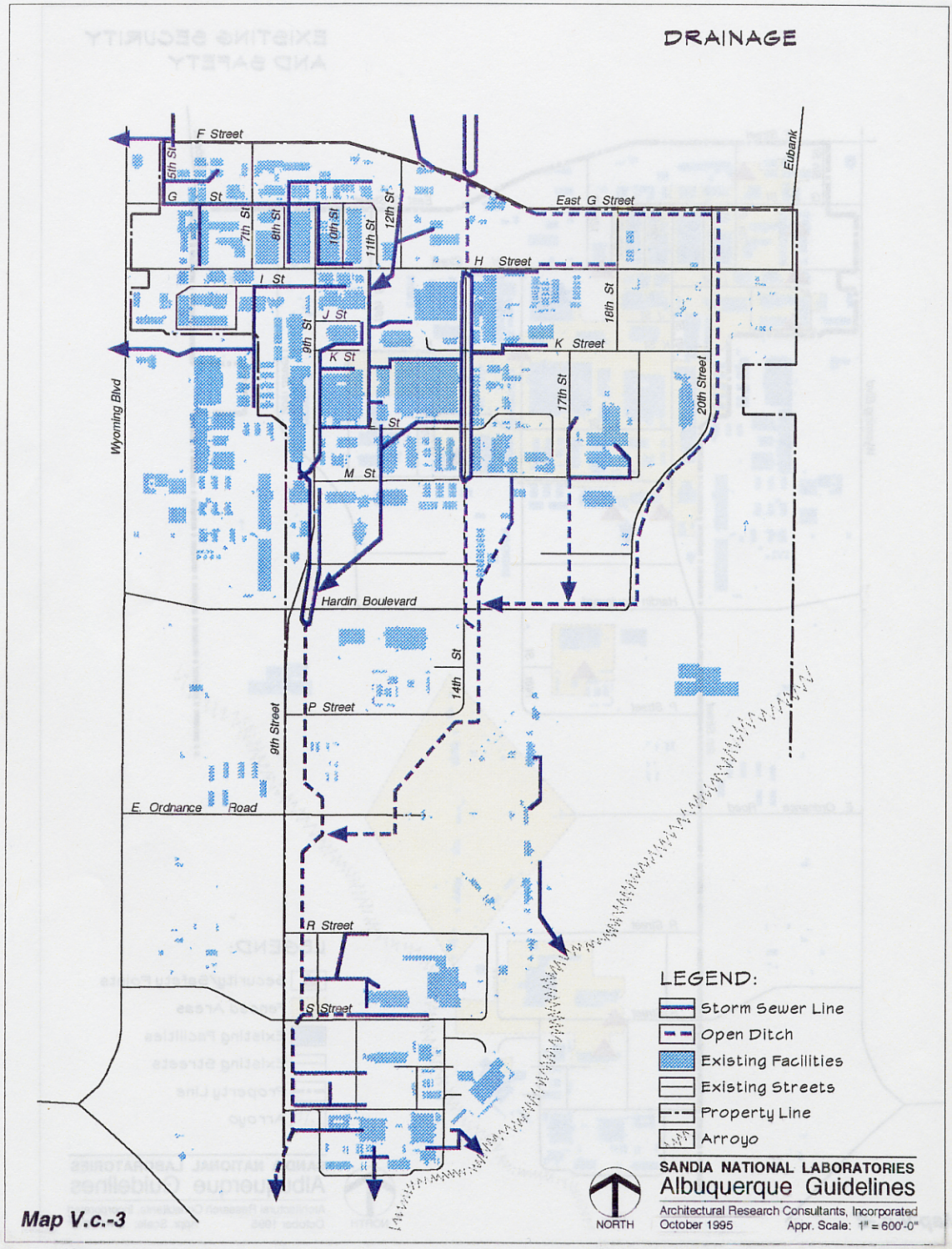

FACILITIES:
PERMANENT, TEMPORARY
AND PROPOSED
F Street
5th St
G St
7th St
8th St
10th St
11th St
12th St
East G Street
Eubank
H Street
I St
J St
K St
K Street
18th St
20th Street
Wyoming Blvd
9th St
L St
17th St
M St
Hardin Boulevard
14th St
P Street
9th Street
E. Ordnance Road
R Street
S Street
LEGEND:
Permanent Facilities
Temporary Facilities
Proposed Facilities
Existing Streets
Proposed Streets
Property Line
Arroyo
NORTH
SANDIA NATIONAL LABORATORIES
Albuquerque Guidelines
Architectural Research Consultants, Incorporated
October 1995
Appr. Scale: 1" = 600'-0"
Map V.c.-1

EXISTING SECURITY AND SAFETY



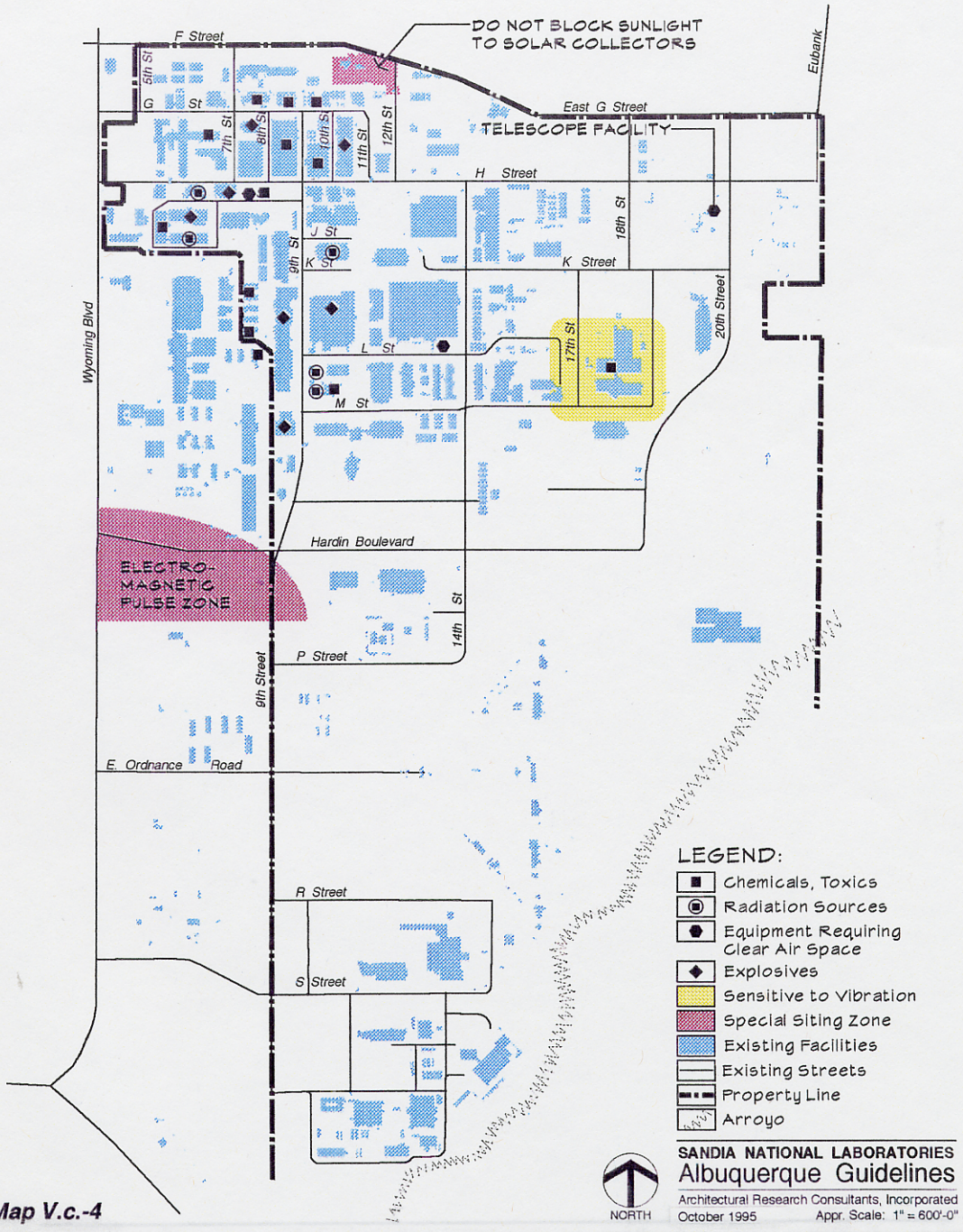
SANDIA NATIONAL LABORATORIES
Albuquerque Guidelines
Architectural Research Consultants, Incorporated
October 1995 Appr. Scale: 1" = 600'-0"

Map V.c.-2


DRAINAGE
F Street
5th St
G St
7th St
8th St
10th St
11th St
12th St
East G Street
Eubank
H Street
I St
J St
9th St
K St
16th St
K Street
17th St
20th Street
Wyoming Blvd
St
M St
Hardin Boulevard
14th St
P Street
9th Street
E. Ordnance Road
R Street
S Street
LEGEND:
Storm Sewer Line
Open Ditch
Existing Facilities
Existing Streets
Property Line
Arroyo
NORTH
SANDIA NATIONAL LABORATORIES
Albuquerque Guidelines
Architectural Research Consultants, Incorporated
October 1995
Appr. Scale: 1" = 600'-0"

Map V.c.-3

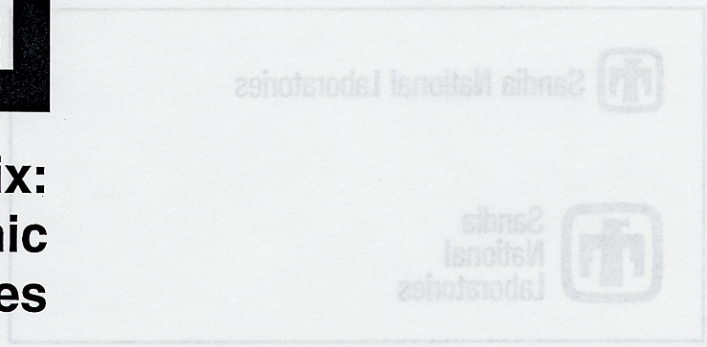
SPECIAL SITING CONCERNS



Map V.c.-4

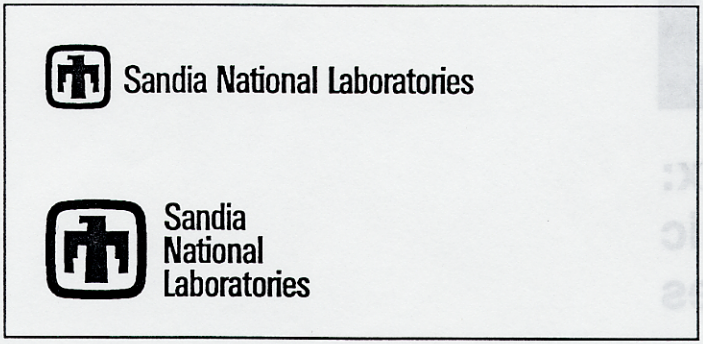
V.d

Appendix: SNL Graphic Guidelines



The Sandia Signature

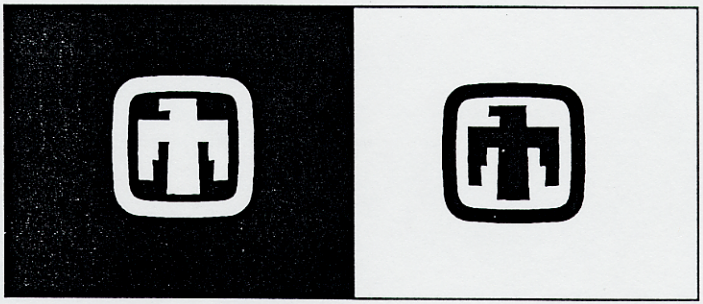
SLI 1125, covers the policy on using the corporate signature and an overview is given here. The Sandia National Laboratories' signature consists of the *thunderbird* called the insignia, and the words, *Sandia National Laboratories'* called the logotype. Together they are combined to form the *corporate signature.*



The two correct signature orientations: Horizontal (top), Stacked (bottom)

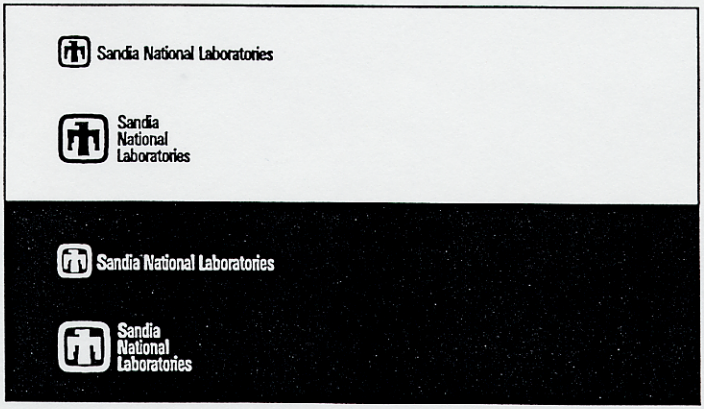
The corporate signature may only appear in two configurations, the horizontal format and the stacked version. These configurations apply to both black and white as well as color versions. Within each configuration the position and size of the thunderbird insignia in relation to the logotype is fixed, and must not be altered in any way. These two standards are shown on the left.

The Sandia logotype is a custom design font and *cannot be typeset.* The official logotype is the only type that may appear along side the thunderbird. The Art Department can provide you with an .eps version on many platforms. Contact your 7155 SDR.



Thunderbird may be used alone, but text other than logotype cannot be used in conjunction

The corporate signature or thunderbird insignia may be used in a positive or reverse form, although the entire signature must be used in one of these two methods.The thunderbird insignia may be used alone but should not be incorporated into, or used in connection with any other design elements. When used, it must be displayed as a stand alone element. If the thunderbird insignia is used, and the words "Sandia National Laboratories" are also used in close proximity, the text must not appear to be connected with the insignia to avoid confusion with the corporate signature.



The two correct backgrounds contain not distracting colors or patterns that interfere with signature identity

The background on which the signature is placed should not contain colors or patterns that interfere with the visibility or recognition of the corporate signature. Preferably, it should be reproduced on a solid neutral or

light colored background, or entirely reversed out of a dark background.

The use of designs, symbols, other logos, or graphic elements linked to the corporate signature, logotype, or thunderbird insignia is prohibited. This rule applies to both internally and externally developed communications products.

The thunderbird insignia height of the thunderbird is known as "X". The signature or insignia should be free of text or other graphic elements (isolated) for a distance equal to or exceeding 1/2 X.

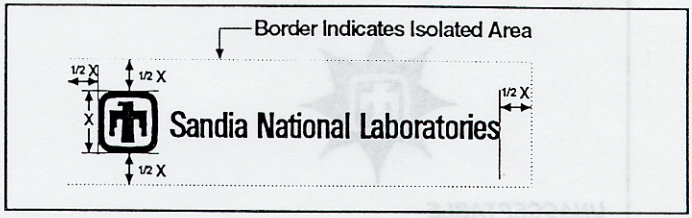
The Screened Version

Although not suggested, the entire signature or insignia may be screened in the range of 50% to solid black (no gradiated screens). The screen must meet or exceed 600 DPI or 120 line screen.

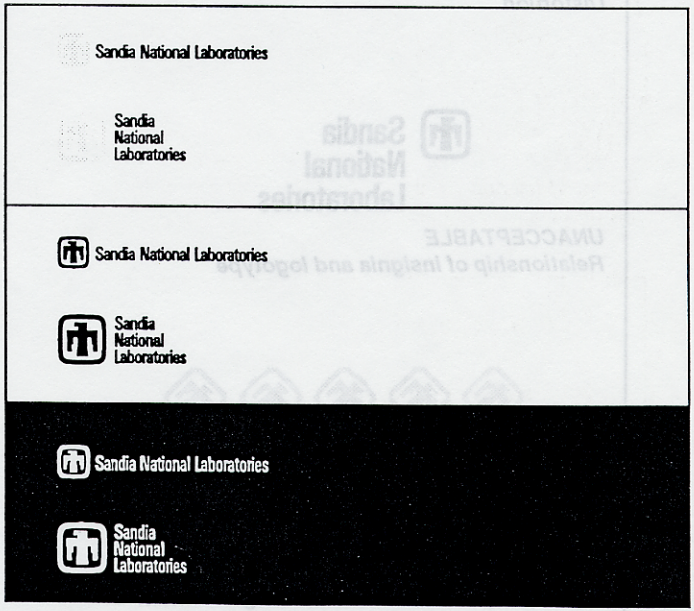
Use of Color

The standard colors of the corporate logotype and thunderbird are solid black, or a combination of the thunderbird in Sandia Blue and the logotype in solid black. A standard Sandia blue is intended primarily for the thunderbird symbol with the logotype in black. Sandia blue is a specific hue and value of turquoise. Sandia Blue, black, or white (reverse) for the entire signature is acceptable. For offset printing, proper ink color can be obtained by using process cyan.

The signature and insignia may be printed in colors other than the standards, only if offset printing in a single color where cost prohibits the use of additional standard colors.



Additional text or other graphic elements should never appear within the neutral area



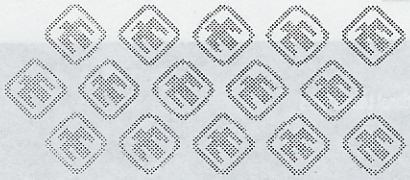
Correct color usage

UNACCEPTABLE
Background to course

UNACCEPTABLE
Incorporates thunderbird into a design

UNACCEPTABLE
Distortion

UNACCEPTABLE
Relationship of insignia and logotype



UNACCEPTABLE
use of insignia to create new design element

Unacceptable Sandia Signature Usage

To the left are some of the most common offenses against our corporate identity. The above description is intended as an overview, please contact your 7155 SDR for more information.

A Comment on Letterhead...

Letterhead and business cards are not to be created or designed in The Art Department. Customers needing these products should be referred to ???????

V.e

Appendix: Plant Material Guide

Description of Plant Groupings

Plants have been grouped by general terms such a deciduous or evergreen trees, deciduous or evergreen shrubs, grasses, or other groups.

Within each group are categories or types of use.

Category A
Plants frequently used or reliable performers under a variety of conditions.

Category B
Secondary plants less frequently used due to maintenance considerations or that exhibit a higher level of site sensitivity in certain locations.

Category C
Plants considered experimental in Albuquerque. Examples of these plants can be found in Albuquerque, but there may only be a small (1 to 5) known number of examples. These plants should be used sparingly, such as one experimental plant per project.

Category D
Plants believed to survive on natural rainfall. These plants require water until established or else growth will be sparse.

Plants that are noted on the Plant Material Matrix are noted by an asterisk (*) and are italicized.

Also included is a native grass seed mix list for various portions of the site.

Type	Comments
Bulbs	
Category A	
Iris spp. - Iris	
Muscari armeniacum - Grape Hyacinth	
Narcissus 'King Alfred' - Daffodil	
Tulipa spp. - Tulip	
Category B	
Crocus verna - Dutch Crocus	
Gladiolus hortulanus - Garden Gladiolus	
Hyacinthus orientalis - Common Hyacinth	

Type	Comments
Grasses**	
Category A	
Cortaderia selloana - Pampas Grass	
**Festuca - Fescues*	
Festuca ovina glauca - Blue Fescue	
Miscanthus sinensis gracillimus - Slender Miscanthus	Limited availability
Poa spp. - Bluegrass spp.	
Ryegrass	
Category C	
Calamagrostis acutiflora stricta - Feather Red Grass	Limited availability
Miscanthus floridulus - Giant Miscanthus	Limited availability
Panicum - Swithchgrass	Limited availability
Pennisetum alopecuroides - Fountaingrass	Limited availability
Pennisetum setaceum - Fountaingrass	Limited availability
Category D	
Bouteloua curtipendula 'Niner' - Sideoats Grama	
**Bouteloua gracilis 'Hachita' - Blue Grama*	
**Buchloe dactyloides 'Sharp's Improved' - Buffalo Grass*	Needs water to get established
Eragrostis lehmanniana - Lehman's Lovegrass	
Hilaria jamesii 'Viva' - Viva Galleta	
**Oryzopsis hymenoides - Indian Rice Grass*	
Sporobulus cryptandrus 'Palome' - Sand Drop Seed	

**Noted on the Plant Material Matrix*

***See Native Grass Seed Mix List for various portions of the site*

Type	Comments
Deciduous Ground Covers	
Category A	
Cerastium tomentosum - Snow-in-Summer	
Lonicera japonica 'Halliana' - Hall's Honeysuckle	
Category C	
**Potentilla sp. - Potentilla (Cinquefoil)*	
Evergreen Ground Covers	
Category A	
**Euonymus fortunei - Creeping Euonymus*	
Hedera helix 'Baltica' - Baltic Ivy	
Hedera helix 'Hahns' - Hahns Ivy	
Sedum spp. (Dragonsblood et al) - Sedum	
**Vinca major - Myrtle*	
**Vinca minor - Dwarf Periwinkle*	
Category B	
Ajuga repens - Ajuga (Bugleweed)	
Baccharis pilularis - Dwarf Coyotebrush	Borderline cold tolerance
Fragaria spp. - Strawberry	
Mahonia repens - Creeping Mahonia	
Category C	
Abelia grandiflora 'Prostrata' - Protrate Abelia	
Rosmarinus officinalis prostratus - Dwarf Rosemary	Borderline cold tolerance

**Noted on the Plant Material Matrix*

Type	Comments

Herbaceous Perennials

Category A

Achillea millefolium - Yarrow
Achillea taygetea - Moonshine Yarrow
Centranthus ruber - Red Valerian
Cerastium tomentosum - Snow in Summer
Ceratostigma plumbaginoides - Dwarf Plumbago
Coreopsis lanceolata -
Species and hybrid Coreopsis
Gaillardia grandifloria - Blanketflower
Hemerocallis hybrids - Daylilies
Iris hybrids - Bearded Iris
Linum lewisii - Blue Flax
Penstemon strictus - Rocky Mountain Penstemon
Stachys lanata - Woolly Lamb's Ear
Thymus citroides - Lemon Thyme
Chrysanthemum spp. - Daisies & Mums

Category D

Artemisia frigida - Fringed Sage
Artemisia ludoviciana - Prairie Sage
Asclepias tuberosa - Butterfly Weed
Oenothera speciosa - Mexican Evening Primrose
Penstemon cardinalis - Cardinal Penstemon
Penstemon eatonii - Firecracker Penstemon
Penstemon pinifolius - Pineleaf Penstemon
Penstemon thurberii - Thurber's Penstemon

Type	Comments
Deciduous Shrubs	
Category A	
Abelia	
Abelia 'Edward Goucher'	
**Abelia grandiflora - Glossy Abelia*	
Buddleia davidii - Common Butterfly Bush	
Cortaderia selloana - Pampas grass	
Cotoneaster	
**Cotoneaster lacteus - Parneyi Cotoneaster*	Collects trash
Euonymus alata - Winged euonymus	
**Forestiera neomexicana - New Mexico Olive*	
Forsythia	
Forsythia 'Beatrix Farrand'	
Forsythia 'Linwood Gold'	
Forsythia intermedia	
**Hibiscus syriacus - Althea (Rose of Sharon)*	
Lagerstroemia indica - Crape Myrtle	
Lonicera spp. - Honeysuckle (shrub)	
Miscanthus gracilis - Slender Miscanthus	
Philadelphus coronarius - Sweet mock orange	
Potentilla fruticosa - Shrubby cinquefoil	
Punica granatum - Pomegranate	
Sumac	
Rhus glabra - Smooth Sumac	
Rhus typhina - Staghorn Sumac	
**Salvia greggii - Cherry Sage*	
Spiraea	
Spiraea prunifolia - Bridal Wreath	
Spiraea ssp. - Bridal Wreath	
Spiraea vanhouttei - Van Houtte	
Syringa spp. - Lilac	
Vitex agnus-castus - Vitex	
Weigela florida - Weigela	
Wisteria sinensis - Wisteria	

**Noted on the Plant Material Matrix*

Type	Comments
Category B	
Artemisia ludoviciana - Prairie sage	
**Caryopteris clandonensis - Blue Beard Blue Mist*	
**Chaenomeles japonica - Flowering quince*	Limit use due to thorns
Chaenomeles speciosa vars. - Flowering Quince	Limit use due to thorns
Cornus stolonifera - Red Twig Dogwood	May get aphids
Jasminum nudiflorum - Flowering jasmine	Borderline cold tolerant
Raphiolepis indica - India hawthorn	Borderline cold tolerant
Spartium junceum - Spanish Broom	Borderline cold tolerant
Viburnum opulus 'Roseum' - Snowball	
Category C	
Genista lydia - Summer Broom	
Genista tinctoria - Summer Broom	
Larrea tridentata - Creosotebush	Borderline cold tolerant
Poinciana gilliesii - Bird of Paradise	Borderline cold tolerant
Category D	
**Cercocarpus montanus - Mountain Mahogany*	
**Chrysothamnus nauseosus - Chamisa*	
Dalea scoparia - Broom Dalea	
Eurotia lanata - Winterfat	
**Fallugia paradoxa - Apache Plume*	
**Rhus trilobata - Three Leaf Sumac*	
Salvia pinquefolia - Rock Sage	
Evergreen Shrubs	
Category A	
Buxus microphylla japonica - Japanese Boxwood	
Cotoneaster dammeri - Bearberry Cotoneaster	
Cotoneaster lowfast - Lowfast Cotoneaster	
Euonymus japonica - Evergreen Euonymus	
Euonymus japonica microphylla - Boxleaf Euonymus	

**Noted on the Plant Material Matrix*

Type	Comments
Category A (cont.)	
Juniper	
Juniperus chinensis 'Armstrong' - Armstrong Juniper	
Juniperus horizontalis 'Emerald Spreader' - Emerald	
Spreader Juniper	
Juniperus horizontalis 'Wiltonii' - Blue Carpet Juniper	Does not hold color in winter
Juniperus procumbens - Japanese Garden Juniper	
Juniperus sabina 'Broadmoor' - Broadmoor Juniper	
Juniperus sabina 'Buffalo' - Buffalo Juniper	Used frequently
Juniperus sabina tamariscifolia - Tam Juniper	
**Photinia fraseri - Fraser's Photinia*	
Pinus mugo mughus - Mugo Pine	
Yucca recurvifolia (Yucca pendula) - Softleaf Yucca	
Category B	
Aucuba japonica - Aucuba	Use only in shady areas
Baccharis pilularis - Coyotebush	Borderline cold tolerance
Berberis repens - Creeping Mahonia	
**Elaeagnus pungens - Silverberry*	Tends to be eaten by rabbits.
Holly	
Ilex cornuta 'Burfordii' - Burford Holly	
Ilex crenata convexa	
Ligustrum texanum - Waxleaf Ligustrum (Privet)	Borderline cold tolerance
Picea glauca 'Conica' (Picea albertiana) - Alberta Spruce	
Thuja spp. - Arborvita	
Category C	
Agave neomexicana - Century Plant	
Larrea tridentata - Creosotebush	
Photinia serrulata - Chinese Photinia	
Rosmarinus officinalis 'Prostrata' - Prostrate Rosemary	Borderline cold tolerance

**Noted on the Plant Material Matrix*

Type	Comments
Category D	
Artemisia cana - Silver Sage	
Artemisia filifolia - Threadleaf or Sand Sage	
Artemisia tridentata - Big Sage (Sagebrush)	
**Atriplex canescens - Fourwing Saltbush*	
Atriplex gardneri - Gardner Saltbush	
Ceratoides lanata - Winterfat	
Chrysothamnus nauseosus - Chamisa	
Nolina microcarpa - Beargrass	
Salvia dorrii - Desert Sage	
Decidous Vines	
Category A	
**Campsis radicans - Trumpet Vine*	Fragrant
Lonicera spp. - Honeysuckle	Rangy
**Parthenocissus quinquefolia - Virginia Creeper (et al)*	
**Parthenocissus tricuspidata - Boston Ivy*	Cling tightly to north walls
**Wisteria sinensis - Chinese wisteria*	
Category B	
Jasminum nudiflorum - Winter Jasmine	
Polygonum aubertii - Silver Lace Vine	Rangy
Evergreen Vines	
Category A	
Euonymus fortunei 'Colorata' - Purpleleaf Wintercreeper	
**Hedera helix 'Baltica' - English Ivy*	
Hedera helix 'Hahn's' - Hahn's Ivy	
Category C	
Lonicera spp. - Honeysuckle	Not reliably evergreen

**Noted on the Plant Material Matrix*

Type	Comments
Deciduous Trees	
Category A	
Acer saccharinum - Silver Maple	Weak limbed, shallow root
Betula papyrifera - Clump Birch	
Forestiera neomexicana - New Mexico Olive	Let grow naturally, do not prune
Fraxinus oxycarpa - Raywood Ash	Used in 962 Parking Lot
Fraxinus pennsylvanica lanceolata "Marshall's" - Marshall Ash -	
Fraxinus pennsylvanica lanceolata "Summit" - Summit Ash	Used frequently
Fraxinus velutina "Modesto" - Modesto Ash	Faster growth than other Ashes
Fraxinus velutina - Arizona Ash	
Gleditsia triacanthos inermis "Imperial" - Imperial Honey Locust	
**Gleditsia triacanthos inermis "Shademaster" - Shademaster Honey Locust*	Used frequently
**Koelreuteria paniculata - Golden Rain Tree*	
**Malus "Spring Snow" - Spring Snow Crab*	Fruitless variety
Malus ioensis plena - Bechtel Crab	Nearly fruitless variety
**Pistacia chinensis - Chinese Pistache*	Used north of 878
**Pyrus spp. - Pears*	
Sophora japonica - Japanese Pagoda	
Category B	
Acer palmatum - Japenss Maple	Needs shade
Carya illinoiensis - Pecan	Limit use due to nuts
Catalpa speciosa - Western Catalpa	Seed pods are problematic
**Celtis occidentalis - Common Hackberry*	
**Chilopsis linearis - Desert Willow*	
**Crataegus phaenopyrum - Washington Hawt*	
**Elaegnus angustifolia - Russian Olive*	Prone to borer infestations
Morus alba - Fruitless Mulberry	Pollen producer, restrict use
Platanus acerifolia - London Plane Tree	Leaves and seeds are maintenance problem
Populus alba - White Poplar	Do not use near any utilities or paving

**Noted on the Plant Material Matrix*

Type	Comments
Category B (cont.)	
Populus angustifolia - Narrowleaf Cottonwood	Do not use near any utilities or paving
Populus canadensis - Carolina Poplar	Do not use near any utilities or paving
Populus fremontii - Fremont Cottonwood	Do not use near any utilities or paving
Populus sargenti - Plains Cottonwood	Do not use near any utilities or paving
Populus wislizeni - Rio Grande Cottonwood	Do not use near any utilities or paving
**Prunus cerasifera spp. - Purpleleaf Plum*	Prone to borer infestations
Prunus serrulata spp. - Flowering Cherry	Prone to borer infestations
Robinia pseudoacacia "Inermis" - Globe Locust	
Robinia pseudoacacia "Purple Robe" - Purple robe Locust	Use boxed material only
Salix baylonica - Weeping Willow	Do not use near any utilities or paving
Salix matsudana "Navajo" - Globe Navajo Willow	Do not use near any utilities or paving
Salix matsudana "Tortuosa" - Corkscrew Willow	Do not use near any utilities or paving
Category C	
Acer grandidentatum - Bigtooth Maple	Limited availability
Acer negundo - Boxelder	
Acer platanoides - Norway Maple	
Acer pseudoplatanus - Sycamore-leaf Maple	
Aesculus californica - California Buckeye	Limit use due to fruits
Aesculus carnea - Red Horsechestnut	Limit use due to fruits
Aesculus hippocastanum - Common Horsechestnut	Limit use due to fruits
Albizzia julibrissin - Silk Tree	Borderline hardiness
Celtis reticulata - Netleaf Hackberry	Limited availability
Cotinus coggygria - Smoke Tree	
Ginkgo biloba - Ginkgo (Maidenhair tree)	
Juglans major - Arizona Walnut	Limit use due to nuts
Juglans regia - English Walnut	Limit use due to nuts
Liquidambar styraciflua - Sweet Gum	Limit use due to nuts
Magnolia soulangiana - Saucer Magnolia	Winds damage flowers, Ph problems
Platanus wrightii - Arizona Sycamore	

**Noted on the Plant Material Matrix*

Type	Comments
Category C (cont.)	
Populus tremuloides - Aspen	North sides of multi-buildings only
Prosopis glandulosa torreyana - Mesquite	Borderline hardiness
Quercus macrocarpa - Bur Oak	
Robinia neomexicana - Rose Lucust	
Tulipifera liriodendron - Tulip Tree	Blossoms are lost in Spring winds
Ziziphus jujuba - Chinese Jujbe	Has fruit
Category D	
Quercus gambeli - Gambel Oak	Good in small groves
Evergreen Trees	
Category A	
**Picea pungens - Colorado Spruce*	
**Pinus nigra - Austrian Pine*	Somewhat resistant to pine tip moth
Pinus sylvestris - Scotch Pine	
Category B	
**Juniper*	
Juniperus chinensis "Corymbosa" - Corymbosa Juniper	
Juniperus chinensis "Keteleer" - Keteleer Juniper	
Juniperus chinensis "Torulosa" - Hollywood Twister Juniper	
Juniperus virginiana "Cupressifolia" - Hillspire Juniper	
Pines	
Pinus ponderosa - Ponderosa Pine	Gets pine tip moths
**Pinus thunbergiana - Japanese Black Pine*	
**Pinus edulis - Pinon Pine*	Prone to aphids and other infestations

**Noted on the Plant Material Matrix*

Type	Comments
Category B (cont.)	
**Cupressocyparis leylandii - Leyland False Cypress*	
**Cupressus arizonica - Arizona Cypress*	
Pseudotsuga menzelsii - Douglas Fir	
Yucca torreyi or Yucca thompsoniana or Yucca elata - Palm Yucca	
Category C	
Abies concolor - White Fir	Suffers in heat
Calocedrus decurrens - Incense Cedar	
Cedrus atlantica - Atlas Cedar	
Cedrus deodara - Deodar Cedar	Used on east side of Building 858
Cedrus libani - Cedar of Lebanon	
Pinus eldarica - Afghan Pine	Borderline cold tolerance
Pinus flexilis - Limber Pine	
Pinus pinea - Italian Stone Pine	
Prunus caroliniana - Carolina Laurel	Borderline cold tolerance
Sequoiadendron giganteum - Giant Redwood (Sequoia)	
Thuja plicata - Western Red Cedar	
Category D	
Juniper	
Juniperus monosperma - Single-seed Juniper	
Juniperus osteosperm - Utah Juniper	
Juniperus scopulorum "Emerald Green" - Emerald Green Juniper	
Juniperus scopulorum - Rocky Mountain Juniper	

**Noted on the Plant Material Matrix*

Native Grass Seed Mix List

Native Grass Seed Mix "A" (for areas adjacent to fences)

Common Name	Botanical Name
Blue Grama	Bouteloua eriopoda 'Nogal'

Native Grass Seed Mix "B" (for south portion of site)

Common Name	Botanical Name
Plains Lovegrass	Eragrostis intermedia
Sand Dropseed	Sporobolus cryptandrus
Blue Grama	Bouteloua eriopoda
Alkali Sacaton	Sporobolus airoides
Indian Ricegrass	Oryzopsis hymenoides
Mesa Dropseed	Sporobolus flexuosus
Viva Galleta	Hilaria jamesii "Viva"
Bottlebrush Squirreltail	Sitanion hystrix
Bush Muhly	Muhlenbergia porteri
Purple Three-Awn	Aristida purpurea

Native Grass Seed Mix "C" (for outlying areas of site)

Common Name	Botanical Name
Plains Lovegrass	Eragrostis intermedia
Sand Dropseed	Sporobolus cryptandrus
Blue Grama	Bouteloua eriopoda
Alkali Sacaton	Sporobolus airoides
Indian Ricegrass	Oryzopsis hymenoides
Mesa Dropseed	Sporobolus flexuosus
Viva Galleta	Hilaria jamesii "Viva"
Bottlebrush Squirreltail	Sitanion hystrix
Bush Muhly	Muhlenbergia porteri
Purple Three-Awn	Aristida purpurea
Chamisa	Chrysothamnus nauseosus
Apache Plume	Fallugia paradoxa
Winterfat	Ceratoides lanata
Sand Sage	Artemesia filifolia
Four wing Saltbush	Atriplex canescens

Native Grass Seed Mix "D" (for drainage swale areas of site)

Common Name	Botanical Name
Blue Grama	Bouteloua eriopoda
Buffalo Grass	Buchloe dactyloides
Viva Galleta	Hilaria jamesii "Viva"
Purple Three-Awn	Aristata purpurea