Chapter Six
Development Guidelines

6.1 Introduction

Development guidelines are included in this Master Plan 2003 Update to quantify or further define the general concepts and planning intentions set forth in Chapter 5. Although there is flexibility within the Master Plan, certain key relationships, patterns, and standards should be adhered to or considered when developing site or building projects to ensure that the desired functional characteristics and campus character are achieved. The Development Guidelines define these key elements and provide recommendations for their implementation.

Subjects addressed in this chapter include issues of building size and scale, definition of open spaces, site character and quality, as well as access and circulation. Phased implementation is recommended in this chapter as a logical sequence of construction and demolition, providing a means to efficient and effective use of the site. Phasing will be subject to actual program needs and available funding.

These Guidelines supplement the NIH Design Policy and Guidelines, which include NIH Physical Security Design Guidelines.

6.2 Building and Siting Guidelines

6.2.1 Setbacks and Build-to-Lines

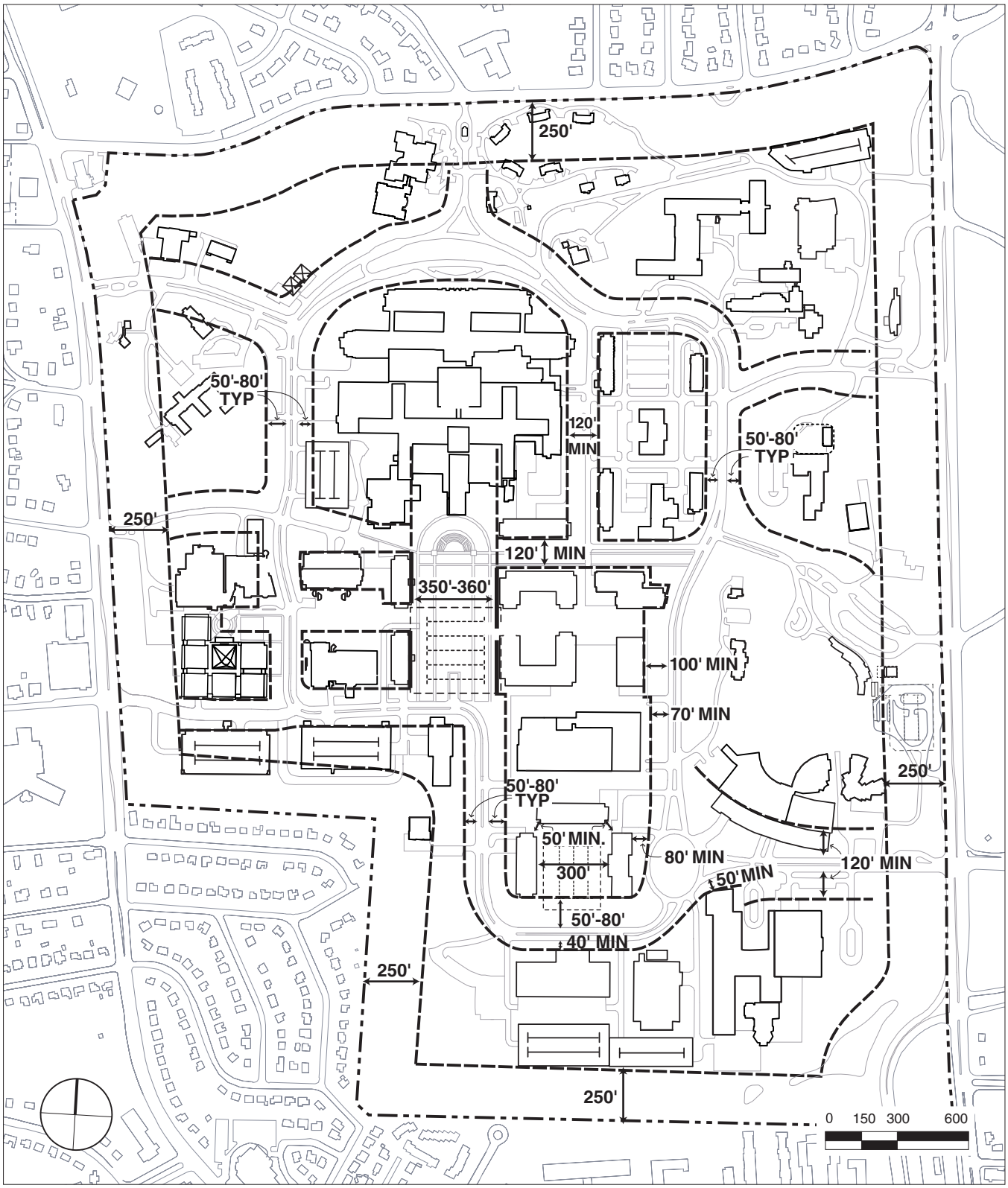
Major Building Setbacks

On a campus-wide basis, the Master Plan proposes general patterns of setbacks for buildings from major roadways to control density, ameliorate the scale of buildings, and ensure the development of a “campus” character to the site. Along internal roadways, buildings should generally not be any closer than 50 to 80 feet from roadway curb lines. Where exceptionally large buildings occur, or at prominent campus addresses such as the Center Drive/Rockville Pike entrance and the area in front of the Clinical Center Complex, building setbacks should be in the 80 to 150 feet range. In order to maintain a clear relationship between building entries and roadways, it is recommended that no new structures be set back more than 180 feet from their principal roadway. See Figure 6.2.1.

At the perimeter of the site, the buffer zone setbacks should be acknowledged by excluding new buildings and surface parking within this area. The buffer should be maintained at 250 feet throughout the entire campus perimeter. See Section 5.2.4 for more detailed discussion of buffer zone characteristics.

Within the campus there are two proposed major open spaces, which have critical minimum dimensions. The first space is the Central Mall, which has a minimum width dimension of 350 to 380 feet. This width corresponds to the distance between the C and G wings of the existing Clinical Center. The second major space to be defined is the South Quad, which has a minimum width dimension of 300 feet by 300 feet to ensure an appropriate proportion to the space.

In general, enclosed open spaces are perceived to be comfortable in scale if the proportion of the width of the open space to the height of surrounding structure is between 2.5:1 and 3.5:1. Spaces, which have a proportion greater than 2:1 create an “urban” feel, and require significant, shadow considerations. To fall within these proportional guidelines, the buildings, which will form the “walls” of the Central Mall, should be a minimum of 100 feet and a maximum of 160 feet high. Building faces along the east and west sides of the Central Mall should align to create uniformity to the enclosure, edge treatment, and width of the space.



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2003 Update
Bethesda Campus

SETBACK LINE
BUILD-TO LINE

Figure 6.2.1

Major Building Setbacks

To avoid the perception of the Central Mall as being too narrow and long, the desired proportion of the width to length of the mall is recommended at between 1:2 and 1:3. With a recommended width of between 350 and 380 feet and a total length of approximately 1200 feet, the proposed width to length proportion is about 1:3. From the south end of the mall to the amphitheater and trees on the north, the proportion is approximately 1:2. The length of the Central Mall is also based on the need to connect the north and south portions of the site, a distance of approximately 2,600 feet from the loop road on the north to the loop road on the south.

The scale and integrity of buildings within the Historic Core (Buildings 1 through 5) should be protected. A minimum setback of 120 feet to the nearest buildings on the west and south sides is recommended.

6.2.2 Building Heights

General Campus Height Plan

Proposed building heights follow the Master Plan building height concept of placing the highest buildings near the center of campus and transitioning to low buildings at the perimeter. Transitions in building heights are also made near the structures of the Historic Core. Figure. 6.2.2-a indicates the recommended maximum heights of new construction on campus. This height limit includes all occupiable floors (excluding interstitial floors and mechanical penthouses), and should be measured from the average grade at the perimeter of the structure. Figure 6.2.2-a is intended as a general campus-wide guideline. Within this overall building height framework there are particular areas, which require special consideration upon implementation of nearby construction. These areas are listed later in this section under Critical Areas.

An important concept in the development of height limitations at the perimeter of the site is the imposition of an allowable height envelope corresponding to a 1:5 height to distance ratio, extending approximately 750 feet into the NIH campus on the north, west and south sides. This ratio limits the height of any proposed new structure to one foot for every five feet of distance measured perpendicularly from the property line of parcels adjacent to the NIH campus, except along Rockville Pike where building height concerns are lessened. There are four primary reasons for using the 1:5 height ratio:

- In relation to the discussion of spatial definition in Section 6.2.1, generally accepted urban design guidelines indicate that areas, which have a height to distance ratio greater than 1:4, do not feel enclosed. Therefore, a 1:5 ratio will provide an even greater sense of openness at the perimeter of the site.
- A person's primary cone of vision is about 30 degrees above the horizon. Objects which fall within this visual zone block the observer's view of the sky, thus giving a greater or lesser sense of enclosure depending on the amount of the sky-plane which is blocked. The 1:5 height ratio corresponds to approximately 11.5 degrees, so that an object within this height envelope would obstruct less than half of the viewer's sky-plane.
- A 1:5 ratio is typical of surrounding residential neighborhoods. In surrounding areas, houses tend to be 2 stories tall ("20 feet) and about 100 feet apart at rear yards.
- Almost all of the current buildings on the NIH campus fall within the 1:5 height to distance ratio.

The recommended building heights were determined from three-dimensional massing studies of the relationships between proposed and existing structures on campus, and to fall within the 1:5 height envelope at the perimeter of the campus. Heights have been arranged to create a coherent pattern among all campus buildings and to give a sense of hierarchy or prominence to the most important ones. In general, the tallest buildings are located on the Central Mall. The building heights shown also accommodate

building construction sufficient for the attainment of the proposed Master Plan development program as described in Section 5.1.3.

Critical Areas

The Master Plan minimizes the effects of new construction on neighboring areas off campus. Within the campus, special attention has been given to creating appropriately scaled open spaces and relationships between new and existing buildings. Areas of significant attention to scale issues include: development adjacent to the Convent Building 60; development near the Historic Core quad; the Central Mall; the potential development parcels near the Metro station; and the areas adjacent to the south perimeter of the campus which directly abut residential neighborhoods. Figures 6.2.2-c, and 6.2.2-d illustrate in section form the Master Plan intentions for building envelopes in these sensitive areas. Sectional drawings indicate the desired target heights of buildings as used to calculate the target square footage areas listed in Table 5.2.3-a.

6.2.3 Ground Level Activity and Use

In all areas of the campus it is desired that buildings present an accessible appearance at ground level. Building entries should be designed to address streets or major spaces. Blank walls without fenestration should be avoided.

In particular, ground level activities and uses are encouraged around the Central Mall. This area should become the central meeting place of the campus. Numerous building entries and ground level activities, which open out into the mall, will aid in creating this sense of vitality and centrality.

Pedestrian movement can also add to the vitality of public spaces on campus. Spaces should be designed to accommodate and encourage pedestrians comfortably. Walkways within the major open spaces should be of high quality materials, shaded, and equipped with seating and furnishings where appropriate. Buildings around the major open spaces may also include arcades to encourage pedestrian movement in inclement weather.

6.2.4 Density and Bulk

Maintaining a “campus” character and image for the site is an important aspect of the Master Plan. To ensure that an appropriate proportion of open space and landscape is maintained, it is important to control the density of buildings on campus. Generally, development should be denser at the core of the campus than at the periphery. However, filling in of open spaces shown in the Master Plan by additional construction is discouraged as this may diminish the character and quality of the open spaces, as well as impede views and light available to other buildings.

Building bulk in future development should also be limited. The Master Plan concept creates quads or groups of buildings made up of individual building modules, which can be implemented incrementally over time. Where possible, building modules should be limited to footprints of 40,000 gsf or less, with no dimension greater than 300 feet in any direction. Long buildings creating the appearance of a wall should be avoided, especially near the perimeter of the site.

6.2.5 Rooftop Elements

Rooftop elements such as parapets, penthouses, exhaust stacks and antennas should be carefully designed to ensure architectural compatibility and to minimize their

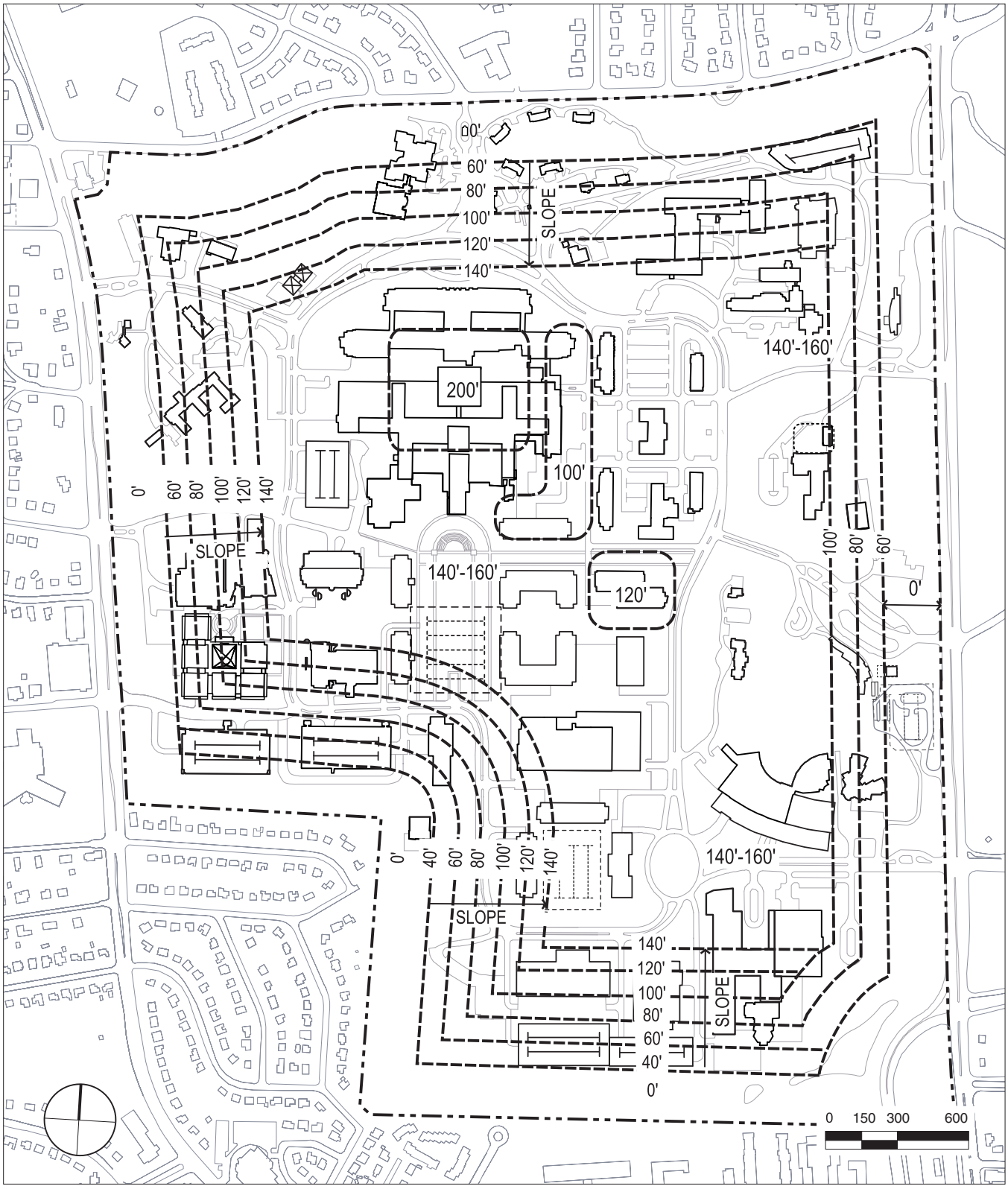

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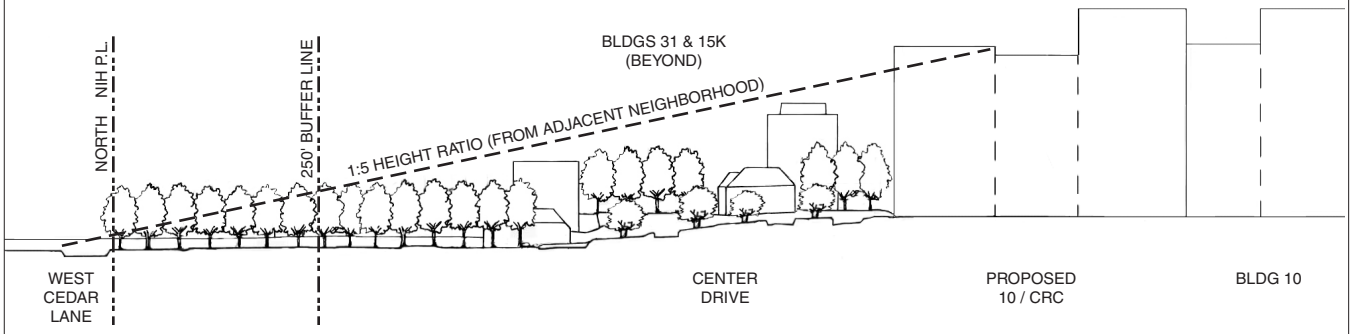
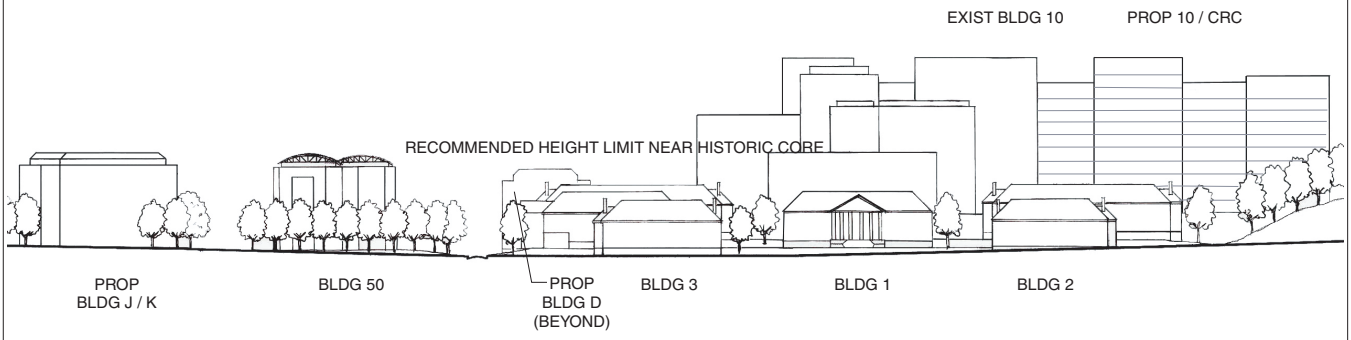
Figure 6.2.2-a

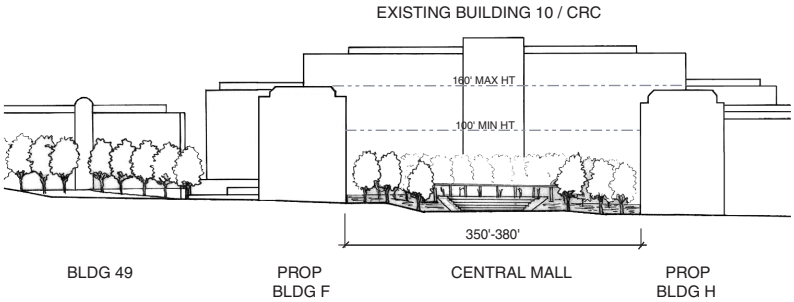
Recommended Maximum Building Heights



1 Recommended Building Envelopes for North Campus Area - View Toward East



2 Recommended Building Envelopes near Historic Core - View Toward West



3 Recommended Building Envelopes at Central Mall - View Toward North

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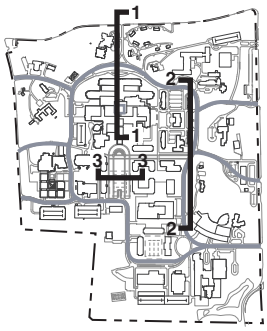

Figure 6.2.2-b

Building Envelopes Critical Areas

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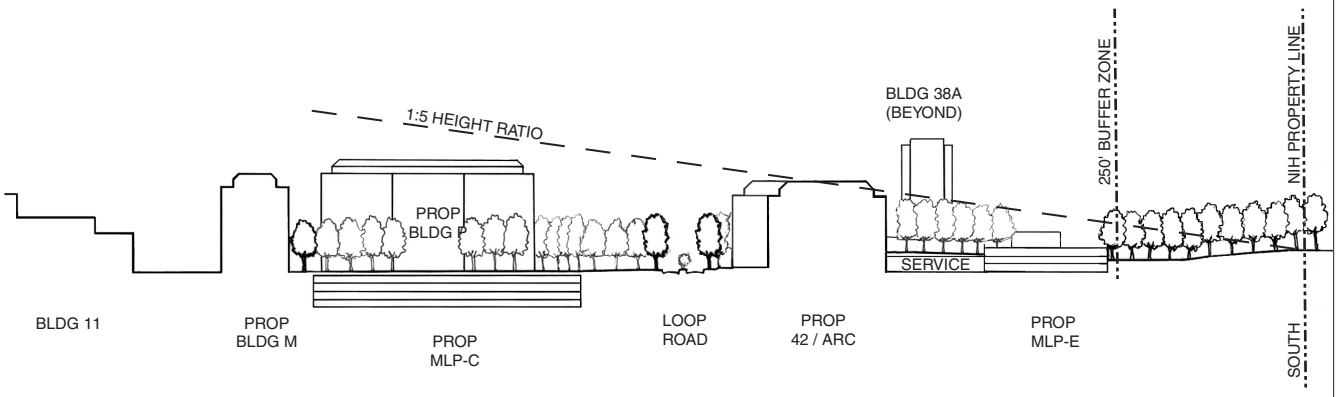
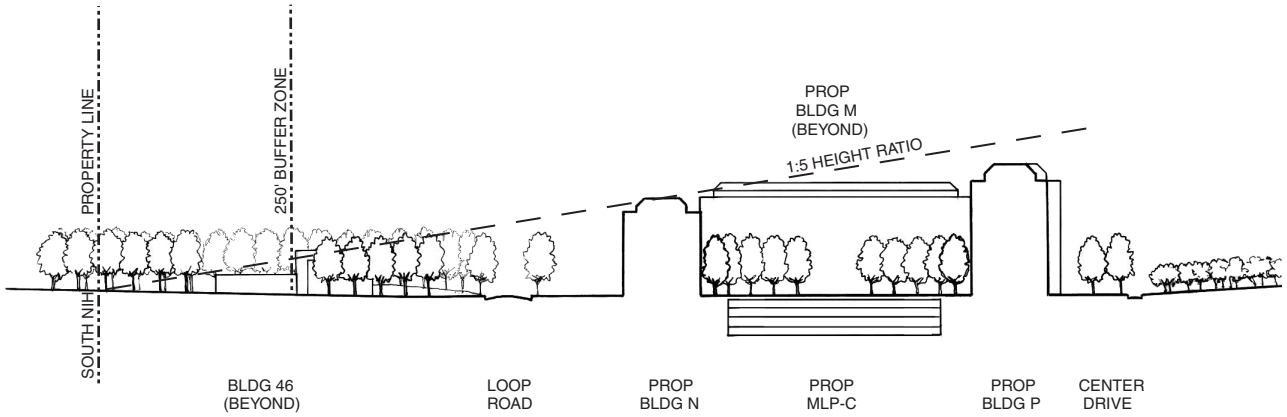
SmithGroup



1 Recommended Building Envelopes for South Quad from South Property Line - View Toward East



2 Recommended Building Envelopes for South Quad from Southwest Property Line - View Toward North

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Bethesda Campus

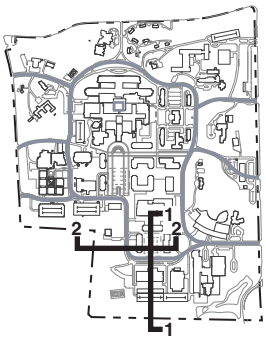

Figure 6.2.2-c

Building Envelopes Critical Areas

NIH / ORF /DFP

Oudens & Knoop, Architects, P.C.

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visual impact on the skyline. Mechanical and elevator penthouses should create visually attractive roofscapes and rooflines for the NIH campus. These elements should be integrated into the architectural expression of the building, and can be articulated as an attic story or hidden within the roof form of the structure. All rooftop equipment should be screened from view using materials consistent with the major building facades.

Installation of rooftop antennas, including satellite and microwave dishes, should be carefully considered for location and visual impact. Antennas should be installed at the lowest possible elevation above the roofline, and screened to the extent practicable from public view. Antennas should be set back as far as possible from all edges of the roof (20 feet at a minimum). Rooftop antennas, which cannot be screened, should be placed in association with penthouse structures so as to avoid the appearance of a freestanding object on the roof. Antenna and mounting materials should be unobtrusive and of a color that blends with surrounding buildings. Antennas should be protected against corrosion, securely mounted, and adequately grounded to protect against lightning strike.

6.3 Historical and Archeological Guidelines

6.3.1 Historical Guidelines

As discussed in Section 4.6.1, to date NIH and the Maryland Historical Trust (MHT) have agreed that the following sites meet the criteria for listing in the National Register of Historic Places:

- The Historic Core
  - Building 1 — Administration Building
  - Building 2 — Office/Administration
  - Building 3 — Office/Administration
  - Building 4 — Research
  - Building 5 — Research
  - Building 6 — Research
- Building 7 — Research
- Buildings 15B1-15G2, 15H, and #15I — The Officers' Quarters
- Building 15K — Wilson House (Tree Tops)
- Building 16/16A — George Freeland Peter Estate (Stone House and Caretaker's Residence)
- Building 38 — National Library of Medicine
- Building 60 — Convent Building

Buildings that have been evaluated and do not meet the criteria for listing in the National Register of Historic Places include:

- Building 8 — Research
- Building 9 — Research
- Building 10 — Clinical Center
- Building 61 — Caretaker's Cottage (Convent)

It is possible that other resources not yet evaluated may also meet the criteria for listing in the National Register of Historic Places, or that other buildings, upon reaching 50 years of age, will be eligible for listing. (Under Section 110 of the National Historic Preservation Act, federal agencies are required to identify and evaluate historic resources and to ensure that the resources are managed and maintained in a manner that is sensitive to their historic, archaeological, architectural, and cultural values.) NIH is committed to working with the Maryland Historical Trust (the State Historic

Preservation Office) to evaluate the potential historic significance of buildings that are approaching 50 years of age. Until these evaluations are complete, NIH acknowledges that cultural resource investigations will be necessary for individual undertakings to be submitted under Section 106 review. (Under Section 106 of the National Historic Preservation Act, government agencies are required to take into account the effects of planned undertakings on historic resources prior to approving funding for the undertaking.) NIH will continue consultation with the Maryland Historical Trust on these and other issues.

Although a Programmatic Agreement and Historic Resources Management Plan are goals to be considered for the future, it is not possible at this time to fund or implement these documents.

In this regard, the Secretary of the Interior's Standards for Rehabilitation provide basic principles to guide work undertaken on historic buildings. The Standards are as follows:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of distinctive features, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.
7. Chemical or physical treatments, such as sandblasting, that can cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

6.3.2 Archeological Guidelines

Implementation of the NIH Master Plan will necessitate new construction and site improvement, hence ground disturbance. It must be assumed that any archeological resources present at the specific site would be adversely affected by these construction

activities. Figure 4.6 shows the few remaining sites with archeological potential based on the undisturbed nature of the areas. These are identified as archeologically sensitive areas. Future construction in these areas will require Phase I cultural surveys prior to design and construction to satisfy Section 106 of the National Historic Preservation Act criteria for determining archeological significance and potential eligibility for the National Register. If Phase I surveys indicate that the areas contain materials of potential significance, then a Phase II survey will be completed. The scope of the Phase I survey is dictated by public law, which assures that appropriate levels of survey evaluation and mitigation are pursued. The National Historic Preservation Act of 1966, as amended in 1980, directs the Secretary of the Interior to promulgate guidelines for Federal agency responsibilities under Section 110 of the same Act. The *Maryland Historical Trust Archeological Standards and Guidelines* will be followed to complete these requirements.

In the master planning process, efforts were made to avoid or minimize intrusion into archeologically sensitive areas. However, if a sensitive area will potentially be impacted, the site will be evaluated and recommendations for appropriate sampling, recovery of artifacts, or protection in place will be prepared as necessary. It is possible, but not probable, that an alternative building site would have to be chosen or construction delayed if the archeological site were determined to be of great importance. In general, artifact recovery is preferable to avoidance since the historic and archeological value of most sites lies in the information obtainable from the artifacts.

The survey, evaluation and mitigation work (if required) should be completed during the planning of individual building projects and prior to the start of any construction. This releases the site for construction and avoids delays and additional costs once construction is underway.

6.4 Circulation Guidelines

6.4.1 Vehicular

Although no new overall campus peak hour trips will be generated by future NIH growth beyond the trip generation goal defined for the Transportation Management Plan in the 1992 “Memorandum of Understanding”, traffic volumes will increase at some intersections due to the increase of employment and the increase and redistribution of parking within the campus.

The locations of roadway types on campus are presented in Figure 6.4.1-a. In general, lanes are recommended to be eleven feet wide at primary site entries, with the exception of the Lincoln Drive exit where the recommended lane widths are to be ten feet. The loop road is recommended to consist of three different cross section widths; Section B, Section D, and Section E (see below). Lane widths are recommended to be ten feet wide in most other areas. The number of lanes along the loop road was determined based on the peak hour link volumes, the desire to provide for bicycle circulation throughout campus, and the presence of intersecting driveways. Entrance roadways should be median divided, except in sections of the northern part of campus where the existing, undivided roadway provides a woodland appearance. Medians should be a minimum of eight feet wide to allow for adequate planting area. Where curb lane parking is provided, the parking lane should be thirteen or fourteen feet wide for off-peak parking and bicycle traffic. Where provided, bike lanes should be a minimum of five feet wide, clearly designated, and striped to separate them from the main roadway. Following is an explanation of the proposed cross-sections, which are illustrated in Figure 6.4.1-b.

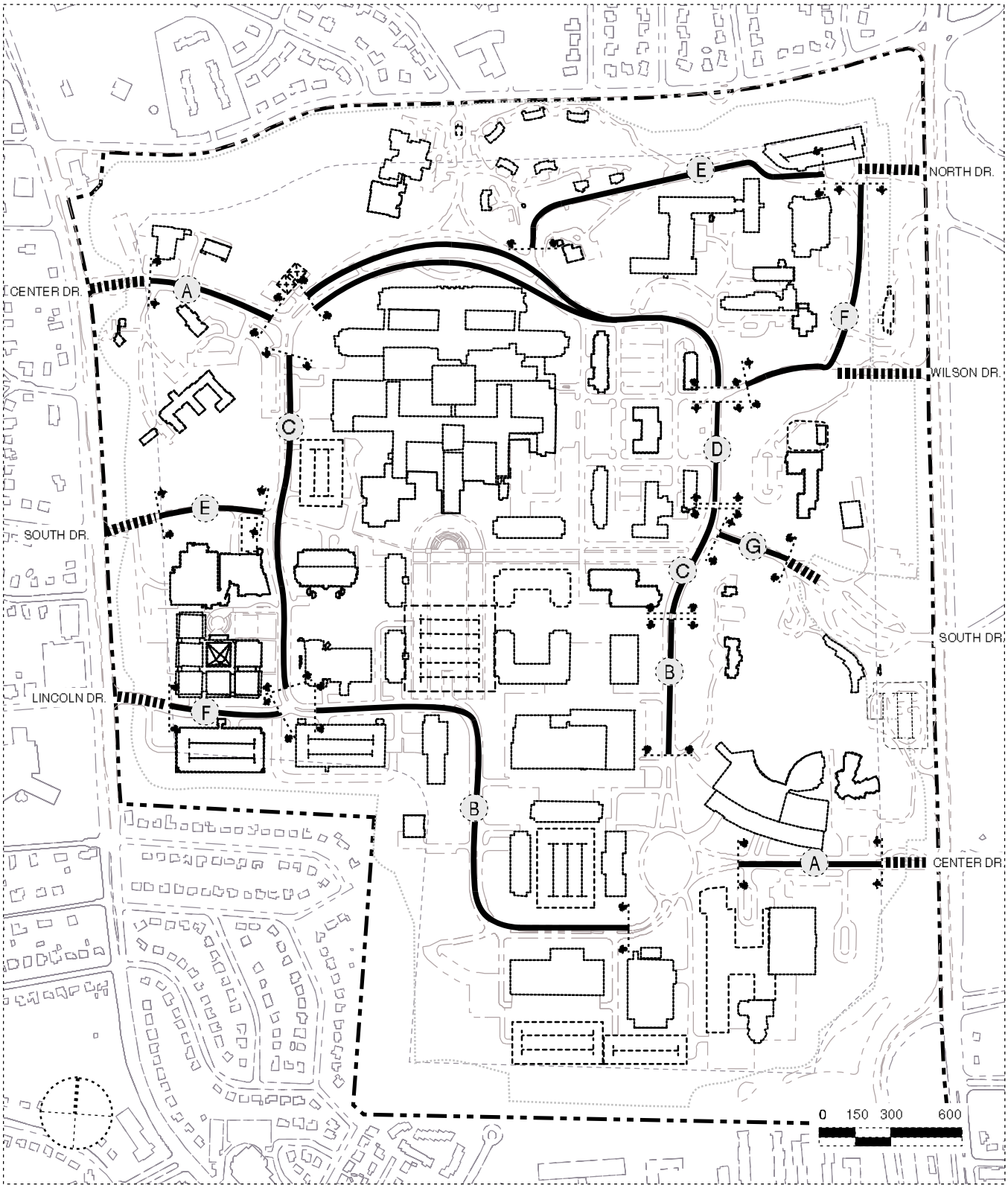

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Figure 6.4.1-a

- (A) 4 LANES, MEDIAN, BIKE LANES - WIDTH 62'
- (B) 4 LANES, MEDIAN, BIKE LANES/OFF-PEAK PARKING - WIDTH 56'
- (C) 2 LANES, BIKE LANES/OFF-PEAK PARKING - WIDTH 48'
- (D) 2 LANES, OFF-PEAK PARKING LANES - WIDTH 40'
- (E) 2 LANES - WIDTH 22'
- (F) 2 LANES, BIKE LANES - WIDTH 30'
- (G) 2 LANES, MEDAIN, BIKE LANES - WIDTH 40'
- VEHICULAR GATE

Roadway Types

- **Section A** is designated for major site entries. The roadway provides four moving lanes with marked bike lanes in both directions. The minimum eleven-foot wide lanes are recommended because of the high volumes of traffic anticipated in this area. No curb parking is allowed in this section.

- **Section B** is the north and south loop road section. This roadway type has one ten foot wide travel lane and one fourteen-foot travel lane in each direction. The ten-foot wide travel lane would be for vehicles only and the fourteen-foot wide lane would serve as an on-street, off-peak parking/bicycle travel lane and a mixed vehicular/ bicycle travel lane during the peak periods. Two travel lanes, separated by a landscaped median, are recommended in each direction during the peak periods since traffic volumes are anticipated to require four moving lanes.

- **Section C** is the west and east loop road section. This roadway type has one ten-foot wide travel lane and one fourteen-foot travel lane in each direction. The ten-foot wide travel lane would be for vehicles only and the fourteen-foot wide lane would serve as an on- street, off-peak parking/bicycle travel lane and a mixed vehicular/ bicycle travel lane during the peak periods. Two travel lanes are recommended in each direction during the peak periods since traffic volumes are anticipated to require four moving lanes. No median is included as part of this cross-section due to the physical constraints of providing for it.

- **Section D** is the loop road in front of Building 1. Due to the constraints of the historic buildings to the west and steep slopes to the east, this roadway section was kept as narrow as possible. The roadway provides two ten-foot wide travel lanes in each direction. Two travel lanes are recommended in each direction since traffic volumes are anticipated to require four moving lanes during the peak periods.

- **Section E** is used for roadways with relatively low traffic volumes or which pass through woodland areas, in an effort to avoid the removal of existing trees. This roadway type has one, eleven-foot travel lane in each direction.

- **Section F** consists of a thirty-foot cross-section with one ten-foot travel lane in each direction with one five-foot bicycle lane in each direction.

- **Section G** is for the East South Drive entry to campus. This roadway type has one eleven-foot wide travel lane and one five-foot exclusive bicycle lane in each direction. There is no on- street parking in this roadway section type.

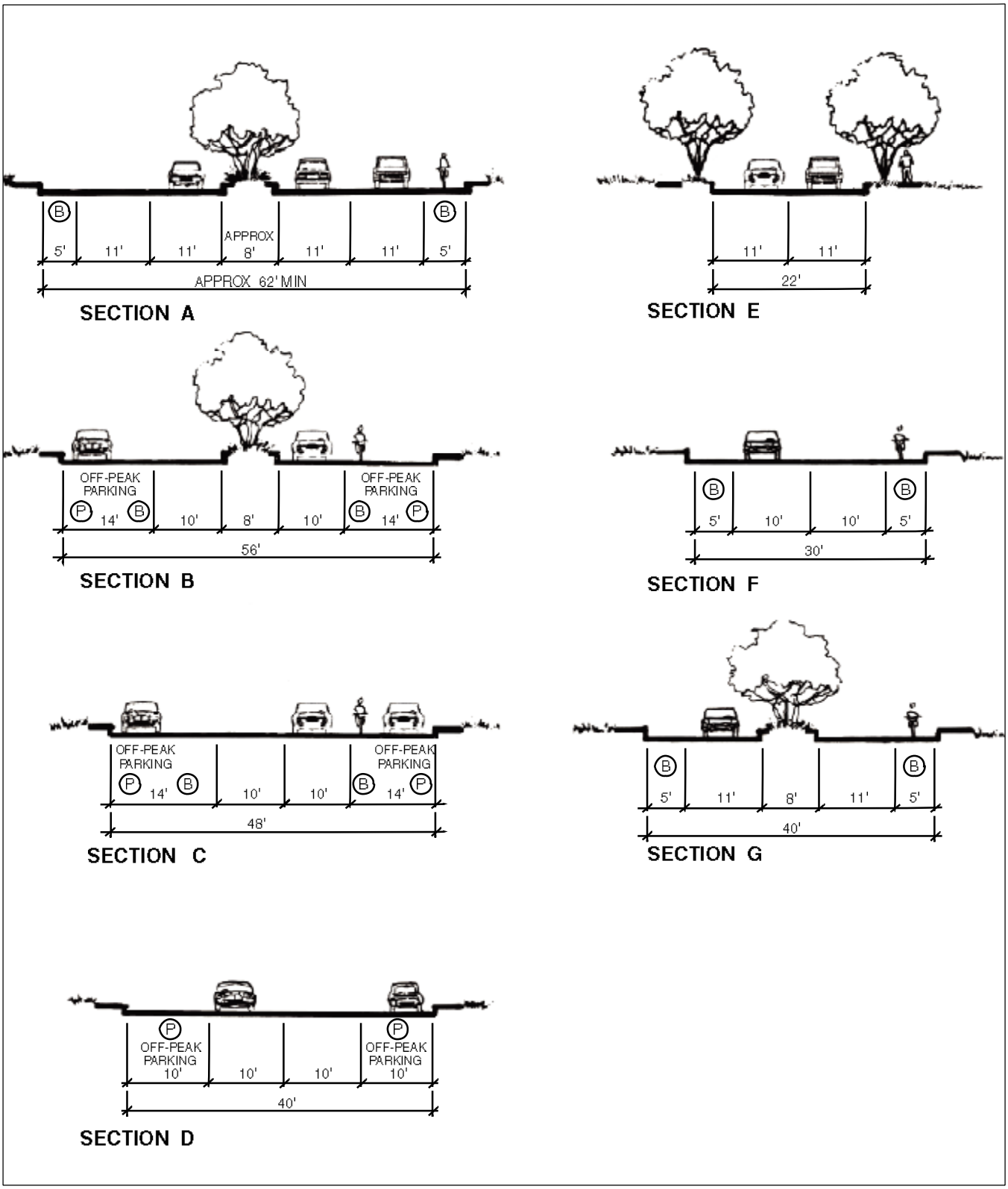

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Figure 6.4.1-b

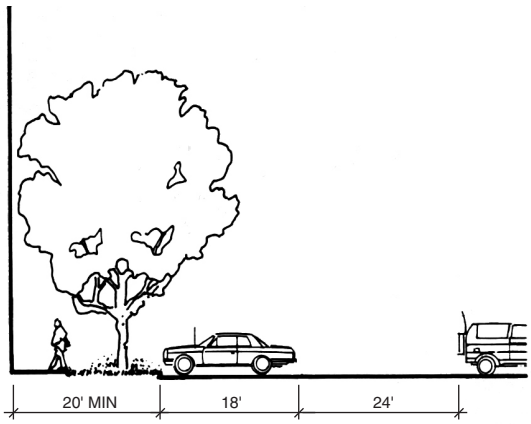
Typical Roadway Sections

6.4.2 Parking

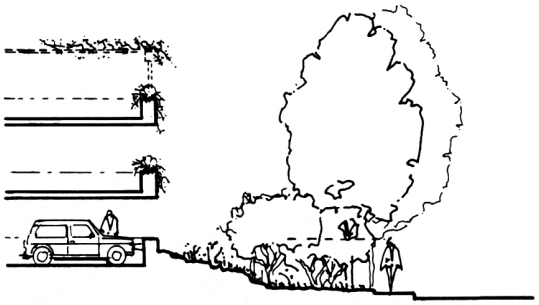
Where possible, surface-parking areas should be reduced within the campus, and surface parking should be removed from the buffer zones at the perimeter of the campus. Surface parking should be screened at its perimeter with planting, berms or low walls. Parking lots should have interior planting islands to break up large expanses of paved area.

Parking decks should be integrated into the topography where possible, and should be screened by landscape or have planting areas integral with their perimeters, such as planter boxes or trellises. For examples of parking screening techniques, see Figure 6.4.2.

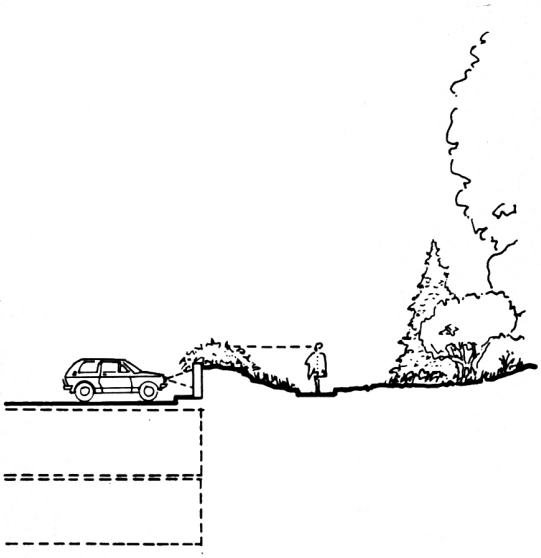
Curbside parking should be designated for limited time and off-peak hour use, with appropriate signage and enforcement. Limiting curbside parking to off-peak hours and limited time periods will maintain a reserve of parking spaces intended for off-campus employees coming to the site for part-day activities. This arrangement will also allow increased traffic flow at peak hours by providing extra travel lanes. Accessible parking for persons with disabilities should be placed as near and convenient to buildings as possible.



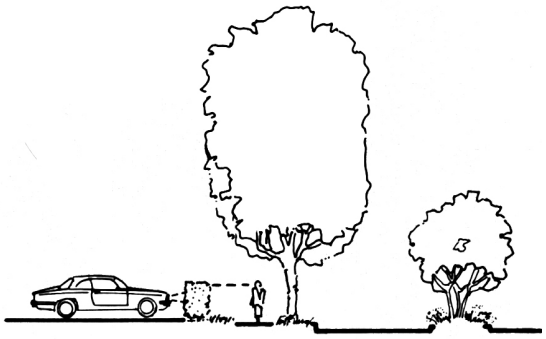
1 TYP SURFACE PARKING NEAR BLDG



2 TYP PARKING DECK SCREENING



3 TYP SURFACE PARKING SCREENING



4 TYP SURFACE PARKING SCREENING

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Figure 6.4.2

Typical Parking Guides

6.4.3 Service

All future commercial delivery truck traffic will access the NIH campus using the CVI truck entrance, where there will be an on-site inspection facility. The truck entrance will be located south of the North Drive employee-only entrance, and will only provide access to the inspection facility. Commercial vehicles, which pass inspection, will be allowed to continue onto campus, to their final destination after concurrence with the destination building dock master to avoid congestion at the destination point.

Since service/delivery areas are necessities for virtually all buildings on campus, the placement and design of these areas must be considered carefully. Generally, the following guidelines should be administered for the design of service/delivery areas, as illustrated in Figure 6.4.3.

All major loading areas should be provided at the ends or rear of buildings. Some short-term delivery service should be provided in short term visitor parking near the front of the buildings. Long term vendor and contractor parking should be provided in long term parking facilities. In no case should major loading be permitted on- street or in parking facilities.

The number of access driveways on the internal loop road has been limited by providing shared service/delivery areas for groups of buildings. This consolidation of the service/ delivery areas will minimize conflicts in the internal road system. In site areas where grades and slopes of the topography permit, service/delivery areas should occur at a lower level. In all locations service/delivery areas should be screened by walls and/or landscaping.

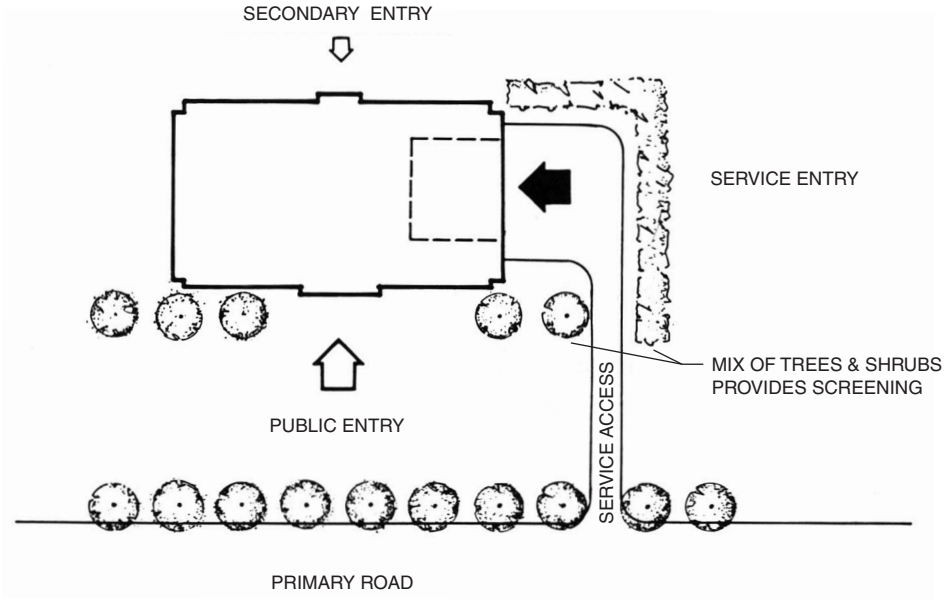
The design of the access driveways from the internal loop road system should be provided with adequate sight distances and proper turn-around areas for trucks within the access drive layout. In general, access driveways for service/delivery vehicles and employee or visitor passenger vehicles should be separated. Although these criteria may not be feasible in all cases, it is a good policy to reduce the possibility of the access driveway being temporarily blocked by a service/delivery vehicle.

6.4.4 Pedestrians and Bicycles

Pedestrian Pathways

The existing system of extensive pedestrian paths on the NIH campus should be enhanced to increase the capacity of certain highly trafficked areas, make better connections from the campus core to surrounding neighborhoods, and form a more continuous pathway system. Employee pedestrian access to the NIH campus will be provided for employees at all vehicular and pedestrian/bicycle employee-only gates in the perimeter fence. Pedestrian access to the NIH campus will be provided for NIH visitors through the South Drive Gateway Center entrance located on Rockville Pike and at the Cedar Lane entrance.

Pedestrian crossings of campus roadways should generally occur at intersection points along the loop road and at the entrance driveways from the county and state road system. It is anticipated that the internal, unsignalized intersections will operate as three-way stop intersections. This intersection type will facilitate the crossing of small groups of pedestrians. All pedestrian crossings should be clearly signed and lighted, with crossing areas designated by striping, special paving, raised road surface, or other appropriate marking devices. Medians should be designed to provide pedestrian refuge areas. In addition, the implementation of mid-block pedestrian crossings at certain locations may be provided. Vehicular traffic through these mid-block pedestrian crossing sections is not required to stop if the pedestrian area is clear; but is required



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Master Plan
2003 Update
Bethesda Campus

Figure 6.4.3

Typical Service Area Guides

to yield to pedestrians in the cross walk. The mid-block pedestrian crossing area should be clearly signed, striped, and lighted, and may also include a median for pedestrian refuge.

In order to minimize the chance of vehicular-pedestrian conflicts, the NIH should adopt some crosswalk location guidelines to standardize the location of future crosswalks on campus. The following elements should potentially be used as part of a new crosswalk location policy, to regulate when and where future crosswalk installation is appropriate on the NIH campus:

- Crosswalks should be provided at all roadway intersections;
- Crosswalks should not be used indiscriminately;
- Crosswalks should allow for restriction of parking in the immediate appropriate vicinity for adequate visibility;
- Crosswalks should be sited based on an engineering study if located other than at an intersection;
- A non-intersection crosswalk location should only be considered when all of the following circumstances are present: 1) The distance to the nearest intersection exceeds 300 feet, 2) There is a proven demand for a crossing at the subject location with pedestrian crossing volume that exceeds 100 pedestrians during any one hour, or 150 pedestrians during any two consecutive hours within a 24-hour period, 3) There is adequate sight-distance and other critical safety conditions are satisfied, and 4) The location of the crosswalk does not conflict with any aspect of the campus plan.

NOTE: If all of these conditions are not satisfied and there are any significant signs of pedestrian activity near the subject crossing location prior to the installation of a crosswalk, then the subject location may warrant the placement of a pedestrian barrier to ensure that pedestrians do not cross at the non-intersection location, but rather walk to the nearest marked crossing location.

Bikeways

On-site bikeway facilities are an important element in the promotion of alternative transportation modes for employees of the NIH Bethesda campus. In addition, it is important for the NIH Bethesda campus to link with the Montgomery County Bikeway System for the broader countywide promotion of alternative transportation modes. Bicycle access will be provided for employees at all vehicular entrances and pedestrian/bicycle employee-only gates in the perimeter fence. Bicycle access to the NIH campus will be provided for NIH visitors through the South Drive Gateway Center entrance located on Rockville Pike and at the Cedar Lane entrance.

Bicyclists should be encouraged by signage and policy to walk their bikes in congested areas. In addition to the specially NIH-designated bikeway facilities, bicyclists can often ride in the outer travel lane along roadways with speeds of 30 miles per hour or less. All internal roadways on the Bethesda campus will be signed for speeds of 20 to 25 miles per hour, and therefore it is expected that bicyclists will utilize the loop road system to circulate around the campus, with the exception of the loop road segment between South Drive and Wilson Drive (in front of Building 1) on the east-side of campus. However, it is important that the roadway be regularly maintained and cleared of debris, and that drainage grates be designed flush to the surface with narrow grid openings (so that bicyclists do not get trapped as with conventional parallel, widely spaced grates).

6.4.5 Mass Transit

Metrorail and local bus service is provided to the NIH Bethesda campus at the Medical Center Metro Station on the Red Line. This station and related transit node is located near the intersection of South Drive and Rockville Pike.

Because of the size of the Bethesda campus and the campus edge location of the Metrorail station, it is necessary to provide a means for employees using Metrorail to get to and from the various employment centers around campus. The NIH currently operates internal campus shuttle bus routes.

Shuttle riders transfer between the two systems at the NIH Gateway Center, in order to travel between interior campus locations and off-campus NIH facilities. This bus service is provided as a part of the Transportation Management Program.

All shuttle bus stops should provide adequate covered waiting area at the stop or at nearby buildings. The on-campus shuttle bus stops are located along the loop road in close proximity to most major destinations or building clusters. However, there may be a few shuttle bus stops located directly in front of building entrances, as determined later by the operators of this system.

The Master Plan calls for a continuous, four-lane loop road throughout the interior of the campus. This loop road will allow for more efficient operation of the shuttle bus service provided on campus. The Employee Transportation Services Office (ETSO) currently acts as a liaison with WMATA and Montgomery County Ride-On. This liaison allows for the coordination of the NIH shuttle bus, WMATA, and Ride-On bus services.

6.4.6 Access for Persons With Disabilities

For implementation of access standards, see the Uniform Federal Accessibility Standards (UFAS).

6.5 Site Performance Guidelines

6.5.1 Building Character/Materials

Figure 6.5.1 indicates the Building Character and materials recommended for each zone of the site. In general, the Master Plan recommends that all new construction in the central core be of Brick - Modern design, and that buildings at the perimeter of the site be of Concrete / Stone - Modern design, reinforcing the pattern that currently exists. The predominant material for central core buildings should be red brick, responding to the materials of the Historic Core and numerous other central campus buildings. Structures at the perimeter should be predominantly white or light in color. Outside of the Historic Core and away from historic properties, it is preferred that a contemporary architectural vocabulary be used to express the technology and aesthetic of the time of construction. Within or directly adjacent to the "exception zones" as delineated in Figure 6.5.1, projects should be designed to be compatible with the existing historic or special character of the buildings within the zone.

6.5.2 Landscape Design and Planting Criteria

Figure 6.5.2-a, shows the proposed Landscape Concepts and Planting Patterns for the NIH Bethesda Campus.

Planting Patterns and Scale

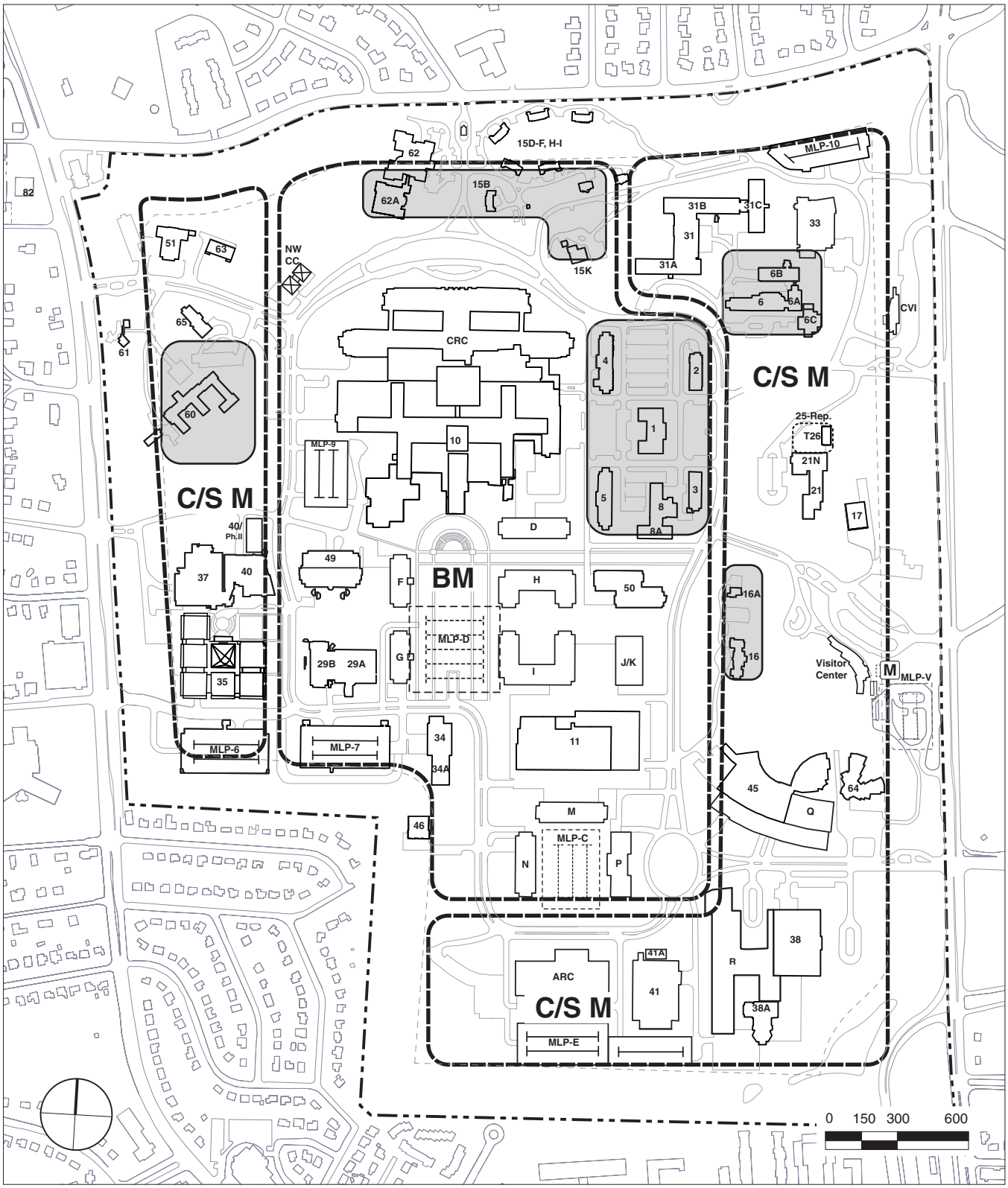
The size of trees, shrubs, and plant beds should be considered with respect to their scale relationship to the NIH campus buildings, roads, and spaces. In general, plantings should be simple and conceived in broad masses that are appropriately scaled to the campus. In addition, there should be a hierarchy of plantings, ranging from large tree and shrub massings along roads and entries, down to small garden scale plantings and floral display beds in courtyards and pedestrian gathering areas.

Plants can also serve to punctuate and reduce the scale of stairs, walls, terraces, and building facades, through the use of hanging, twining, or climbing plants, which can help the buildings and spaces become part of the landscape. Plants should be used to soften the edges of buildings, paths, and outdoor areas with flowers.

Plants selected for use on the NIH campus should be an indigenous or native species, possess appropriately long-lived characteristics, and have visual traits that offer refined intrinsic beauty to reflect the enduring quality of the institution. The overall design of the campus planting should be simple and seek to evoke a mood of tranquility to complement the existing natural and surrounding plantings. It is also recommended that the use of annuals and perennials be encouraged to create an uplifting campus environment for NIH visitors and employees.

Care should be exercised in the use of exotic or highly ornamental plants, and as a general rule should not be used in the more natural perimeter landscape. They should only be used in the central core areas, in association with pools, in enclosed courtyards, and internal landscape spaces between buildings and parking areas. Simple refined patterns will yield a campus that is unique, dignified, and practical to maintain.

The natural forms of plants should be retained through restrained but proper pruning techniques. This is most important when considering shrubs. Shrubs should be planted in arrangements that allow for their natural shape to be retained through periodic renewal pruning. Adequate space must be allowed for plants to grow, particularly near paths and buildings, in order to avoid heavy shearing of these plants which often makes them unnatural and unattractive.



NIH Master Plan 2003 Update

Bethesda Campus

EXCEPTION ZONE

C/S M CONCRETE/STONE MODERN

B M BRICK MODERN

Figure 6.5.1

Building Character Zones

periodic renewal pruning. Adequate space must be allowed for plants to grow, particularly near paths and buildings, in order to avoid heavy shearing of these plants which often makes them unnatural and unattractive.
Tree pruning should start early in the life of campus trees to ensure that a proper form is established and the canopy is promoted and trained to a sufficient height to provide clear visibility beneath trees for autos and pedestrians, and to allow adequate light to lawn areas below.

Selection and placement of plant materials should be made in accordance with lighting and security cameras to avoid obscuring views and creating hard to see places. Trees and shrubs must be kept away from the perimeter fence to prevent their use for climbing over the fence.

Buffers and Perimeter Screening

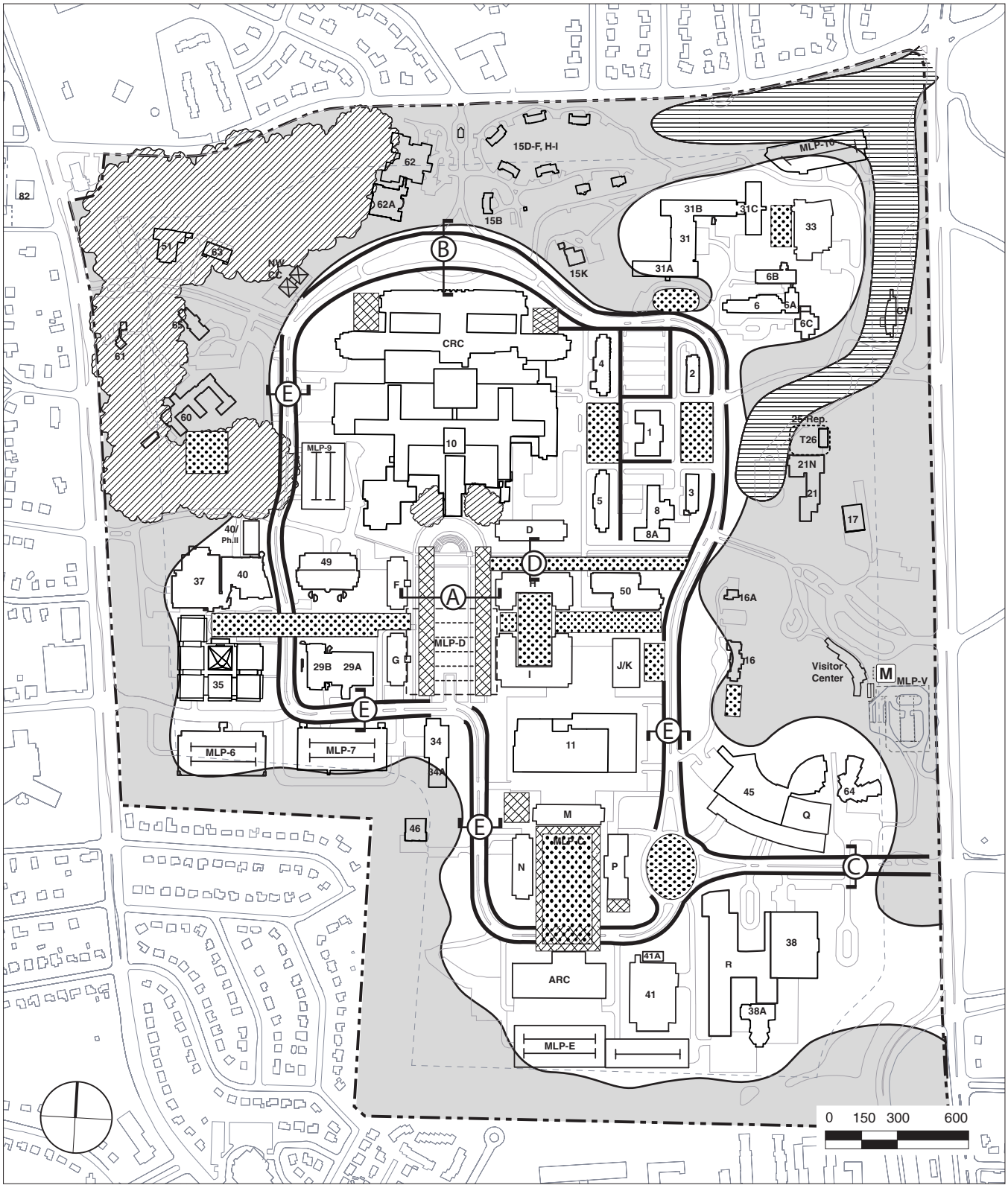
There are three primary long-term objectives for enhancing the perimeter landscape and buffer areas of the NIH campus. The first is preservation. The existing stands of large native trees and areas of natural vegetation that currently provide screening and buffering to the surrounding residential areas are to be maintained. The second is managed renaturalizaton. As surface parking areas are removed from the campus perimeter, these areas will need to be replanted with native and indigenous varieties of plant material to extend and augment the buffer plantings. In addition, open lawn and mowed turf grass areas not designated for recreational purposes should also be planted or reforested in order to reduce grounds maintenance areas. These areas need to have a natural yet controlled or maintained appearance, with curvilinear lawn edges, shrubs, and understory tree massings. The third will be general environmental improvements as a result of the first two objectives. Preservation and reforestation will provide the direct environmental benefits of cooling, enhanced storm water management, erosion control and water quality, increased species diversity, and reduced water and energy consumption for grounds maintenance.

With these objectives in mind, aesthetic design consideration should be focused on maintaining some open views into the site to visually prominent buildings and landscape features from Rockville Pike and Old Georgetown Road. These areas may benefit from the use of high canopy trees and understory plantings to filter and direct these views. Reforested areas should not be designed as strict restorations of the existing woodland communities that naturally occur in the region, but rather as general compositions and structures that simulate the plant communities of the Piedmont Region, implemented to complement the existing landscape patterns and provide spatial definition to the NIH campus. In addition, any reforestation, screening, and buffering in the perimeter areas will require careful study and fine tuning to ensure that design consideration to the campus safety and security is maintained.

Plant Material Palettes

An underlying concept in the development of the Landscape Plan for the NIH campus is the recognition of the medicinal values of plants and water. This medicinal theme can contribute to a deeper understanding of the landscape, its relationship to mankind and the environment, and its relationship to the mission of NIH.

Potential uses and combinations of plants may take on many forms in the landscape development of NIH. For example, plants may be used primarily in cultural associations such as hot/sunny, cool/moist, or dry/shade garden conditions to name a few. Other material uses can be based on purely aesthetic considerations such as color or textural combinations, accent or screening applications, and to control scale and spatial hierarchy within the central core of the NIH Bethesda campus.



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Bethesda Campus

- BOSQUE PLANTING
- STREET TREE PLANTING
- STREAM VALLEY/RIPARIAN
- UNDERSTORY/FOREST EXTENSION
- BUFFER/PERIMETER
- QUAD/COURTYARD/GARDEN

Figure 6.5.2-a

Campus Planting Patterns

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Finally, trees and plants can be displayed in numerous programmatic arrangements, such as grouping together plants with similar traditionally held medicinal values, or to display medicinal plants with exceptional seasonal qualities, for winter, spring, summer, and fall garden themes. These plant groupings may be signed in an interpretive manner so that their uses can be better understood and appreciated. As mentioned previously, care should be exercised in the use and location of these materials.

Special Landscape Areas and Features

The sections shown in Figure 6.5.2-b indicate in greater detail the landscape character and recommendations proposed for key areas of the site.

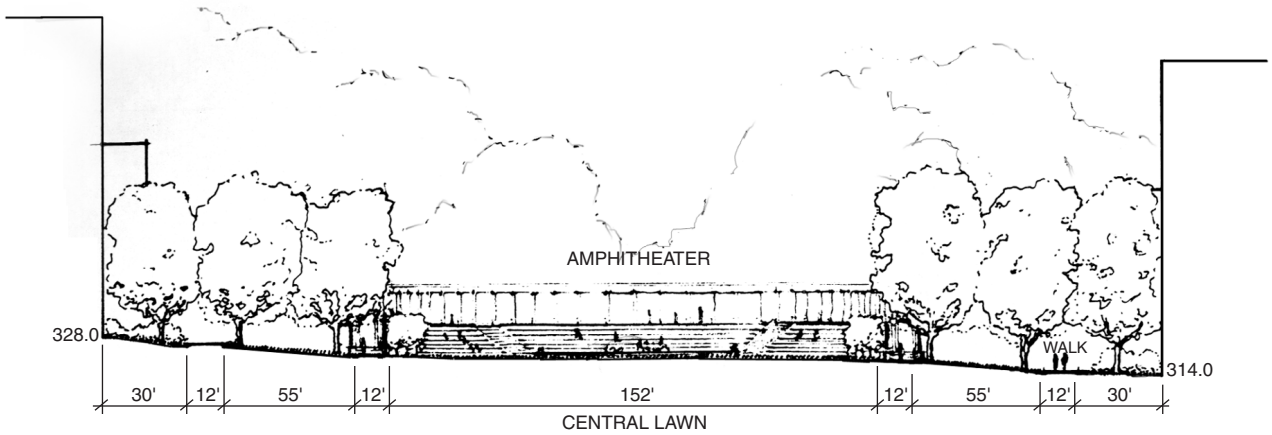
- **Section A** indicates the proposed landscape treatment of the Central Mall. A triple row of trees is proposed to frame this central open space, with a pedestrian concourse between the trees. Changes in grade are proposed to be accommodated within the bosque areas at the edge of the mall. The mall itself is envisioned as a grassy, open area. The mall is proposed to be terminated on the north end by an amphitheater with informal tree plantings as a backdrop.

- **Section B** shows the area to the north of the Clinical Research Center. Bosques are densely planted on the south side of the loop road, flanked by walkways. The median is planted with groundcover and ornamental trees. The existing tree cover is maintained on the north side of the loop road, within a natural landscape character.

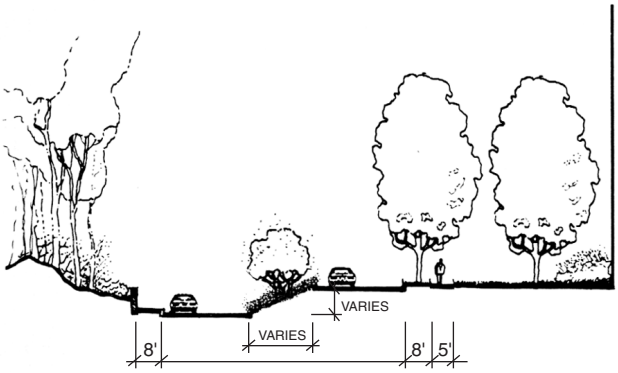
- **Section C** shows the proposed treatment of the main campus entry on Center Drive at Rockville Pike, near Building 45 (the Natcher Building). This area is shown to be formally landscaped with double rows of trees on either side of the road and a landscaped median in the center.

- **Section D** shows the proposed major east-west pedestrian walkway between Center Drive and the Central Mall. In this area, linear planting beds, and potentially and water features, symbolically connect the NIH Stream with the center of the campus. The section also shows the accommodation of a vehicular roadway (if needed) adjacent to Building 8A.

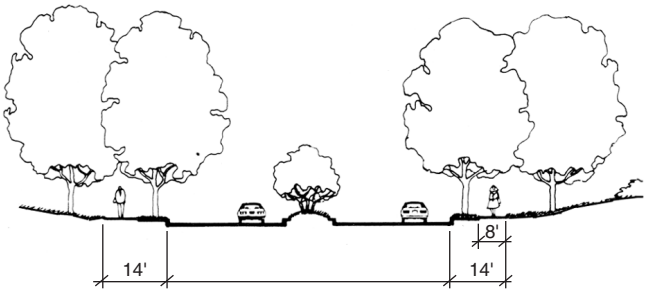
- **Section E** is the typical loop road section, with street trees planted on each side and ornamental trees planted in the median. Where possible, it is recommended that pedestrian walkways be separated from the roadway by a minimum 6-foot planting strip.



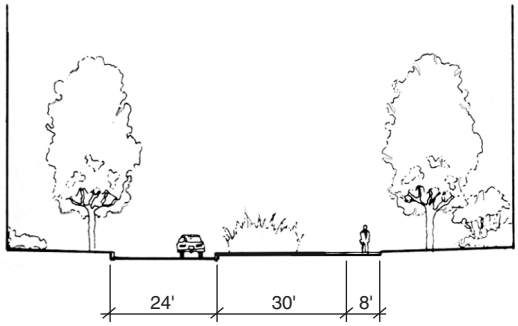
A SECTION @ CENTRAL MALL



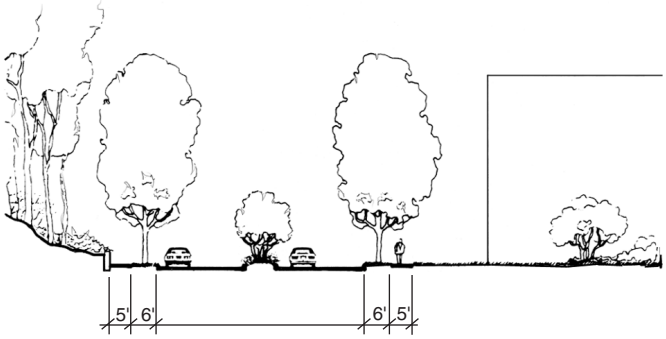
B SECTION @ NORTH SIDE OF CLINICAL RESEARCH CENTER



C SECTION @ MAIN CAMPUS ENTRY ON CENTER DRIVE & ROCKVILLE PIKE



D SECTION @ EAST-WEST PEDESTRIAN WALKWAY



E TYPICAL LOOP ROAD SECTION

Figure 6.5.2-b

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Bethesda Campus

Landscape Special Areas

6.5.3 Streetscape/Pathscape

The NIH is currently considering a comprehensive streetscape, signage and lighting master plan. The plan will include recommendations for the enhancement of existing streetscape design and pathscape according to street type, location, and physical condition of existing streetscape and paths.

Street Tree Recommendations

The primary planting objective for main campus entry roads and the loop road system around the central core area should be to define the campus streets as continuous spatial corridors and to create a uniform appearance. The use of a uniform tree type and spacing will help control the variation of landscape, building conditions and setbacks along the campus streets. As a general rule, the Master Plan recommends the use of large deciduous trees along streets in order to form a continuous canopy that will provide foliage at a height from fifteen to sixty feet above the ground, while allowing open views below the branches.

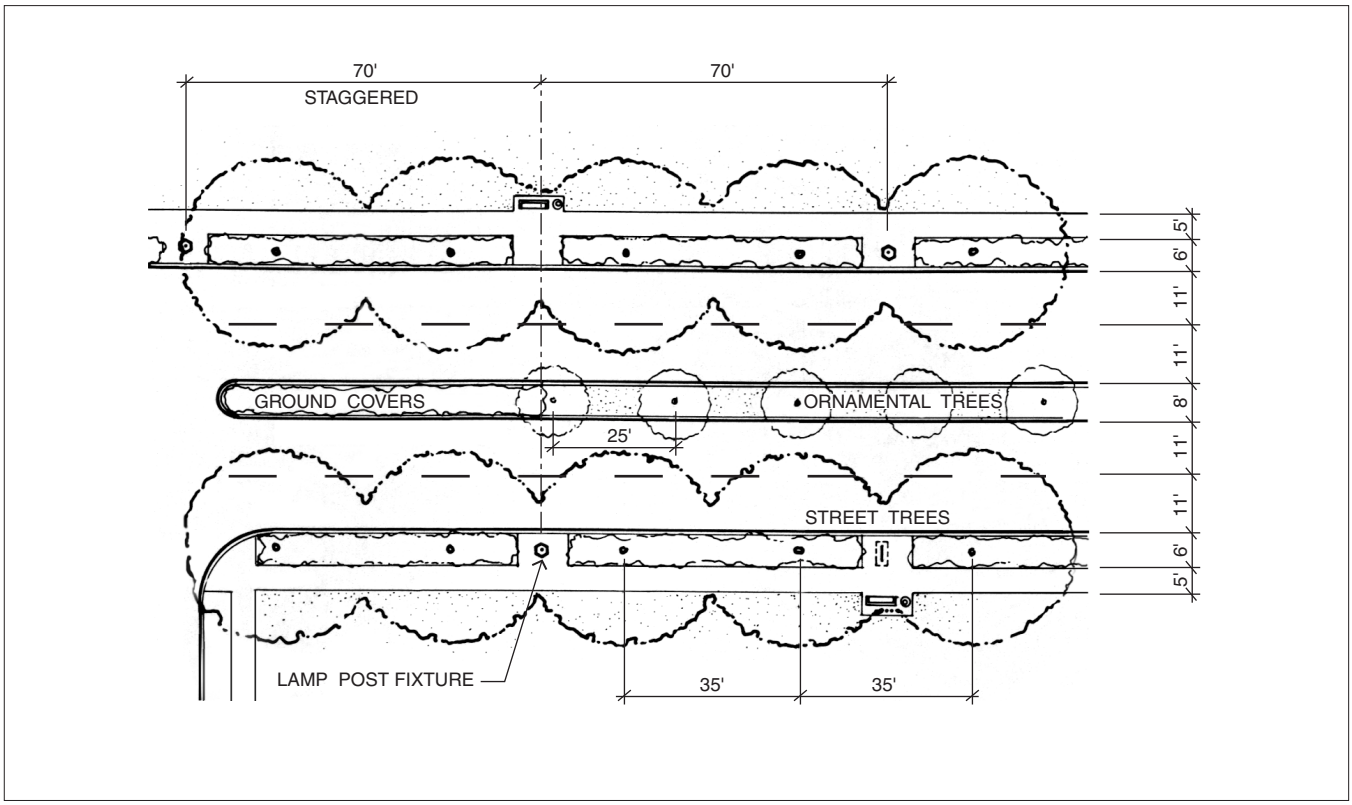
The sycamore (London Planetree), which grows in numerous locations throughout the NIH campus and is commemorated as the Tree of Hippocrates near the National Library of Medicine, is proposed as the keystone tree planting for the central campus bosques. Due to its symbolic importance and ability to survive in an urban setting, this species is proposed to be used as linear tree bosques within the Campus Core, both to frame the Central Mall and help form and articulate important building entries and gathering spaces. It is also recommended that sycamores be used as a bosque planting between the loop road section north of the Clinical Research Center. These dense tree bosques would also serve to reduce the scale of the buildings and provide more intimate spaces for patient and staff use.

Suggested street tree planting of the primary entry from Rockville Pike consists of a double row of Red Maples. Planting along the interior loop road is proposed as a single row of street trees, consisting of combinations of Willow, Laurel and Sawtooth Oaks to reduce monoculture concerns yet maintain a consistent size and similar tree form. Other entries to the campus should have informal tree plantings which relate to the indigenous types present, such as Tulip Poplars, White and Red Oaks, Ash, and Black Gums. These trees may also be planted with understory groupings of ornamental trees, evergreens and shrub plantings. In general, street trees should be selected which have deeper root systems in order to reduce potential future damage to walks and roadways. Additional tree species for consideration include Silver and Weeping Silver Lindens, Crownright Pin Oaks, and Halka Honeylocusts, which have a more uniform upright structure.

Detailed Streetscape Layout Recommendations

The typical streetscape proposed by the Master Plan is shown in Figure 6.5.3. Where possible, roadways should be bounded by planting strips of a minimum dimension of six feet to accommodate street tree planting. Within the planting strip there should be occasional paved areas for access to the curb lane of the street, and in highly traversed areas, continuous paving with tree grates may be required. Also accommodated within the planting strip are streetlight posts, information kiosks, and roadway regulatory and directional signage.

Beyond the planting strip is the pedestrian walkway, which is recommended to have a width of 5 feet minimum or 6 feet where space permits. In locations where room permits, walkway widths of six feet would allow the walks to accommodate service vehicles, if needed. Paths and walkways will generally be constructed of concrete or asphalt, however, special paving patterns and materials should be used to highlight key areas such as plazas and major building entrances. It is recommended that a



NIH
Master Plan
2003 Update
Bethesda Campus

Figure 6.5.3

Streetscape Typical Plan

standard quality paving material be used throughout the campus to ease maintenance and enhance campus coherence. Also within this zone should be seating areas associated with building entries, bus and shuttle stops, and pedestrian gathering places. These should be furnished with comfortable benches, trash receptacles, pedestrian lighting and landscaping.

Currently site furnishings on campus are not well coordinated either by style or location. The Master Plan recommends that seating, receptacles, bollards, and kiosks, which are functional, easily maintained, and aesthetically compatible, be adopted for use throughout the campus. The use of durable wood and natural materials for site furnishings is encouraged. These elements will not only provide pedestrian scale and comfort, but also visually unify the campus environment. Special emphasis should be given to increasing seating areas through the use of low seat walls, picnic tables, and chairs throughout the campus, in order to improve the quality and location of outdoor places for eating and relaxation within the extensive grounds of the NIH campus.

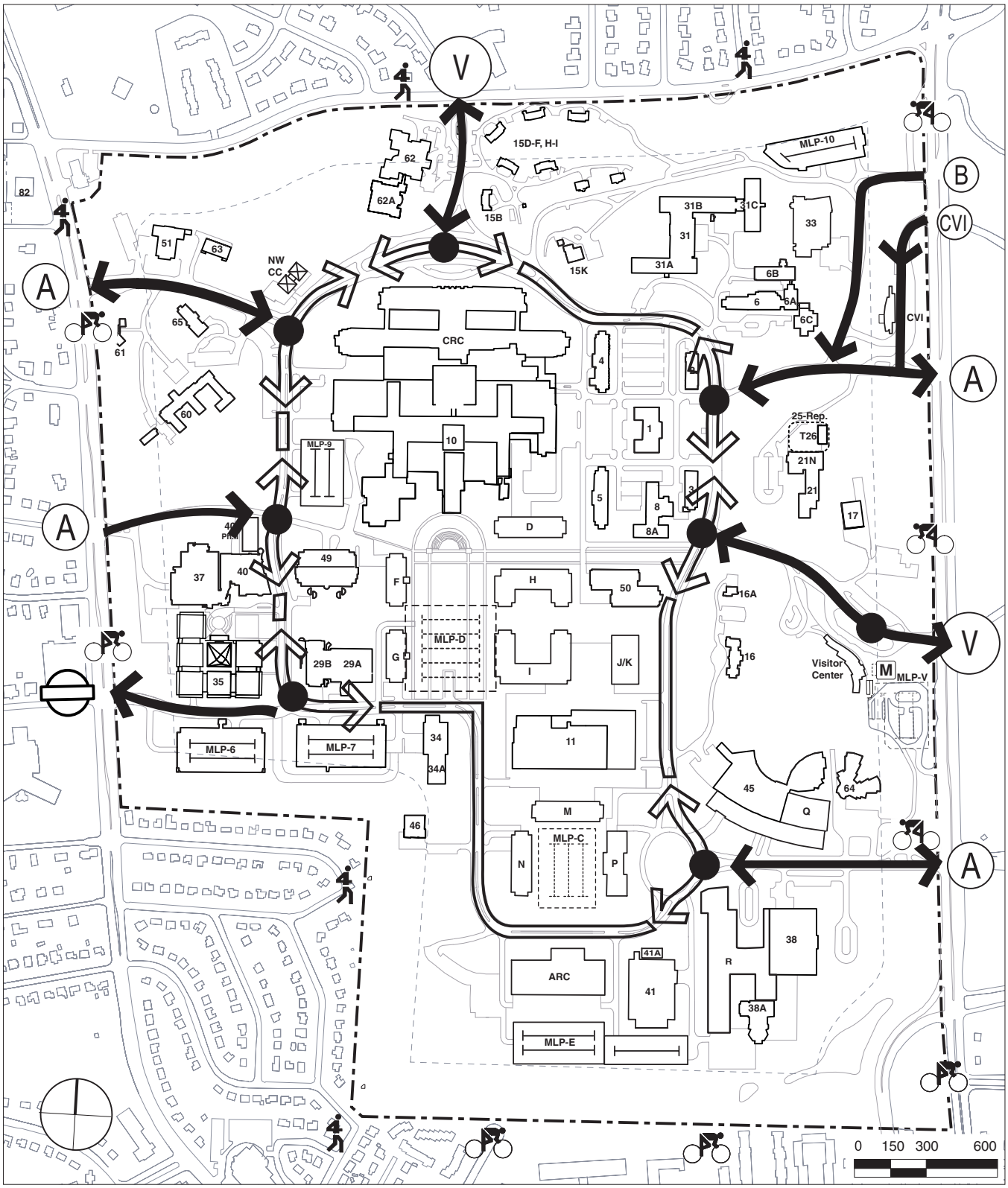
6.5.4 Exterior Signage

The NIH is currently considering a comprehensive streetscape, signage and lighting master plan. The plan will include recommendations for the upgrade or replacement of the existing signage system according to sign type, location, graphic quality, physical condition and maintenance, currentness of information, and adequacy of the amount of signage. The categories of signage which will be addressed include the following:

- **Orientation -** site maps near campus entries and area maps in the core of the campus.
- **Direction -** to major campus buildings and areas, both for vehicles and pedestrians. Notations of accessible routes for persons with disabilities.
- **Identification -** campus entry signage and exterior building and place signage.
- **Regulatory/Safety -** traffic and parking control, safety, and warning signage.
- **Information -** transit information, public announcements, etc.
- **Interpretive -** NIH tour signage, plant species signage, etc.

Figure 6.5.4 illustrates the key signage concepts proposed by the Master Plan. Visitor and staff entries should be clearly and coherently signed to both identify the NIH campus and create a positive first impression of the institution. At the juncture of each entry path (including pedestrian/bicycle paths) with the loop road there must be clear directional signage to major campus buildings. Where possible, a vehicular pull-off with a campus map should be provided at each major vehicular entry path. Along the loop road, signage should be consistent and become a clear orientation tool. A new Gateway Center for visitors containing information is indicated in the Master Plan at the Metro transit area. This location is clearly accessible to both public transit users and visitors arriving by automobile. Additional campus and transit information will be located at the Campus Center (Building L) and at the Clinical Research Center (CRC).

Signage character should be clearly legible and should be of a quality appropriate to a world renowned institution. There should be design compatibility among all campus sign types. Signage placement should also be carefully considered to avoid visual clutter. Specifically, regulatory and traffic signage should be reviewed to determine if more compatible signage designs can be implemented rather than the standard uniform roadway signs which are now used.



NIH Master Plan 2003 Update

Bethesda Campus

Figure 6.5.4

- (A) MAJOR ENTRY SIGNAGE
- (B) SECONDARY ENTRY SIGNAGE
- (V) VISITOR ENTRY SIGNAGE
- (CVI) CVI ENTRY SIGNAGE
- KEY DIRECTIONAL SIGNAGE
- LOOP ROAD SIGNAGE
- BICYCLE/ PED. ENTRY SIGNAGE
- PEDESTRIAN ENTRY SIGNAGE
- NO ENTRY / EXIT ONLY

NOTE: See Figs. 5.3.8-a&b for pedestrian and bicycle circulation plans.

Signage Concept Plan

NIH / ORF / DFP

Oudens & Knoop, Architects, P.C.

SmithGroup

6.5.5 Exterior Lighting

The NIH is currently considering a comprehensive streetscape, signage and lighting master plan. The plan will include recommendations for the upgrade or replacement of exterior campus lighting according to light fixture type, location, light quality, fixture and lamp condition, and adequacy of the number of light fixtures. Categories of lighting, which should will be addressed, include the following.

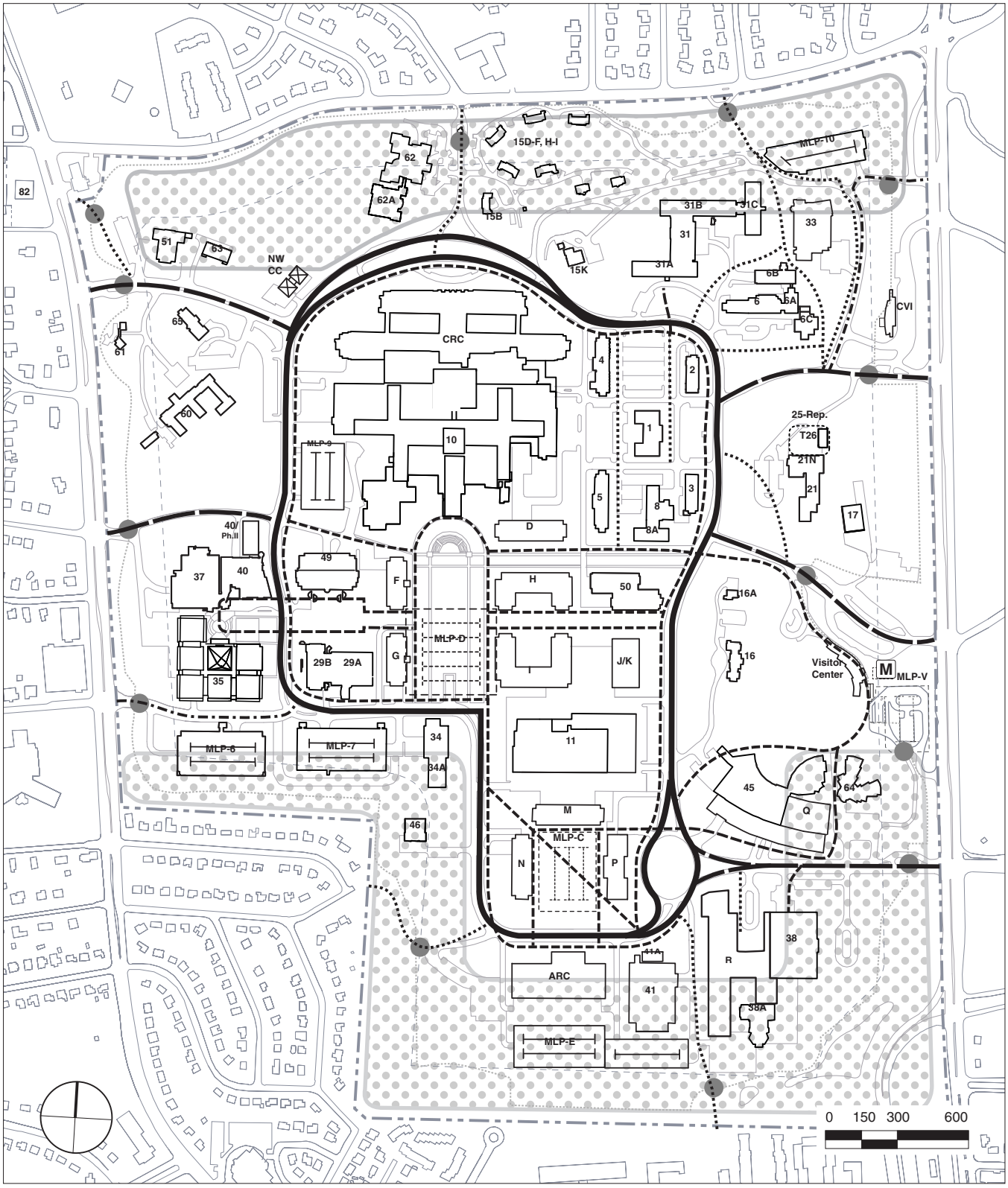
- **Street -** for vehicular safety and general campus illumination.
- **Intersection -** special lighting at roadway intersections.
- **Pedestrian -** for pedestrian safety and path marking.
- **Building -** to identify building entries and provide security.
- **Safety/Security -** for areas of the campus, that pose danger or require surveillance.
- **Signage -** at major entry locations and for key directional and orientation signage.
- **Special Features -** building or landscape highlighting, special outdoor spaces or monuments.

Figure 6.5.5 illustrates the major Master Plan lighting concept recommendations. The major campus entry roadways should be of a single lighting character to identify them as entryways. Loop road lighting should be of a second distinct character to provide coherence to the core of the campus. Within the campus core, lighting for major pedestrian pathways should create a consistent and unified framework which reflects the hierarchy of the principal paths. Branching out from this central framework, lower intensity pedestrian lighting should provide a network of lighted paths connecting all building groups on the campus. Of particular importance is the creation of well-lighted and secure pathways to the Metro station, for employees and visitors. In general, lighting should be less intense at the periphery than at the core.

Figure 6.5.5 also delineates a light control zone at the north and south ends of the campus. In these areas, special attention should be given to avoid spillover lighting into adjacent neighborhoods. Full-cutoff light fixtures, which allow no light to be emitted above a designated horizontal plane, should be used for roadways, walkways, parking structures, and buildings. Increased landscape screening should be provided in the buffer zone, and special architectural light screens should be considered where necessary.

There are currently many lighting fixture types on the NIH campus. The Master Plan recommends that all defined campus lighting systems (the loop road, major pedestrian framework, primary entries, etc.) each be of a single fixture type. Individual building projects may continue to differentiate fixture types for buildings and surrounding area lighting, within a complementary style to other campus lighting. In general, roadway light fixtures should be between 25 to 30 feet high, while major pedestrian path fixtures should be between 12 to 15 feet high. Secondary pedestrian path fixtures may be pole mounted luminaires or bollard type fixtures.

Fixture lamps should be selected for energy savings, light quality, and maintenance characteristics. Metal halide, high-pressure sodium, or compact fluorescent lamps are preferred, and mercury vapor lamps are discouraged. Additionally, it should be recognized that simply increasing lamp wattage is not always the correct solution to a perceived lighting problem. Other factors such as light direction, light quality, surface reflectance, and contrast with surrounding areas can affect perceptions of security and character.



NIH Master Plan 2003 Update

Bethesda Campus

LOOP ROAD LIGHTING
PRIMARY ENTRY LIGHTING
SECONDARY ENTRY LIGHTING
MAJOR PEDESTRIAN PATH LIGHTING
SECONDARY PEDESTRIAN PATH LIGHTING
LIGHT CONTROL ZONE
FENCELINE
CONTROLLED ACCESS GATE

Figure 6.5.5

Lighting Concept Plan

NIH / ORF / DFP

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6.5.6 Utilities

Power Plant Expansion

According to the Master Utilities Plan and 2000 Update, the central Power Plant capacity must be expanded to meet future growth projections. Figure 6.5.6-a shows the Master Plan recommended guidelines for the Power Plant expansion. Future projected expansion includes Boiler 7, additional chillers/cooling towers, utility tunnels running to the ease and south of building 11, and possibly additional electric power facilities or substation. Steam generation facilities are located in the northern half of Building 11, chilled water in the southern section. Future Boiler 7 would be located on the north side of of Building 11 to the east of the COGEN facility. Additional space is available for other uses. Future expansion of the central refrigeration plant would be on the east side of Building 11. The MPW marshalling and storage functions in Building 25 , and the storage and maintenance functions in Building 22 and 22A, must be relocated before this eastward expansion can occur to allow adequate access to the Power Plant, the Master Plan proposes a service court on the north and south sides of the facility. The minimum recommended distance between the Power Plant and adjacent development is 110 feet to allow sufficient maneuvering room for large trucks and emergency equipment. Power Plant service areas should be screened on all sides by minimum eight foot high walls and landscaping. The south service yard is an important utility corridor that already has a high utility density, and this function will continue in the future. The Master Plan proposes this corridor as the potential route or alignment for major relocations of NIH stormwater and sanitary sewer trunk lines that are necessary for East Quad development.

The two existing 500,000 gallon distillate oil fuel tanks on the east side of Building 34 must be relocated prior to construction of the loop road in this area. The Master plan recommends replacing them with equivalent storage capacity on the south side of Building 11.

The Master Plan locates significant pedestrian paths at the west end of Building 11, requiring the relocation of loading functions to other sides of the facility. An expansion reserve area is planned for the east end of the complex, however, it should be set back substantially from Center Drive to avoid becoming an overwhelming mass on the entry side of the campus.

Utility Corridors

In all cases, new utility corridors should avoid existing buildings and development sites proposed by the Master Plan. As noted in Section 5.4.1, it is desired that utility corridors lie within roadways where possible. Excluding the proposed center median, the typical loop road condition allows for 40 feet of width for utility placement. Under more constrained conditions, the loop road section provides two ten to fourteen foot wide outside lanes below which utilities can be placed. This arrangement would allow at least one travel lane in each direction if repair access were needed. Additional utility lines could be placed outside of the roadway within a limited distance of the curb, leaving an easement to allow planting and walkways at the street edge. Figure 6.5.6-b shows the recommended allowable utility corridor areas ranked in their order of preference; first below the curb lane, second below the travel lane, and third outside of the roadway.

For utility systems design criteria, see the Master Utilities Plan, MUP 2000 Update, and Section 5.4 of the Master Plan 2003 update Environmental Impact statement.

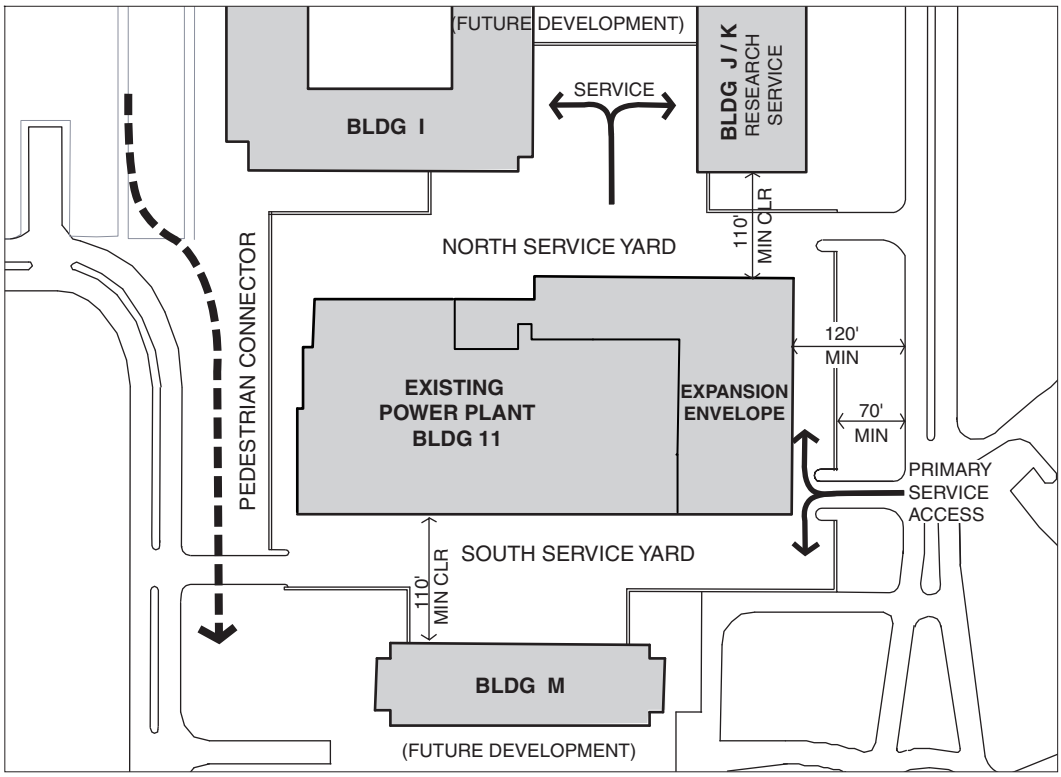

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Figure 6.5.6-a

Power Plant Expansion Guide

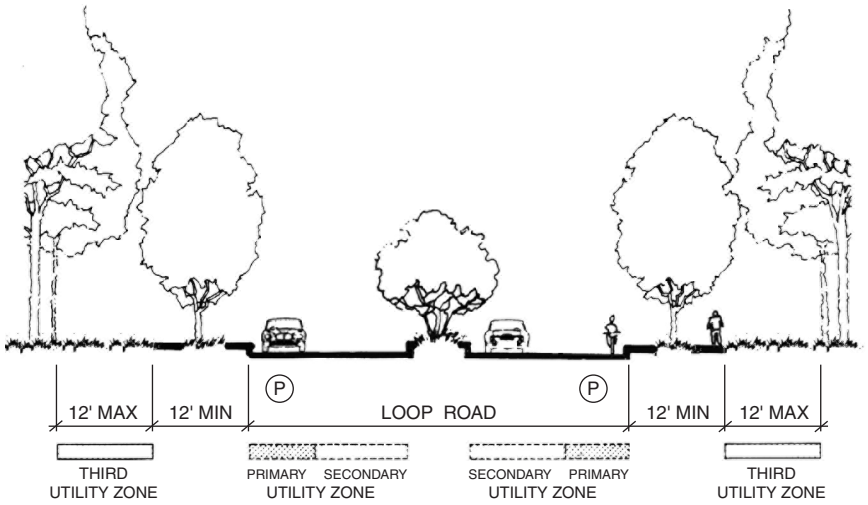

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Figure 6.5.6-b

Utility Corridor Section

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6.6 Phasing

The following diagrams (Figures 6.6.1 through 6.6.4) and text describe the implementation of the Master Plan in five-year increments over the next twenty years. The purpose of the phasing analysis is to give guidance to the sequence of projects to be constructed on campus, to emphasize the priority of key developments, and to illustrate potential future development conflicts. Of particular importance is the development of a strategy to relocate or replace key functions to accommodate new construction in the central areas of the site closest to Metro access.

The phasing plan is based on a linear progression toward fulfilling the programmatic needs projected by the Master Plan. The actual growth and replacement rate on campus will depend on evolving national policy and budget decisions. The phasing illustrates issues and subsequent strategies affecting sequencing such as project priorities, replacement and demolition, and critical continuity of campus functions including services and infrastructure.

Establishing the framework and character of the campus is an important consideration. Priority should be given to implementation of projects, which define the key open spaces of the campus, such as the new lab building sites along the Central Mall. Emphasis should also be placed on projects which replace obsolete structures or which allow a more efficient use of land resources. The proposed Master Plan phasing can be summarized in five steps:

1. Construction of the Clinical Research Center (CRC);
2. Construction of Neuroscience Research Center (35/NRC) completing the West Quad research group;
3. Replacement of the Animal Facility and redevelopment of the Building 14/28 site for the South Quad research group;
4. Replacement of the Support and Computer Services facilities and redevelopment of the Building 12/13 site for the East Quad research group, and;
5. Completion of the Central Mall.

In each section, major activities are identified within a five-year period. At the end of each section a tabulation is given showing the total building area provided which corresponds with the building area target indicated in the Table of Bethesda Campus Growth set forth in Section 2.8.8. Square footage figures do not include structured parking areas.

First Phase Objectives and Relationships

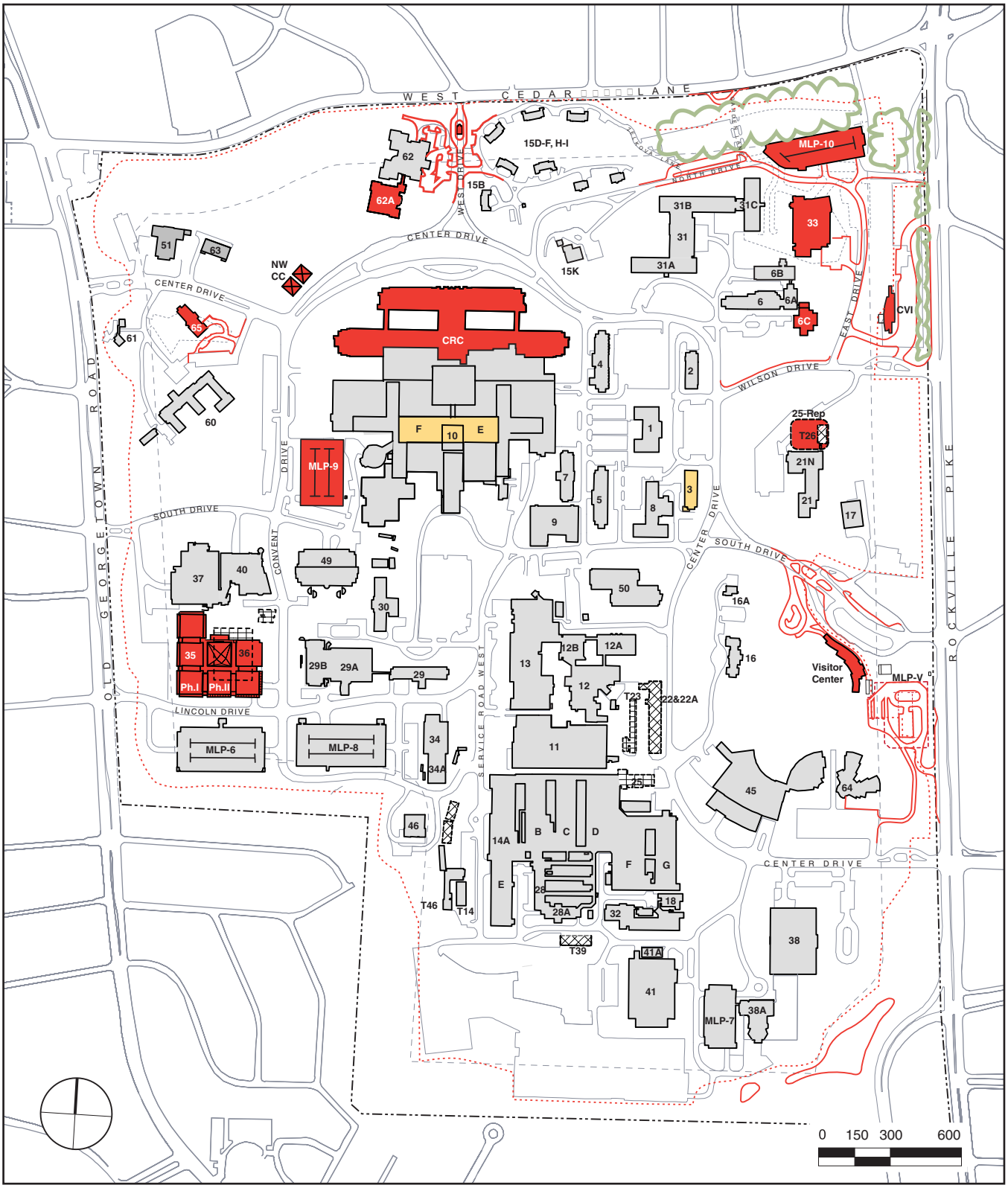
One of the greatest needs among NIH facilities is the timely upgrade of the Clinical Center Complex and completion of the Mark O. Hatfield Clinical Research Center (CRC), which is currently under construction. The Commercial Vehicle Inspection Facility (CVI) and the Gateway Center for visitors are also critical elements in the ongoing security improvements to the NIH facilities and campus environment as a whole.

To meet critical service needs due to the campus growth over the 20-year plan, projects proposed include expansions to the existing Power Plant (Building 11) throughout the implementation of the Master Plan. A new child care center at the northwest side of campus will be added to meet growing NIH child care needs.

Site character enhancements include the removal of buffer parking on the north and northeast sides of the campus, and enhancement of landscape screening to improve the buffer between NIH and adjacent neighborhoods along the south perimeter of the site. The new southeast pond will serve both to provide a parklike setting while providing storm water control.

Table 6.6.1 - First Phase

Existing Total GSF Area	**7,360,734**	**gsf**
Building 65 - Family Lodge	26,500	gsf
Building 62A - Childrens Expansion	34,000	gsf
Building 35 - Porter Neuroscience Research Center (NRC) - Phase I	265,000	gsf
Perimeter Fence + Gates		
Mark O. Hatfield Clinical Research Center (CRC)	1,050,000	gsf
MLP-10 - Multi-level parking at northeast corner of campus	0	gsf
replacing northeast buffer parking		
MLP - 9 - Multilevel Parking west of Clinical Center Complex	0	gsf
Remove remaining surface parking lots 31F and 31H	0	gsf
CVI - Commercial Vehicle Inspection Facility	3,719	gsf
Building 10 Stabilization - Patient Care Units, Floors 2-13, out-of-service	-297,756	gsf
Demolish Research Building 36	-236,285	gsf
Gateway Center (Visitor Center / Visitor Vehicle Inspection Station)	20,528	gsf
MLP-V - Gateway Center multi-level parking below grade	0	gsf
Research Builing 33	150,000	gsf
Building 6C - Addition to Building 6	16,500	gsf
Building 10 upgrades - no additional space	0	gsf
Building 35 - Porter Neuroscience Research Center (NRC) - Phase II	335,000	gsf
including West Quad landscape improvements		
Building 10 Central Core Project, Transition Program and Penthouse	49,227	gsf
Complete renovation of Building 3	0	gsf
Reassign Research Buildings 29A &29B	0	gsf
Renovate Building 10E&F Wings and North Corridor	-147,000	gsf
NWCC - Northwest Child Care Center	21,000	gsf
Demolish T-39 Fitness Center*	-5,160	gsf
25 Rep - Construct Replacement for Building 25 near Building 21	12,000	gsf
Demolish Building 22, 22A and 25	-20,255	gsf
Demolish Building T-23 and T-2	-5,871	gsf
Proposed Southeast stormwater management pond	0	gsf
Master Plan Development - Period sub-total	**1,274,147**	**gsf**
Cumulative subtotal end of First Phase	**8,634,881**	**gsf**



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Bethesda Campus

EXISTING BUILDING
NEW CONSTRUCTION
MAJOR RENOVATION
NEW MLP BELOW GRADE
DEMOLITION
LANDSCAPE IMPROVEMENTS
FENCELINE

Figure 6.6.1

Phasing Plan First Phase

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Second Phase Objectives and Relationships

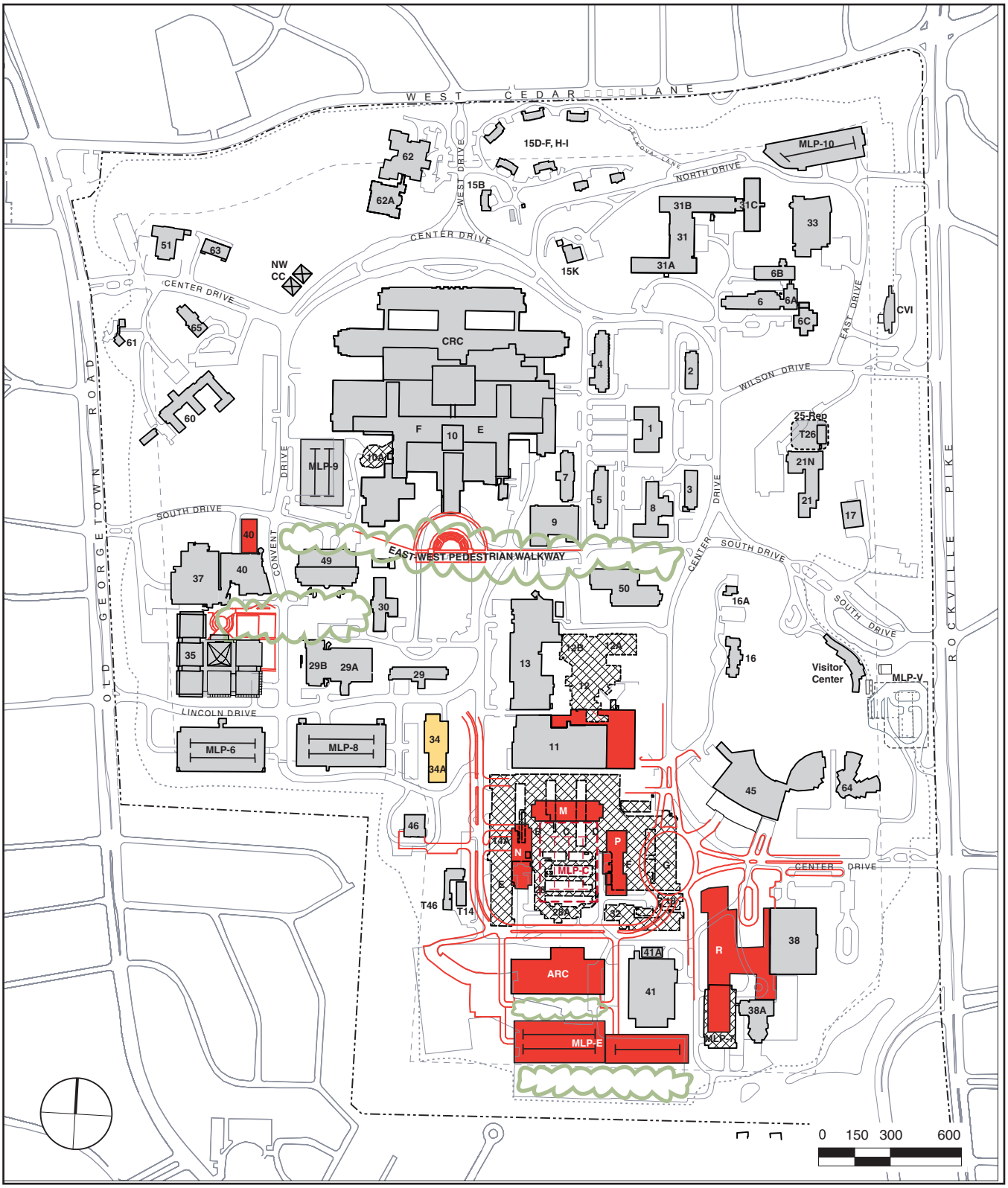
The major objective of this time period is the clearing of the Building 14/28 site for the future South Quad research development. To accommodate the demolition of the existing Animal Facility, which is considered obsolete, the ARC (Animal Research Center) must first be constructed. Construction of the south portion of the loop road should also be completed to improve internal access to this area of the site. The ARC would be the first research building in the South Quad to be constructed, and Research N would follow.

The Medical Pathological Waste (MPW) marshalling and management facilities located in Building 25 must be relocated to make room for any Phase III expansion of the central chilled water plant on the east side of Building 11. Building 25 operations would be moved to a new facility. For purposes of this Master Plan, the relocation of Building 25 is shown in the vicinity of Buildings 21 and T-26, allowing campus facilities for MPW, hazardous, and radioactive waste to be consolidated in one location. If required, the relocation could be done in conjunction with any upgrade or renovation of existing facilities in Buildings 21 and 21N at the site. Many regulatory requirements are involved in siting waste management facilities. Therefore, additional studies of potential relocation sites for Building 25 and details in the arrangement and orientation of facilities would be developed at the time of project implementation. The Master Plan only designates a generalized "site" or area for the Building 25 replacement (25-Rep) to indicate the recommended relocation of the MPW facilities to the Building 21 area. The generalized "site" could be extended to cover the entire Building 21 complex, if that building is involved in improvements at the time of the Building 25 relocation.

Site character enhancements for this phase include landscape/streetscape improvements near the Convent Building (Building 60) and in the Historic Core area. Upgrades are also proposed for the central east-west pedestrian walkway through the campus, along with construction of the amphitheater to help define the center of the campus as a gathering place. The second phase of multi-level parking E is at the south side of the ARC, to accommodate growing population needs. The remaining paved surface south of MLP-E is to be turned into landscape, screening the parking structure.

Table 6.6.2 - Second Phase

Cumulative sub-total end of First Phase	**8,634,881**	**gsf**
ARC - Animal Research Center	335,000	gsf
Demolish Buildings 14/28, 18, 32	-288,071	gsf
Southern Loop Road	0	gsf
Reseach Building M, South Quad	178,500	
Building 11 Phase III eastward Expansion (Boiler 7; Chillers 26-29)	35,000	gsf
Building 40 - Vaccine Research Center - Phase II	50,000	gsf
Research Building N, South Quad	137,700	gsf
MLP C - Multi-level parkingbelow grade at South Quad	0	gsf
Building 10, Reoccupy E & F Wings	444,756	gsf
Remove Portions of South Surface Parking Lot 41B/T1 and 41C	0	gsf
MLP E - Phase I	0	gsf
Demolish Building 10A	-56,000	gsf
Demolish MLP-7	0	gsf
Building R - Addition to the National Library of Medicine	389,370	gsf
Demolish 12, 12A, 12B making wat for East Quad	-156,236	gsf
MLP E - Phase II	0	gsf
Surface parking removal from South buffer and landscape improvements	0	gsf
Research Building P, South Quad	183,600	gsf
Remove Portions of South Surface Parking Lot 41B and 41C	0	
Reassign Building 34/34A (Campus Center)	0	gsf
Master Plan Development - Period sub-total	**1,253,619**	**gsf**
Cumulative subtotal end of Second Phase	**9,888,500**	**gsf**



NIH Master Plan 2003 Update

Bethesda Campus

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NEW CONSTRUCTION
MAJOR RENOVATION
NEW MLP BELOW GRADE
DEMOLITION
LANDSCAPE IMPROVEMENTS
FENCELINE

Figure 6.6.2

Phasing Plan Second Phase

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Third Phase Objectives and Relationships

One major objective of this phase is the redevelopment of the central portion of campus for proximity both to the Clinical Center and Metro of more dense development. Research Building I and Research Service Building J/K are proposed to be built on the former building 12/13 site. Outdated buildings 29 and 30 are proposed to be replaced with modern research Buildings F and G.

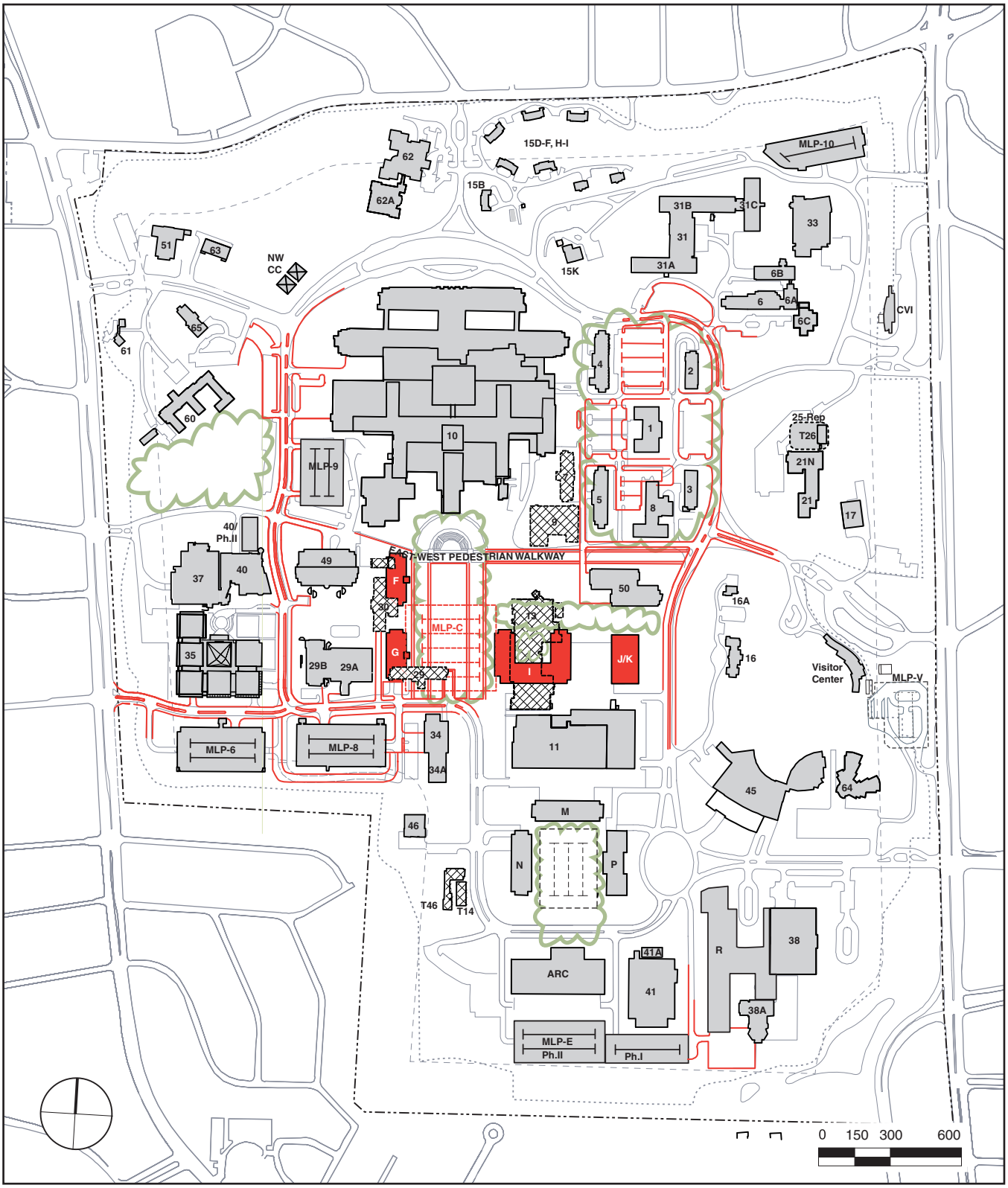
Another major objective is the completion of the Central Mall as the heart of the campus. With the enclosure edges provided by Buildings F, G, and I, the interior landscaping can be completed. The campus center proposed as part of an adaptive reuse of Building 34/34A will be the focal point at the south end of the Mall.

The South Quad research development will get finalized with the construction of labs M and P and by landscaping the plaza above MLP-C.

To accommodate projected campus population growth, construction of MLP-D below the Central Mall is proposed, along with upgrades to the east and west section of the loop road.

Table 6.6.3 - Third Phase

Cumulative sub-total end of Second Phase	**9,888,500**	**gsf**
Demolish Building 29	-89,949	gsf
MLP D, Central Mall Parking	0	gsf
Demolish Research Building 7 and 9	-81,360	gsf
Central Mall	0	
Building J/K - Research Services	212,175	gsf
Demolish Building 13	-212,690	gsf
Demolish T14	-4,000	gsf
Demolish T46 - Child Care Center	-3,000	gsf
Demolish Research Building 30	-93,940	gsf
Research Building I	249,900	gsf
Research Building G	112,200	gsf
Research Building F	149,600	gsf
Master Plan Development - Period sub-total	**238,936**	**gsf**
Cumulative subtotal end of Second Phase	**10,127,436**	**gsf**



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Master Plan
2003 Update
Bethesda Campus

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NEW MLP BELOW GRADE
DEMOLITION
LANDSCAPE IMPROVEMENTS
FENCELINE

Figure 6.6.3

Phasing Plan
Third Phase

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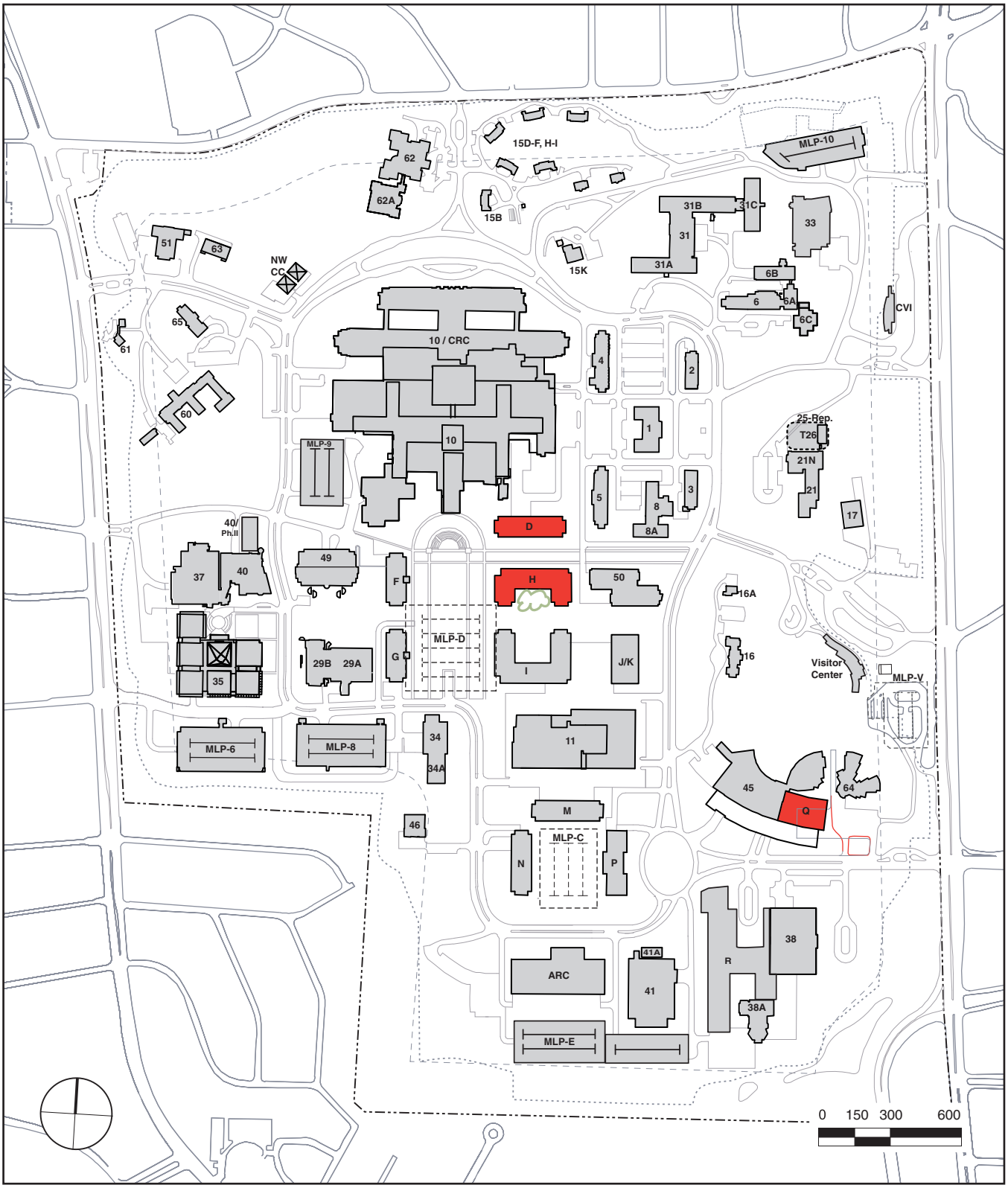
Final Phase Objectives and Relationships

The objective of this phase is the decompression of existing research buildings, to allow for an efficient and appropriate ratio of gross square feet per employee. Included in the final phase development, is proposed Building Q which will be an eastward extension of the Natcher Building containing administrative and office space.

Table 6.6.4 - Final Phase

Cumulative sub-total end of Third Phase	**10,127,436**	**gsf**
Remove Surface Parking Lot 45 (Natcher)	0	gsf
Office Building Q (Natcher Addition)	190,000	gsf
Research Building D	168,700	gsf
Research Building H (includes decompression of existing Research Buildings)	229,500	
Master Plan Development - Period sub-total	**238,936**	**gsf**
Cumulative subtotal end of Second Phase	**10,127,436**	**gsf**



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2003 Update
Bethesda Campus

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DEMOLITION
LANDSCAPE IMPROVEMENTS
FENCELINE

Figure 6.6.4

Phasing Plan
Final Phase

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6.7 Transportation Management

6.7.1 Background

The National Institutes of Health has an ongoing Transportation Management Plan (TMP) with the objective of reducing peak hour vehicular traffic by encouraging NIH employees who drive alone to ride share, use public transportation or use other alternative modes or alternative work scheduling. The TMP is an important element of the transportation component of the Master Plan because it defines policies and programs that influence the design of the transportation and parking systems at NIH.

Maintaining the transportation management plan as part of NIH administrative responsibilities is mandated in a Memorandum of Understanding (MOU) signed by the NIH, the Montgomery County Planning Board (MCPB), and the National Capital Planning Commission (NCPC) in May 1992. The MOU defined an agreement among these three agencies that:

1. the signatories will meet a minimum of two times per year to discuss NIH issues affecting NIH transportation;
2. the NIH commits to best faith efforts to meet its TMP and to seek funding for it; further, the NIH will monitor the success of the TMP with semi-annual traffic counts and annual evaluations;
3. the NIH will assess its parking needs and attempt to reduce its future parking demand to the extent practical;
4. NCPC and MCPB will evaluate future employment and parking in light of the NIH's success in implementing the TMP, and;
5. the NIH will implement other measures if current strategies prove unsuccessful.

The addendum to the MOU lists three goals for the TMP and a series of short-term and long-term strategies. These goals and strategies have provided guidance for the TMP activities, which the NIH has been carrying out, and for the Master Plan. The goals of the 1992 MOU TMP are as follows:

1. ***Improve the availability of parking spaces on campus for NIH personnel and visitors.*** (Note that one of the long-term strategies is to maintain the parking supply at the NIH at no greater than 0.5 parking spaces per NIH employee, consistent with the NCPC Comprehensive Plan for the National Capital, Federal Elements, Federal Parking Policies, 5.b and Diagram 4, plus additional parking spaces to serve the needs of visitors and patients. Additionally, NCPC has asked the NIH to reduce its employee parking supply below the 0.5 parking spaces per employee ratio.)
2. ***Mitigate the traffic impacts of future campus development on the roadways serving the NIH campus, such that the level of congestion is made no worse than if such development did not occur.*** (This means that NIH traffic should have no net impact on traffic conditions as compared with conditions, which would prevail if there were no growth. This has been interpreted into very specific criteria used in the impact analysis for the Master Plan.)
3. ***Maintain a "good neighbor" relationship with the surrounding community.*** (the NIH has established Community Liaison Council to air issues, including transportation and parking. From the standpoint of traffic and parking, the Master Plan and EIS mitigation measures define actions to reduce the NIH's traffic and parking impact on adjacent neighborhoods.)

For many years prior to the MOU, the NIH administration had engaged in efforts to manage its traffic and parking. This included provision of shuttle buses on campus to encourage employees and visitors to use Metrorail, Metrobus and Ride-On bus to

access the campus. Shuttle buses have been provided so that trips between NIH facilities can be made without use of a personal automobile. Shuttle routes have also been provided between NIH locally leased properties and the Bethesda Campus, as well as between the main campus and satellite parking, to reduce demand for on-campus parking and/or vehicle trips to campus.

In addition to these efforts, the NIH has developed a telecommuting pilot program in which a number of employees work at home several days each week, and communicate with their offices using telephone, computer, and modem.

The following table offers a comparison of various factors relating to and influencing NIH-related traffic, both at the time of the 1995 Master Plan and at present:

	1995	2003
Number of Employees	16,500	17,511
Total Daily AM Peak Hour Trip Generation	5,242	4,190
Total Daily PM Peak Hour Trip Generation	5,138	3,159
Total Number of Parking Spaces	10,500	9,356
Number of Employee Transhare Participants	1,923	4,422

The above table shows several significant differences in the NIH's AM and PM daily trip generation and employee modal choice between 1995 and 2003. The above differences indicate that the TMP adopted as part of the 1995 Master Plan was successful in reducing peak hour traffic volumes and encouraging greater use of transit by employees. As a result, the current TMP seeks to build upon the NIH's success over the last five years in minimizing the NIH's traffic impacts, and continue to serve as a cornerstone for the NIH's transportation policy.

6.7.2 Ongoing TMP

In October 1991, the NIH created an Employee Transportation Services Office (ETSO), and staffed a position with the responsibility of coordinating Transportation Management Plan efforts.

In general, it is the responsibility of the ETSO to work with other administrative staff to monitor the effectiveness of existing NIH programs and adjust these programs to make them more effective. The ETSO also currently works as part of a NIH/Naval Medical Center/Suburban Hospital/Montgomery County DPW&T working group. It also works in conjunction with the local community and the North Bethesda Transportation Management District, to coordinate the NIH's transportation management program with the other member groups' TMP programs. The ETSO is a member of the Association of Commuter Transportation (ACT), which works with employers throughout various cities, and local and state agencies, to share alternative commuting ideas and strategies, and to promote these alternative transportation modes to organization member employees. On a daily basis, ETSO's Transportation Information Office provides NIH employees and visitors with public bus route and schedule information, including Metro, MARC, VRE, and MTA. In the future, the ETSO will continue to research new programs, and test and implement them if they prove to be effective.

The current efforts of the NIH ETSO include programs to encourage ride-sharing, use of public transportation, and use of private NIH park-and-ride facilities and services. The following list details each of the current NIH Transportation Management Plan's programs and features:

- NIH Transhare Program – This program was established in 1992 and originally provided employees a subsidy of $21.00 per month. As budgets permitted, the amount of subsidy and level of participation continued to rise. This program currently provides 4,422 employees a monthly subsidy of up to $100.00 for using public transportation. In exchange for program participation, NIH employees must surrender all parking permits and privileges for use of on and off-campus parking areas.
- NIH Carpool Program – This program allows employees to utilize strategically located "carpool" parking spaces that are located in close proximity to many potential on-campus destinations. The carpool spaces are reserved for employees with carpool permits until 9:30 A.M. Two or more people may participate in the program and each individual carpool member must surrender their individual "general" parking permit. There are currently 380 registered carpools (accounting for 760 NIH employees) on the NIH campus.
- NIH Vanpool Program – This program allows a group of employees to obtain an individually reserved space in the lot of their choice for a van. Vanpoolers (10 vanpools with 150 NIH employees) are eligible to participate in the NIH Transhare Program to subsidize their commuting cost(s).
- NIH Ridematching Program – Employees are provided with a list of other available people who are also looking to participate in the program from similar geographic areas. These lists are usually provided to employees within two business days of the request. The NIH ETSO is very active in promoting and facilitating this program through the maintenance of an accurate database listing of all of the participants. In conjunction with the Ridematching Program, the NIH also participates in the Washington Metropolitan Council of Governments "Commuter Connections" Program.
- MWCOG Guaranteed Ride Home Program – the NIH participates in this program, which is also sponsored by the Metropolitan Washington Council of Governments (MWCOG). The program ensures commuters who regularly carpool, vanpool, bike, walk, or take transit to work with a reliable ride home when they need to work overtime or in the event another unexpected reason to leave work arises. The ride, using a taxi or other transit, is free to the user.
- NIH Alternative Work Schedule Program – NIH offers an alternative work schedule program, which allows some NIH employees the opportunity to work one additional hour each day in order to receive one additional day off from work every two weeks.
- NIH Telecommuter Work Program – The NIH Telework Program enables eligible NIH employees to reduce or eliminate their commutes by working part-time or full-time from a remote location, including their home, a telework center, or some other approved site. "Telework", which is also known as "telecommuting", is a management tool that is designed to help organizations and individual's function more effectively and efficiently, as well as recruit and retain qualified employees. Long-term telework can be integrated into space planning and can also have a beneficial impact on the community and the environment by reducing site-generated traffic.
- NIH Shuttle System – the NIH has its own comprehensive shuttle system, which provides regular service to the whole campus and to all of its off-campus work locations. The shuttle system consists of seven routes, with one route serving just the campus as a "loop" route; the "loop" route runs with 10-minute headways while the other routes have headways which vary by route. The campus contains thirteen stops, which are all in close proximity to the buildings. Approximately 3,400 employees use this service during the workday. Several shuttle routes operate from 6:30 a.m. to well past midnight. After normal route times, the shuttle

operates as an escort service to transport employees to their vehicles. Three of the NIH Shuttle stops serve as transfer locations to other shuttle routes and the Montgomery County Ride-On and WMATA Metrobus systems. One of the transfer locations is located at the Medical Center Metrorail station located on campus, where a rider may transfer to the Metrorail, Metrobus, or Ride-On bus systems.

- NIH Express Bus Routes – the NIH has worked with MCDPW&T, NNMC, and Suburban Hospital to implement several express bus routes which link the Bethesda Campus directly to the Milestone Park & Ride Lot in Germantown, MD, the Lakeforest Park & Ride Lot in Gaithersburg, MD, Tyson's Corner in Virginia, and the New Carrollton Metro Station in Prince George's County, MD. These express buses operate during the morning and evening rush periods.
- Off-Campus NIH Satellite Parking – There are currently 575 spaces available to NIH employees at off-campus, satellite locations. The satellite spaces are located in lots strategically located at Metrorail stations or close to NIH employment centers. Employees can park for free at these locations and then either ride Metrorail or an NIH shuttle bus to the campus, depending upon the location.
- NIH Construction Contractor Parking – NIH requires construction contractors to park in off-campus locations. There are currently 150 off-site spaces provided for construction contractor parking, and NIH operates a dedicated construction employee shuttle during the morning and evening rush periods, between the off-site parking and NIH campus. These shuttles do not travel on residential streets.
- Managed NIH Parking Facilities – For those employees who must drive to work, a parking management company has been utilized to assist in parking employees and visitors to the NIH campus. This allows for increased efficiency in the utilization of several parking facilities on campus, and results in more overall campus parking capacity. The managed parking also discourages illegal or lengthy parking and enhances the security of the parking areas.
- NIH/NNMC/Suburban Hospital Working Group – This group meets quarterly and on an "as needed" basis to review transportation issues which affect the three institutions in a coordinated manner. This group was instrumental in the establishment of the numerous express bus services between the NIH local area and Virginia, Montgomery County, and Prince George's County.
- Paid NIH Visitor Parking – the NIH has implemented paid visitor parking on the Bethesda Campus to
  discourage non-visitors from parking in visitor parking spaces on-campus.
- Information and Communication Systems – the NIH is developing enhanced transportation systems information for employees and visitors to provide greater opportunity for them to choose the best transportation and parking alternatives for their commute and trip to the campus. These systems include the following:
  - Official NIH Website – the NIH provides updated parking, transit, and transportation demand management (TDM) information to employees and visitors to promote awareness of our robust TDM plan and parking/transportation system.
  - Highway Advisory Radio (Emergency Broadcast System). The NIH installed and operates a Highway Advisory Radio (HAR) system on the campus. At the present time, this system is used to provide information regarding current facility and operational status and situations, and to inform them of upcoming changes in the parking and traffic facilities.
  - Real-time Bus Arrival Forecasts. The NIH has contracted to install this system that will provide "real-time" shuttle arrival information to shuttle users at on-campus shuttle stops through the use of electronic signs.
  - Personal Digital Assistant Access to the Website. The NIH has developed the capability for employees to access information on the Website using Blackberry PDA's.
- NIH Employee Education/Promotional Events – The NIH ETSO is proactive in

stressing the importance of using transit and participating in other alternative transportation programs to NIH employees. One way the TSO educates new NIH employees about commuting options is through the monthly employee orientation programs. The ETSO also holds NIH Commuter Transportation Fairs. At each of these events, many vendors are present and provide NIH employees with numerous commuting options (vanpool, carpool, transit, commuter buses, Guaranteed Ride Home Program, bicycling, etc.)

Monitoring the effectiveness of existing programs is a continuing activity on which the NIH ETSO office will report on a regular basis to the MCPB and the NCPC as part of its MOU commitment. The first results of these monitoring efforts were obtained in May 1993 when comprehensive traffic counts were conducted at all eleven NIH entrances. These traffic data were compared with 1992 surveys to determine the relative level of change in total campus trip generation during the morning and evening peak hour and for the three-hour peak periods in both the morning and evening.

The results of this monitoring work, which is continued every 6 months, are presented in the Traffic Monitoring Program Current Condition Surveys, the National Institutes of Health, Bethesda, Maryland, by Gorove/Slade Associates, Inc. Washington D.C. The principal finding of the most recent study is that the rate of vehicle trip generation and the absolute number of peak period vehicle trips generated at the NIH Bethesda Campus, has declined from 1992 to 2003 by approximately 33% during the AM peak hour and 45% during the PM peak hour. Thus, the MOU agreement and the effectiveness objectives of the TMP are being satisfied.

6.7.3 Future TMP Goals and Activity

Memorandum Of Understanding

Trip Generation

A primary goal of the NIH TMP is to mitigate traffic impacts such that the level of congestion is made no worse. This has been interpreted in this Master Plan 2003 Update to be a goal of reducing the rate of vehicular trip generation per employee such that growth in employment does not generate peak hour vehicular traffic which would exceed the ceiling for peak hour trip generation set by the MOU and established by the 1992 traffic counts conducted at NIH. This ceiling and the goals for the NIH TMP are calculated as follows:

The NIH has committed to not generate more peak hour trips than what prevailed at the time the Memorandum of Understanding was signed in May 1992. On this basis, a site generation limitation of 5,888 AM peak hour trips and 5,772 PM peak hour trips was established.

The October 2003 traffic-monitoring program revealed that NIH was currently generating 4,190 AM peak hour trips and 3,159 PM peak hour trips. Thus, NIH's current trip generation rates are significantly below the MOU rates by 1,698AM peak hour trips and 2,613 PM peak hour trips, through TMP measures that have been enacted since 1992.

If the main campus employee population grows as estimated (approximately an additional 4,500 (26%) employees to an approximate total of 22,000), trip generation would theoretically by 1,074 AM NIH peak hour trips and 810 PM NIH peak hour trips, using a straight-line extrapolation. Therefore, the total AM NIH peak hour trips of 5,264

and the total PM NIH peak hour trip of 3,969 will still be below the MOU-based limits of 5,888 AM peak hour trips and 5,772 PM peak hour trips.

6.7.4 Future TMP Activities

As part of the Master Plan process, a broad range of enhancements to the current TMP have been identified, which are considered to have a potential for effectiveness in meeting TMP objectives. These candidate programs have been screened in an open forum discussion among those NIH offices now responsible for transportation and parking. Furthermore, preliminary screening of candidate program enhancement has been made based on estimates of their potential cost and range of likely effectiveness. Coupled with these efforts, more effective techniques for monitoring TMP programs are being reviewed and will be implemented. In addition to maintaining and continually striving to improve all of the existing TMP programs, specific additional enhancements to the current TMP which are being considered are as follows:

1. Expand the use of managed parking.
   Rationale: Managed parking gives NIH the flexibility to provide adequate parking at times when demand exceeds self-park capacity, especially when construction projects cause NIH to close down part of the campus parking supply. The managed parking also discourages illegal parking and enhances the security of the parking areas.
2. Restructure routings of transit services and waiting areas on campus to establish a transportation center from which all services emanate, possibly located at the new Clinical Research Center or new NIH Gateway Center for Visitors. Consider providing a permanent taxi-stand at such a location that might be the base for Emergency Ride Home (ERH) services.
   Rationale: A central transportation terminal may be a more efficient means of delivering services and communicating service information to employees. Possibly relocate the Transportation Information Office there.
3. Work with county to discourage illegal parking in nearby residential neighborhoods, including NIH contractors and construction workers.
   Rationale: Unless county parking restrictions in the adjacent neighborhoods are regularly enforced, nearby neighborhoods will remain attractive to NIH visitors and contractors who wish to avoid parking fees.
4. Initiate further promotional and marketing activities for transit, such as services similar to those employed by Transportation Management Associations. For example, arrange discounts with Bethesda CBD merchants and restaurants (through the Chamber of Commerce or the Bethesda Urban Partnership) for Transhare participants and car/vanpoolers.
   Rationale: In addition to providing Metrochecks at The Recreation and Welfare (R & W) Store, additional marketing of services can be conducted, through The R & W Store in order to provide further inducements to encourage transit use by employees. Chamber members could benefit by using this as an opportunity to increase business. While not the deciding factor to utilize other modes, popular merchandise and other discounts will contribute to the attraction of the alternative modes.
5. Seek to ensure good transportation linkages between new campus construction, especially for office buildings, to the Metrorail station, NIH Gateway Center, and/or to a new transportation center.
   Rationale: A pleasant walking experience between office facilities and transit modes is a substantial inducement for transit use.
6. Employee Education. Continue to expand the ETSO's educational effort with top NIH management and campus personnel stressing the benefits of alternative transportation. This would include posting detailed information regarding bicycle routes located throughout the Washington Metropolitan area, on the NIH

website. Easily accessible bicycle route information would aid bicyclists in traveling to/from the Bethesda campus from off-site locations, and may encourage employees who are unfamiliar with the existing metropolitan area bicycle route system to bicycle to/from the Bethesda campus.

7. Increase the number of employee carpools
   Rationale: A much more intensive marketing of this transportation demand management measure to NIH employees would reduce the amount of NIH-related single occupant vehicles (SOVs).
8. Conduct Annual Employee Transportation Surveys
   Rationale: Annual transportation surveys given to NIH employees would allow the ETSO to better monitor employee transportation needs on a more continual basis and suggest changes to the NIH Transportation Demand Management (TDM) program to maintain the TDM program's relevance and effectiveness.
9. Review and Enhance Current Telework Program Policy
   Rationale: When revised and fully implemented, the revised program policy will lower existing barriers to telecommuting, and enable managers and employees to integrate telecommuting more effectively into their organizations and further reduce commute traffic.
10. Increase Transhare
    Rationale: A much more intensive marketing of this transportation demand management measure to NIH employees would reduce the amount of NIH-related single occupant vehicles SOVs.
11. Parking Reduction. The following recommendations have been made regarding the reduction of parking at NIH and may be repetitive to the previously mentioned enhancements to the current TMP:
    - Maintain parking at 0.50 spaces per worker plus 97 additional spaces for visitors and patients by the year 2020. This parking ratio would be achieved through the maintenance of existing TMP measures, an adequate on-campus parking inventory, and incentives resulting in a measurable success in parking demand reduction. It would be contingent on the continued funding for the TMP (such as NIH TRANSHARE subsidy program, satellite parking). Federal legislation which would require NIH to charge visitors and/or employees for parking while allowing NIH to retain the revenues to cover operating expenses and subsidize additional TMP measures could expedite the achievement of the reduction of a lower employee-parking ratio.
    - Continue to encourage NIH employees to utilize transit and ridesharing in an effort to minimize NIH's trip generation during peak periods.
    - Continue to implement pedestrian- and bicycle-friendly recommendations of the NIH Master Plan 2003 Update, including the construction of more pedestrian and bicycle paths throughout the campus, and ensuring more secure bicycle storage provision
    - Continue to expand Alternative Work Schedule (AWS) to a more evenly distributed 5-day program utilization
    - Continue to expand telecommuting programs
    - Increase NIH TRANSHARE, and continue to explore subsidies for other modes: carpools/vanpools, bicycle, walking. Explore subsidies for NIH visitors, contractors, patients, and volunteers, which are not available under current law.
12. Study potential for enhancements to NIH Transportation Information and Communications Systems.

The NIH will monitor the information needs of its employees and study additional communications systems that could provide additional opportunities to improve their commute trip-making alternatives. For example, it would be desirable to communicate with employees who are already in transit either in private automobiles or on public transportation. Technology is available to accomplish this using off-campus highway advisory radio or variable message signs, "reverse 911" cellphone communications, audible wireless voice messaging, and other telecommunications technologies. This

could alert commuters to specific conditions on the campus that may adversely impact their commute. It is anticipated that in the event of a traffic event such as an accident, change in the "Threat Level by the Department of Homeland Security", or some other type of emergency, motorists could be channeled to alternate NIH entrances/exits for an orderly arrival or departure, which will minimize traffic problems on major roadways leading to and from the campus. Also, the NIH is examining technology that would provide employees with real time information regarding occupancy of the on-campus parking facilities.

6.7.6 Conclusions

This section has outlined the principal goals of the NIH Master Plan TMP and the recommended activities to attain these goals. The analysis indicates that the goals may be reached to differing degrees with shifts in the mode choice distribution by 2020. By achieving these shifts:

- The MOU impact goal will be met since the peak hour trip generation of NIH will not exceed 1992 levels.
- The NIH will manage its parking supply so as to not exceed a parking ratio of 0.50 spaces per employee. As a result, the parking supply for employees can equal 11,012 spaces in 2020 to comply with NCPC guidelines.

Appendix A

Applicable Federal Regulations

A.1 The following laws and regulations that impact the master planning process, as it applies to the Public Health Service facilities planning program, are listed in the PHS Facilities Manual.

A.1.1 National Environmental Policy Act of 1969, as amended (NEPA) (42 USC 4321 et seq.) This law prescribes the consideration that federal agencies must give the impact of their actions on the human environment.

A.1.2 The Clean Air Act of 1970 (42 USC 7401 et seq.). Authorizes EPA to establish national standards for air quality to protect the public health and welfare. It is a comprehensive and complex Federal statue for the prevention and control of air pollution from stationary and mobile sources.

A.1.3 Clean Water Act of 1977, as amended (33 USC 403 et seq., 33 USC 1344 et seq., 33 USC 1413 et seq.) Army Corps of Engineers. Prohibits release of discharges to navigable waters without a National Pollution Discharge Elimination System permit.

A.1.4 Clean Air Act Amendments of 1990 (Pub. L. 101-549, 42 USC 7401-7671q). The amendments accelerate the schedule for pollutant emission reductions from mobile and stationary sources, and set many new requirements for reduction of air toxins by 75%, including reduction of sulfur dioxide emissions, phase out of chloroflourocarbons, and use of cleaner fuels.

A.1.5 The Safe Drinking Water Act (42 USC 300f-300j-26). Authorizes EPA to determine if an action which will have an environmental effect on a sole or principal drinking water source would also constitute a significant hazard to a human population and, if so, to prohibit such an action.

A.1.6 National Historic Preservation Act of 1966 (16 USC 470-470x-6) and Implementation Procedures Contained in Federal Register Vo. 35, No. 23, February 3, 1970, Department of the Interior, National Park Service, National Register of Historic Places. Requires evaluation of the effect the proposed facility will have on historic properties listed or that may be eligible for listing in the National Register of Historic Places, and requires that the Advisory Council on Historic Preservation be notified and given reasonable opportunity to comment with regard to the undertaking.

A.1.7 Uniform Relocation Assistance and Land Acquisition Policies Act of 1970 (42 USC 4601-4655). This law sets forth the policy for fair and equitable treatment of persons displaced as a result of Federal and Federally assisted programs.

A.1.8 Housing and Urban Development Act. This law reflects national policies on urban growth.

A.1.9 Executive Order 11988, Floodplain Management. Prohibits construction or support of incompatible development in floodplains without determining flooding risks, identifying natural floodplain values and impacts, and mitigating impacts.

A.1.10 Executive Order 12372, Intergovernmental Review of Federal Programs, as amended. This Executive Order requires Federal agencies to under-take coordinated planning on an intergovernmental basis with local, regional and state agencies for coordination and review of proposed federal financial assistance and direct federal development.

A.1.11 Executive Order 12898, Environmental Justice. Requires federal agencies to identify and address disproportionately high and adverse effects of its activities on minority and low income populations.

Appendix B

Program Questionnaire and Interview

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Suite 820
Chevy Chase, Maryland 20815-7003

Gerald F Oudens FAIA
Stuart L Knoop FAIA
David K Shaw AIA

Joseph J Giunta Jr AIA
Tom O Sachs AIA
Stephen M Stinnette AIA

July 5, 2000

Dr.
National Institute of General Medical Studies
45 Center Drive, MSC 6200 (Room 2AN-12)
Bethesda, MD 20892-6200

Dear Dr. :

Pursuant to Dr. Kirchstein's letter dated June 6, 2000, we are contacting you to prepare for an interview in which we seek to determine NIGMS's needs as we plan for the research agenda of the future in the context of the 20 year NIH Master Plan 2000 Update. To assist your staff in preparing for the interview, we enclose memoranda of our interviews conducted with NIGMS in 1993 along with a copy of the questionnaire which provided the outline for the interviews. We also enclose personnel projections made by NIGMS staff in 1993 and a copy of the current NIGMS Mission Statement as it appears on the NIH web page.

For this Master Plan 2000 Update we would like you to review the memoranda of our 1993 meetings and advise of us significant changes that have occurred since these responses were recorded. We are particularly interested in the following:

a. Mission and Objectives
   Any anticipated or contemplated changes in mission and the impact of such change on personnel and other requirements.

b. Functional and Operational Relationships
   1) How each of the functions in NIGMS interact with each other, with other Institutes and Centers, including Building 10, the ACRF and the CRC at initial occupancy and long-term, and with other, non-NIH entities if any.
   2) If first class research space were available on campus or at convenient, close-in locations (such as the NNMC), what research activities would you consider locating outside of the Clinical Center Complex (CRC/Building 10/ACRF).
   3) Which functions and personnel, now on the main campus, can be located off-campus, and the conditions under which location off-campus would be workable.
   4) Which functions now located off-campus must be brought back and the reasons for this.

c. Personnel Needs
   In order to plan appropriately for NIH's facilities requirements, we would like to understand your IC's current staffing and future personnel projections for 2005, 2010 and 2020 from a program perspective. Please use the attached forms to provide data by personnel category at the division, program or branch level most appropriate to reflect your requirements. (A floppy disc with the forms in Excel is enclosed for your convenience.)

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Oudens + Knoop Architects PC

Dr.
July 5, 2000
Page 2

d. Clinical Research Center/Building 10/ACRF Resources
In addition to activities reported in the staffing projections, please note anticipated changes and/or growth in Clinical programs, as well as projected needs for inpatient, outpatient and diagnostic & treatment resources.

e. Animal Requirements
Describe your current and anticipated long range animal use and the types and numbers of animals required. Please note the functional, management and cost considerations that affect the location of your animal holding facilities.

f. Campus Quality
How do quality of life issues, i.e., the nature of the site; opportunities for socialization and collegiality; provisions for recreation, dining, fitness and other amenities; and conveniences of access and parking affect your ability to achieve your mission and what aspects are particularly important to you in this regard.

If you have not already been contacted, Ms. Paula Nazarian of this office will be calling soon to schedule an appointment for the interview. If you have any questions, please call me at 301-718-0080. If you would like additional information about the master plan and interview process, Ms. Stella Serras-Fiotes, Master Planner and Assistant Director for Facilities Planning, Office of Research Services, can be reached at 301-496-5037.

Sincerely,

Gerald F. Oudens, FAIA
OUDENS + KNOOP ARCHITECTS, P.C.

cc:
Executive Officer
Stella Serras-Fiotes, ORS/OFP

GFO:pn
enclosures

Appendix B

Program Questionnaire and Interview

Please Respond in the space provided or attach additional pages as required. Please note "not applicable" where appropriate.

A. Mission and Objectives

1. Mission

A. Please review, in Attachment A, your current mission statement as reported in the 1991 NIH Almanac. Is this statement current and complete?

B. How do you envision the evolution of this mission in the future.

2. Organization and Programs

A. Please review the organizational listing presented in Attachment B and advise us whether it is current and correct with respect to activities and locations.

B. Please review, in Attachment C, the listing of programs, and activities within those programs, as precedented in the 1991 NIH Almanac and advise us whether this listing of programs and activities is current and complete.

C. How are intramural and extramural research programs or other services initiated? On what basis do you decide to pursue these on an extramural basis? On an intramural basis?

D. Please describe the relationship between you intramural and extramural research programs.

E. What are the benefits of an on-campus location for your office of extramural programs? Are there benefits to an off-campus location for this function?

F. Please describe your training programs and the way in which they influence space needs. To what extent are these accommodated in the laboratory setting and to what extent in classroom or conference space?

G. Please describe your current and anticipated long range animal use, the types and numbers of animals required and the functional, management and cost considerations that affect the location of the animal holding facilities.

H. Please describe your activities in the Clinical Center and, also, how these relate to the work of other ICD's in the Clinical Center.

3. Growth

A. What are the factors that precipitate growth, what forms may growth take, and to what extent can these be predicted?

B. Describe constraints which limit or preclude your response to pressures for growth.

C. To what extent do stipulations attached to funding dictate the activities of your ICD?

4. Long-Range Plan

A. Please discuss your long-range plan and your anticipated schedule for its implementation.

B. What impact would each of the following objectives, as presented in the Framework for Discussion of Strategies for NIH, have on your mission, programs and long-range plan?
   1. Critical Science and Technologies
   2. Research Capacity
   3. Intellectual Capital
   4. Stewardship of Public Resources
   5. Public Trust

C. How and what extent, are each of the following anticipated by your long-range plan?
   1. robotics
   2. computerization
   3. communications
   4. other technologies

5. Functional and Operational Relationships

A. Please describe important locational relationships between administrative offices, programs, laboratories, and branches within your ICD.

B. Please describe important locational relationships between your ICD and activities within your ICD, and other ICD's and components of those ICD's.

C. Please discuss the degree to which your long range plan will change the organization of your ICD, functional relationships within the ICD and the organizational and functional relationships of your ICD to other components of the NIH.

6. Campus Quality

A. How do quality of life issues; i.e.; the nature of the site; the size, character and location of buildings; opportunities for socialization and collegiality provisions for recreation, dining and other amenities; convenience of access and parking; proximity of affordable housing; etc; affect your ability to achieve your mission, and what aspects of the campus are particularly important to you in this regard?

B. Human Resource Needs

1. Personnel

A. Please tabulate on Attachment D1 your current staffing by position and activity area.

B. Please tabulate on Attachments D2 through D4 estimated staff require ments by position and activity for programs to be continued and for anticipated new programs needed to support implementation of your long range plan, at short-mid and long-term (20 years) stages, as it is described in noted of the interview on Mission and Objectives.

C. Please discuss the composition of research teams, the range of staffing variations for these teams, and the team composition that might be considered average or representative of basic research activity.

D. Please discuss your staffing of Clinical Center activities and identify support services provided to you that are not under your direct control.

2. Computerization and Other Technology

A. How do you anticipate personnel planning will be affected by computer-ization, communications, automation, robotics and other technology?

C. Physical Resources

1. Facilities

A. Please be prepared to identify, on building plans to be brought to the interview by the architect, the locations and perimeters od spaces occupied by your ICD and of those spaces shared with other ICD's.

B. What changes do you anticipate in facility requirements based on computerization, communications, automation, robotics, and other technologies?

2. Standards

A. Do you maintain space standards for personnel and activities? Id so, please provide.

B. In each activity category, i.e., administrative offices, laboratories and support areas, please identify representative current spaces that respond well to the needs of that activity and be prepared to visit these spaces and describe how they are responsive to the needs of activity.

Appendix C

Missions of the NIH Institutes and Centers

The National Cancer Institute

The National Cancer Institute (NCI) is a component of the National Institutes of Health (NIH), one of eight agencies that compose the Public Health Service (PHS) in the Department of Health and Human Services (DHHS). The NCI, established under the National Cancer Act of 1937, is the Federal Government's principal agency for cancer research and training. The National Cancer Act of 1971 broadened the scope and responsibilities of the NCI and created the National Cancer Program. Over the years, legislative amendments have maintained the NCI authorities and responsibilities and added new information dissemination mandates as well as a requirement to assess the incorporation of state-of-the-art cancer treatments into clinical practice.

The National Cancer Institute coordinates the National Cancer Program, which conducts and supports research, training, health information dissemination, and other programs with respect to the cause, diagnosis, prevention, and treatment of cancer, rehabilitation from cancer, and the continuing care of cancer patients and the families of cancer patients. Specifically, the Institute:

- Supports and coordinates research projects conducted by universities, hospitals, research foundations, and businesses throughout this country and abroad through research grants and cooperative agreements.
- Conducts research in its own laboratories and clinics.
- Supports education and training in fundamental sciences and clinical disciplines for participation in basic and clinical research programs and treatment programs relating to cancer through career awards, training grants, and fellowships.
- Supports research projects in cancer control.
- Supports a national network of cancer centers.
- Collaborates with voluntary organizations and other national and foreign institutions engaged in cancer research and training activities.
- Encourages and coordinates cancer research by industrial concerns where such concerns evidence a particular capability for programmatic research.
- Collects and disseminates information on cancer.
- Supports construction of laboratories, clinics, and related facilities necessary for cancer research through the award of construction grants.

National Eye Institute

The National Eye Institute (NEI) was established by Congress in 1968 to protect and prolong the vision of the American people. As one of the Federal government's National Institutes of Health (NIH), the NEI conducts and supports research that helps prevent and treat eye diseases and other disorders of vision. This research leads to sight-saving treatments, reduces visual impairment and blindness, and improves the quality of life for people of all ages. NEI-supported research has advanced our knowledge of how the visual system functions in health and disease.

Vision research is supported by the NEI through approximately 1600 research grants and training awards made to scientists at more than 250 medical centers, hospitals, universities, and other institutions across the country and around the world. The NEI also conducts laboratory and patient-oriented research at its own facilities located on the NIH campus in Bethesda, Maryland.

Because of continued Congressional and public support, the national investment in

vision research has yielded substantial dividends to treat many potentially blinding eye diseases:

- Diabetic retinopathy. Laser technology is safe and effective in treating this disease that affects more than one-third of the nearly 10 million Americans who have been diagnosed with diabetes.
- Amblyopia. Atropine eye drops can treat amblyopia, the most common cause of visual impairment in children, and work as well as the standard treatment of patching one eye.
- Age-related macular degeneration (AMD). An NEI supported study showed that using high levels of antioxidants and zinc significantly reduces the risk of advanced age-related macular degeneration (AMD) by 25 percent.
- Glaucoma. The NEI has supported research on effective drugs that reduce elevated eye pressure, a significant risk factor for this blinding disease.
- Retinopathy of prematurity. Identifying a treatment called cryotherapy—which involves briefly freezing the outer periphery of the retina—has significantly reduced this potentially blinding eye disease in premature infants.
- Corneal stromal keratitis. NEI research discovered that an oral antiviral drug significantly decreases the recurrence of herpes of the eye and reduces the recurrence of corneal stromal keratitis, the more severe form of the disease.
- Cytomegalovirus (CMV) retinitis. Finding that ganciclovir implants into the eye are effective in treating this disease—which affects people with AIDS—has helped to significantly improve quality of life.
- Uveitis. Safe and effective drugs have been introduced against certain forms of this potentially blinding inflammation of the inside of the eye.
- Retinitis pigmentosa. A number of gene mutations have been identified as causing retinitis pigmentosa, which is a group of inherited diseases that affect more than 100,000 Americans. This research provides the first step in developing new strategies to prevent or control these blinding diseases.
- Leber's congenital amaurosis. NEI-supported scientists have demonstrated that inserting substitute genes into the eye restores sight to dogs born blind with this congenital retinal disease. These results may someday allow scientists to develop treatments that will restore vision to children blind from the same disease.
- Lasers for treatment of AMD, glaucoma, and myopia (nearsightedness). The NEI has contributed to the development of medical lasers to treat the wet form of AMD, diagnose and treat patients with glaucoma, and correct myopia and other refractive errors of the eye.

Although the NEI has done much to promote healthy vision, the future promises to bring even more pioneering advances:

- NEI-supported scientists are working toward transplanting healthy cells into diseased retinas. This research may lead to new treatments for people with blinding retinal diseases, including AMD and retinitis pigmentosa.
- Researchers are exploring gene-based treatments to slow some forms of retinal degeneration.
- NEI-supported scientists are developing "neuroprotection" methods that will prevent or slow glaucoma cell damage and promote the survival of retinal cells damaged by glaucoma.

Part of the NEI mission is to develop public and professional education programs that help prevent blindness, reduce visual impairment, and increase awareness of services and devices that are available for people with low vision. To meet these objectives, the NEI has established the National Eye Health Education Program (NEHEP), a partnership of over 65 professional, civic, and voluntary organizations and government agencies concerned with eye health. The program represents an extension of the NEI's support of vision research, where results are disseminated to health professionals,

patients, and the public. The NEI is also the lead Federal agency for the vision and hearing chapter in Healthy People 2010, the nation's blueprint to improve public health.

National Heart, Lung, and Blood Institute

The National Heart, Lung, and Blood Institute (NHLBI) provides leadership for a national program in diseases of the heart, blood vessels, lung, and blood; blood resources; and sleep disorders. Since October 1997, the NHLBI has also had administrative responsibility for the NIH Woman's Health Initiative.

The Institute plans, conducts, fosters, and supports an integrated and coordinated program of basic research, clinical investigations and trials, observational studies, and demonstration and education projects. Research is related to the causes, prevention, diagnosis, and treatment of heart, blood vessel, lung, and blood diseases; and sleep disorders. The NHLBI plans and directs research in development and evaluation of interventions and devices related to prevention, treatment, and rehabilitation of patients suffering from such diseases and disorders. It also supports research on clinical use of blood and all aspects of the management of blood resources. Research is conducted in the Institute's own laboratories and by scientific institutions and individuals supported by research grants and contracts.

For health professionals and the public, the NHLBI conducts educational activities, including development and dissemination of materials in the above areas, with an emphasis on prevention.

The NHLBI supports research training and career development of new and established researchers in fundamental sciences and clinical disciplines to enable them to conduct basic and clinical research related to heart, blood vessel, lung, and blood diseases; sleep disorders; and blood resources through individual and institutional research training awards and career development awards.

The Institute coordinates relevant activities in the above areas, including the related causes of stroke, with other research institutes and federal health programs. Relationships are maintained with institutions and professional associations, and with international, national, state, and local officials as well as voluntary agencies and organizations working in the above areas.

National Human Genome Research Institute

The National Human Genome Research Institute (NHGRI) led the National Institutes of Health's (NIH) contribution to the International Human Genome Project, which had as its primary goal the sequencing of the human genome. This project was successfully completed in April 2003. Now, the NHGRI's mission has expanded to encompass a broad range of studies aimed at understanding the structure and function of the human genome and its role in health and disease.

To that end NHGRI supports the development of resources and technology that will accelerate genome research and its application to human health. A critical part of the NHGRI mission continues to be the study of the ethical, legal and social implications (ELSI) of genome research. NHGRI also supports the training of investigators and the dissemination of genome information to the public and to health professionals.

The direction and vision for the future for NHGRI and for genomics research - *A Vision for the Future of Genomics Research* - was released in April 2003, coinciding with the 50th anniversary of James Watson and Francis Crick's seminal publication of the structure of DNA.

National Institute on Aging

The National Institute on Aging (NIA), one of the 25 institutes and centers of the National Institutes of Health, leads a broad scientific effort to understand the nature of aging and to extend the healthy, active years of life. In 1974, Congress granted authority to form the National Institute on Aging to provide leadership in aging research, training, health information dissemination, and other programs relevant to aging and older people. Subsequent amendments to this legislation designated the NIA as the primary federal agency on Alzheimer's disease research.

The NIA's mission is to improve the health and well-being of older Americans through research, and specifically to:

Support and conduct high quality research on:

- aging processes
- age-related diseases
- special problems and needs of the aged
- Train and develop highly skilled research scientists from all population groups
- Develop and maintain state-of-the-art resources to accelerate research progress
- Disseminate information and communicate with the public and interested groups on health and research advances and on new directions for research.

National Institute on Alcohol Abuse and Alcoholism

NIAAA provides leadership in the national effort to reduce alcohol-related problems by:

- Conducting and supporting research in a wide range of scientific areas including genetics, neuroscience, epidemiology, health risks and benefits of alcohol consumption, prevention, and treatment
- Coordinating and collaborating with other research institutes and Federal Programs on alcohol-related issues
- Collaborating with international, national, state, and local institutions, organizations, agencies, and programs engaged in alcohol-related work
- Translating and disseminating research findings to health care providers, researchers, policymakers, and the public

National Institute of Allergy and Infectious Diseases

The National Institute of Allergy and Infectious Diseases (NIAID) is a component of the National Institutes of Health (NIH). NIAID conducts and supports research that strives to understand, treat, and ultimately prevent the myriad infectious, immunologic, and allergic diseases that threaten hundreds of millions of people worldwide.

The Institute's mission is driven by a strong commitment to basic research and the understanding that the fields of immunology, microbiology, and infectious disease are related and complementary. NIAID research centers on the four cornerstones of its Strategic Plan — immune-mediated diseases (and immune tolerance), HIV/AIDS, emerging infectious diseases, and vaccines.

National Institute of Arthritis and Musculoskeletal and Skin Disease

The mission of the National Institute of Arthritis and Musculoskeletal and Skin Diseases is to support research into the causes, treatment, and prevention of arthritis and musculoskeletal and skin diseases, the training of basic and clinical scientists to carry out this research, and the dissemination of information on research progress in these diseases.

National Institute of Biomedical Imaging and Bioengineering

The mission of the National Institute of Biomedical Imaging and Bioengineering is to improve health by promoting fundamental discoveries, design and development, and translation and assessment of technological capabilities in biomedical imaging and bioengineering, enabled by relevant areas of information science, physics, chemistry, mathematics, materials science, and computer sciences. The Institute plans, conducts, fosters, and supports an integrated and coordinated program of research and research training that can be applied to a broad spectrum of biological processes, disorders and diseases and across organ systems. The Institute coordinates with the biomedical imaging and bioengineering programs of other agencies and NIH Institutes to support imaging and engineering research with potential medical applications and facilitates the transfer of such technologies to medical applications.
In support of its mission the Institute will:

- Support research and research training through existing NIH funding mechanisms, and take the lead in exploring novel approaches for funding technology development and interdisciplinary research.
- Form partnerships with NIH Institutes and Centers to translate fundamental discoveries into research and applications for specific diseases, disorders, or biological processes.
- Coordinate with other government agencies to translate fundamental or crosscutting discoveries and developments in imaging and engineering, and related areas of information science and technology assessment, into biomedical applications.
- Encourage and support the development of relevant standards and guidelines that will enable widespread adaptability for biomedical imaging, bioengineering, and related information science and technology and computation, by taking a leadership and coordinating role for the NIH.

National Institute of Child Health and Human Development

The National Institute of Child Health and Human Development (NICHD) is part of the National Institutes of Health, the biomedical research arm of the U.S. Department of Health and Human Services. The mission of the NICHD is to ensure that every person is born healthy and wanted, that women suffer no harmful effects from reproductive processes, and that all children have the chance to achieve their full potential for healthy and productive lives, free from disease or disability, and to ensure the health, productivity, independence, and well-being of all people through optimal rehabilitation.

National Institute on Deafness and Other Communication Disorders

The National Institute on Deafness and Other Communication Disorders (NIDCD) is one of the Institutes that comprise the National Institutes of Health (NIH). NIH is the Federal government's focal point for the support of biomedical research. NIH's mission is to uncover new knowledge that will lead to better health for everyone. Simply described, the goal of NIH research is to acquire new knowledge to help prevent, detect, diagnose, and treat disease and disability. NIH is part of the U.S. Department of Health and Human Services.

Established in 1988, NIDCD is mandated to conduct and support biomedical and behavioral research and research training in the normal and disordered processes of hearing, balance, smell, taste, voice, speech, and language. The Institute also conducts and supports research and research training related to disease prevention and health promotion; addresses special biomedical and behavioral problems associated with people who have communication impairments or disorders; and supports efforts to create devices which substitute for lost and impaired sensory and communication function.

It is estimated that more than 46 million people in the United States suffer some form of disordered communication. NIDCD has focused national attention on disorders of human communication and has contributed to advances in biomedical and behavioral research that will improve the lives of millions of individuals with communication disorders. NIDCD has made important contributions to the body of knowledge needed to help those who experience communication disorders and to advance research in all aspects of human communication.

NIDCD accomplishes its mandate through the Division of Intramural Research, which conducts research in laboratories at the NIH, and the Extramural Research Program, a program of research grants, career development awards, individual and institutional research training awards, center grants, and contracts to public and private research institutions and organizations. As a whole, the Institute supports and conducts approximately 600 research projects. The Institute also conducts and supports research and research training in disease prevention and health promotion and the special biomedical and behavioral problems associated with people having communication impairments and disorders.

NIDCD's extramural grant portfolio demonstrates a balance of basic and clinical research. The intramural research program spans a variety of topics, including, but not limited to, the development of a vaccine against otitis media, the identification and characterization of genes responsible for hereditary hearing impairment, genes associated with neoplasms affecting human communication, and treatment of voice disorders.

National Institute of Dental and Craniofacial Research

The mission of the National Institute of Dental and Craniofacial Research (NIDCR) is to promote the general health of the American people by improving their oral, dental and craniofacial health. Through the conduct and support of research and the training of researchers, the NIDCR aims to promote health, prevent diseases and conditions, and develop new diagnostics and therapeutics.

National Institute of Diabetes and Digestive and Kidney Disease

The National Institute of Diabetes and Digestive and Kidney Diseases conducts and supports research on many of the most serious diseases affecting public health. The Institute supports much of the clinical research on the diseases of internal medicine and related subspecialty fields as well as many basic science disciplines.

The Institute's Division of Intramural Research encompasses the broad spectrum of metabolic diseases such as diabetes, inborn errors of metabolism, endocrine disorders, mineral metabolism, digestive diseases, nutrition, urology and renal disease, and hematology. Basic research studies include biochemistry, nutrition, pathology, histochemistry, chemistry, physical, chemical, and molecular biology, pharmacology, and toxicology.

NIDDK extramural research is organized into divisions of program areas:

- Division of Diabetes, Endocrinology, and Metabolic Diseases
- Division of Digestive Diseases and Nutrition
- Division of Kidney, Urologic, and Hematologic Diseases

The Division of Extramural Activities provides administrative support and overall coordination. A fifth division, the Division of Nutrition Research Coordination, coordinates government nutrition research efforts.

The Institute supports basic and clinical research through investigator-initiated grants, program project and center grants, and career development and training awards. The Institute also supports research and development projects and large-scale clinical trials through contracts.

National Institute on Drug Abuse

NIDA's mission is to lead the Nation in bringing the power of science to bear on drug abuse and addiction

Recent scientific advances have revolutionized our understanding of drug abuse and addiction. The majority of these advances, which have dramatic implications for how to best prevent and treat addiction, have been supported by the National Institute on Drug Abuse (NIDA). NIDA supports over 85 percent of the world's research on the health aspects of drug abuse and addiction. NIDA supported science addresses the most fundamental and essential questions about drug abuse, ranging from the molecule to managed care, and from DNA to community outreach research.

NIDA is not only seizing upon unprecedented opportunities and technologies to further understanding of how drugs of abuse affect the brain and behavior, but also working to ensure the rapid and effective transfer of scientific data to policy makers, drug abuse practitioners, other health care practitioners and the general public. The NIDA web page is an important part of this effort. The scientific knowledge that is generated through NIDA research is a critical element to improving the overall health of the Nation. Our goal is to ensure that science, not ideology or anecdote, forms the foundation for all of our Nation's drug abuse reduction efforts.

NIDA was established in 1974, and in October 1992 it became part of the National Institutes of Health, Department of Health and Human Services. The Institute is organized into divisions and offices, each of which plays an important role in programs of drug abuse research.

National Institute of Environmental Health Sciences

Human health and human disease result from three interactive elements: environmental factors, individual susceptibility and age. The mission of the National Institute of Environmental Health Sciences (NIEHS) is to reduce the burden of human illness and dysfunction from environmental causes by understanding each of these elements and how they interrelate. The NIEHS achieves its mission through multidisciplinary biomedical research programs, prevention and intervention efforts, and communication strategies that encompass training, education, technology transfer, and community outreach.

National Institute of General Medicine Sciences

The National Institute of General Medical Sciences (NIGMS) primarily supports basic biomedical research that is not targeted to specific diseases or disorders. Because scientific breakthroughs often originate from such untargeted studies, NIGMS-funded work has contributed substantially to the tremendous progress that biomedical research has made in recent years. The Institute's training programs help provide the most critical element of good research: well-prepared scientists.

NIGMS is one of the National Institutes of Health (NIH), the principal biomedical research agency of the Federal Government. NIH is a component of the U.S. Department of Health and Human Services.

Each year, NIGMS-supported scientists make major advances in understanding fundamental life processes. In the course of answering basic research questions, these investigators also increase our knowledge about the mechanisms involved in certain diseases. Other grantees develop important new tools and techniques, many of which have applications in the biotechnology industry. In recognition of the significance of their work, a number of NIGMS grantees have received the Nobel Prize and other high scientific honors.

National Institute of Mental Health

The National Institute of Mental Health conducts Strategic Planning for specific research areas as well as for the Institute as a whole. NIMH staff and experts, including the public, carry out this process of reviewing current research, and assessing areas of need and scientific opportunity. Generally both immediate goals and long-range goals are outlined as a guide to decisions about the NIMH research portfolio. Strategic planning often involves National Mental Health Advisory Council members and sometimes is in response to a request by that Council. The reports are usually internal documents to guide research planning.

National Institute of Neurological Disorders and Stroke

The mission of NINDS is to reduce the burden of neurological disease - a burden borne by every age group, by every segment of society, by people all over the world.
To support this mission, NINDS:

- Conducts, fosters, coordinates, and guides research on the causes, prevention, diagnosis, and treatment of neurological disorders and stroke, and supports basic research in related scientific areas.
- Provides grants-in-aid to public and private institutions and individuals in fields related to its areas of interest, including research project, program project, and research center grants.
- Operates a program of contracts for the funding of research and research support efforts in selected areas of institute need.
- Provides individual and institutional fellowships to increase scientific expertise in neurological fields.
- Conducts a diversified program of intramural and collaborative research in its own laboratories, branches, and clinics.
- Collects and disseminates research information related to neurological disorders.

National Institute of Nursing Research

The National Institute of Nursing Research supports clinical and basic research to establish a scientific basis for the care of individuals across the life span-from management of patients during illness and recovery to the reduction of risks for disease and disability, the promotion of healthy lifestyles, promoting quality of life in those with chronic illness, and care for individuals at the end of life. This research may also include families within a community context. According to its broad mandate, the Institute seeks to understand and ease the symptoms of acute and chronic illness, to prevent or delay the onset of disease or disability or slow its progression, to find effective approaches to achieving and sustaining good health, and to improve the clinical settings in which care is provided. Nursing research involves clinical care in a variety of settings including the community and home in addition to more traditional health care sites. The NINR's research extends to problems encountered by patients,

families, and caregivers. It also focuses on the special needs of at-risk and underserved populations, with an emphasis on health disparities. These efforts are crucial in the creation of scientific advances and their translation into cost-effective health care that does not compromise quality.

NINR accomplishes its mission by supporting grants to universities and other research organizations as well as by conducting research intramurally at laboratories in Bethesda, Maryland. The research fosters interdisciplinary collaborations to ensure a comprehensive approach to research on health promotion, illness, and disabling conditions. This approach is especially relevant in research such as that aimed at long-term care for the elderly, the special needs of women across the life span, bioethical issues related to genetic testing and counseling, biobehavioral aspects of managing the prevention and treatment of infectious diseases, end of life care, and environmental influences on risk factors related to chronic illnesses. NINR research includes all age groups and is based on adequate gender and minority representation.

NINR's intramural investigations, with an interdisciplinary, patient-focused approach to human health and illness, are particularly suited to the research environment on the NIH campus. The unique clinical research facilities offer diverse opportunities for professional exchange and collaboration on questions related to patient care and quality of life. These studies also provide training opportunities that acquaint scientists with the research issues and clinical strategies employed by investigators in nursing research.

In addition, the Institute supports comprehensive research training and career development programs to prepare individuals with requisite skills to conduct nursing research in an interdisciplinary setting.

National Library of Medicine

The National Library of Medicine (NLM), on the campus of the National Institutes of Health in Bethesda, Maryland, is the world's largest medical library. The Library collects materials in all areas of biomedicine and health care, as well as works on biomedical aspects of technology, the humanities, and the physical, life, and social sciences. The collections stand at more than 7 million items—books, journals, technical reports, manuscripts, microfilms, photographs and images. Housed within the Library is one of the world's finest medical history collections of old and rare medical works. The Library's collection may be consulted in the reading room or requested on interlibrary loan. NLM is a national resource for all U.S. health science libraries through a National Network of Libraries of Medicine.

Centers

Center for Information Technology

To provide, coordinate, and manage information technology, and to advance computational science.

The vision of CIT is to be a vital partner in the discovery of biomedical knowledge.

Center for Scientific Review

- Serves as the central receipt point for all research and training grant applications submitted to the NIH. Also receives some of the applications submitted to other components of the Department of Health and Human Services (DHHS) and refers them to these components;

- Assigns all NIH applications to the appropriate institutes or centers for consideration for funding and also to the scientific review groups within CSR or other institutes or centers for review;
- Provides the scientific merit review of most research grant and fellowship applications submitted to the NIH;
- Provides staff support to the Office of the Director, NIH, in the formulation of grant and award policies and procedures; and
- Assists other NIH components in providing information on the NIH peer review system and information about the research grant and fellowship application process and procedures to the scientific community, the Congress, other NIH staff, and the general public.

John E. Fogarty International Center

Over the past four generations, public health tools and interventions resulting from research have dramatically improved life expectancy and quality of life. However, significant disparities continue to exist in global health status. Low- and middle-income nations suffer over ninety percent of the burden of premature mortality as measured in lost years of life. These countries, constituting three-quarters of the world's population, now share a double burden: The persistent cluster of infectious diseases and malnutrition that are responsible for 16 million deaths per year, of which many are children; and a growing incidence of chronic disease and disabilities due to increased life spans and new risk exposures that accompany the demographic transition.

In the United States, health disparities are evident within and among population groups. Genetic and environmental factors, nutrition, access to health education and services, behavior, and other factors are implicated in varying degrees as contributors to these disparities. Research advances made abroad may have a positive impact on U.S. populations through improvements in education or counseling strategies; development of diagnostics, drugs or intervention technologies; or through identification of new avenues of research that ultimately lead to health care interventions. In addition, basic knowledge gained through research studies conducted abroad contribute to the scientific foundation upon which U.S. and international medical studies are built.

Adapting research advances in biomedicine to populations at home and abroad requires a continuing commitment to basic science as well as rigorous clinical and applied studies. To address these needs, the Fogarty International Center (FIC) forges collaborations with a range of domestic and international partners in international research and training to pursue three core objectives. The first is to accelerate the pace of discovery and its application by enabling scientists worldwide to share conceptual insights, analytic methods, data sets, patient cohorts or special environments. The second is to engage and assist both young and established U.S. investigators to address scientific challenges related to global health. And the third is to help develop a cadre of highly capable young foreign investigators positioned to cooperate with U.S. scientists in areas of the world that, due to geography, population structure, or disease burdens, provide unique opportunities to understand disease pathogenesis, anticipate disease trends, or develop interventions.

These objectives form the conceptual basis for current FIC programs related to HIV/AIDS, emerging infectious diseases, maternal and child health, population research and demographic science, medical informatics, drug discovery from biodiversity, as well as fellowship programs for young Americans, with emphasis on under represented minorities. The disciplinary fields described are pursued through a range of funding mechanisms, including institutional training grants, cooperative agreements, small

research grants, fellowships, and multilateral initiatives involving international organizations.

The Fogarty International Center promotes and supports scientific research and training internationally to reduce disparities in global health.

National Cancer for Minority Health and Health Disparities

The National Center for Complementary and Alternative Medicine (NCCAM) is 1 of the 27 institutes and centers that make up the National Institutes of Health (NIH). The NIH is one of eight agencies under the Public Health Service (PHS) in the Department of Health and Human Services (DHHS).

NCCAM is dedicated to exploring complementary and alternative healing practices in the context of rigorous science, training complementary and alternative medicine (CAM) researchers, and disseminating authoritative information to the public and professionals.

Our four primary areas of focus are

- Research. We support clinical basic science research projects in CAM by awarding grants across the country and around the world; we also design, study, and analyze clinical and laboratory-based studies on the NIH campus in Bethesda, Maryland.

- Research Training and Career Development. We award grants that provide training and career development opportunities for predoctoral, postdoctoral, and career researchers.

- Outreach. We sponsor conferences, educational programs, and exhibits; operate an information clearinghouse to answer inquiries and requests for information; provide a Website and printed publications; and hold town meetings at selected locations in the United States.

- Integration. To intergrate scientifically proven CAM practices into conventional medicine, we announce published research results; study ways to intergrate evidence-based CAM practices into conventional medical practice; and support programs to develop models for incorporating CAM into the curriculum of medical, dental, and nursing schools.

National Center for Research Resources

The mission of the National Center on Minority Health and Health Disparities (NCMHD) is to promote minority health and to lead, coordinate, support, and assess the NIH effort to reduce and ultimately eliminate health disparities. In this effort NCMHD will conduct and support basic, clinical, social, and behavioral research, promote research infrastructure and training, foster emerging programs, disseminate information, and reach out to minority and other health disparity communities.

The NCMHD envisions an America in which all populations will have an equal opportunity to live long, healthy and productive lives.

National Center for Research Resources

The National Center for Research Resources (NCRR) serves as a “catalyst for discovery” by creating and providing critical research technologies and shared

resources. This infrastructure underpins biomedical research and enables advances that improve the health of our Nation's citizens.

Biomedical research investigators supported by the Institutes and Centers of the National Institutes of Health require a broad array of technologies, tools and materials critical to their research efforts. From the models required for research on diseases and disabilities, to the biomedical technology and instrumentation necessary to elucidate cellular and molecular structure, to the clinical settings in which to conduct studies to discern the cause of disease and in which novel clinical trials of new therapies can be developed, biomedical researchers must have access to the necessary resources in order to continue to make progress against human disease and disability.

The NCRR has a unique responsibility at the National Institutes of Health: to develop critical research technologies and to provide cost-effective, multidisciplinary resources to biomedical investigators across the spectrum of research activities supported by the NIH. This has four major facets:

Create resources and develop technologies that are cost-effective, accessible and responsive to the research needs of the biomedical research community. To meet these needs the NCRR must be in the vanguard of evolving trends in basic and clinical research so that resources will be available to facilitate that research.

Provide shared clinical, primate and biotechnology resources for use by investigators supported by all the NIH Institutes and Centers. These resources, primarily centers, serve more than 10,000 researchers, supported through well over $1 billion of categorical research resource Institute funds, thus leveraging those funds for more cost-effective and efficient research.

Develop quick, flexible approaches to new and emerging biomedical research needs and opportunities. These innovations often involve high-risk research, but the payoffs may be substantial.

Strengthen the nation's biomedical research infrastructure through programs to develop and enhance the capacity of minority institutions and centers of emerging excellence to participate in biomedical research, to increase the exposure of K-12 students and their teachers to the life sciences, to improve the condition of research animal facilities, and to construct or renovate facilities for biomedical and behavioral research.

The NCRR plays a key role in addressing pressing trans-NIH research issues, such as access to state-of-the-art instrumentation and biomedical technologies; containment of the escalating costs of highly sophisticated clinical research; development of appropriate, specialized research models both animal and nonanimal; and remedying the shortage of independent clinical investigators and the under representation of minority investigators. Present and future program directions emphasize "smart," network-connected technologies, computer-aided drug design, development and testing of gene and molecular therapies, bioengineering approaches to decrease health care costs, and enhanced training and career development for patient-oriented research.

Warren Grant Maguson Clinical Center

The NIH Clinical Center will serve as a premier center for clinical research. A model of collaborative excellence, the NIH Clinical Center will lead through innovation in the design, conduct, training, and impact of clinical research.

The NIH Clinical Center is the clinical research facility of the National Institutes of Health. It provides patient care, services, training, and the environment in which NIH clinician-scientists creatively translate emerging knowledge into better understanding, detection, treatment, and prevention of human diseases for the health of a diverse nation.

The Standards for Clinical Research, established in 2001, set forth some essential principles and processes for the conduct of clinical research in the NIH intramural research programs. A clinical standards review process using these standards was initiated in the summer of 2000.

The Bench-to-Bedside Program encourages collaborations between basic and clinical investigators across the NIH institutes in order to translate scientific findings into clinical applications. Since its inception in 1998 more than 175 proposals have been submitted and 32 projects have been funded. In addition to institute resources, a new source of funding has been identified: The NIH Office of Rare Diseases will be supporting five projects at $100,000 per award per year for two years. The projects must focus on an area of science/research directly related to a rare disease.

The Office of Protocol Services was established in 2002 to provide principal investigators with tools and applications that help simplify the entire protocol process. One such effort, ProtoType, will simplify the protocol writing process by providing recommended language cassettes for protocol and consent form use. The application will assure that regulatory requirements are met by providing help on relevant parts of the protocol and by linking to NIH Clinical Center policies.

Clinical Research Information System (CRIS), the Clinical Center's next-generation clinical information infrastructure, is a $60 million project that will link and support patient care, research and management. This phase of the CRIS project replaces and expands the Clinical Center's current hospital information system known as the Medical Information System, or MIS. Once complete, at least 24 distinct information systems will feed into two CRIS hubs, the Clinical Data Repository and the Clinical Data Warehouse.