

## A Framework for Campus Planning

## Supplement

#### **CONTENTS**

#### 1. INTRODUCTION 3

Methodology

Overview of Capital Investment Projects 1993-2009

New Construction on Central Campus and the Athletic Fields Since 2000

Planning Precincts

## 2. PLANNING PRINCIPLES ASSESSMENT 11

Uses

Buildings

Open Space

Streets

Signage

Lighting

Utilities and Infrastructure

## 3. PRECINCT ACTIVITY: OPEN SPACE AND DEVELOPMENT OPPORTUNITIES 23

Core

Broadway/Tower Parkway

Hillhouse

Science Hill

Upper Prospect

Yale Athletic Fields

## 4. OTHER PLANNING ACTIVITY SINCE 2000 49

Circulation

Streetscapes

**Exterior Lighting** 

Exterior Signage

## 5. PLANNING CONSIDERATIONS 53

Sustainability Overview

Utilities and Infrastructure Overview

### 6. UPDATE SUMMARY CONCLUSIONS 61

Design Process

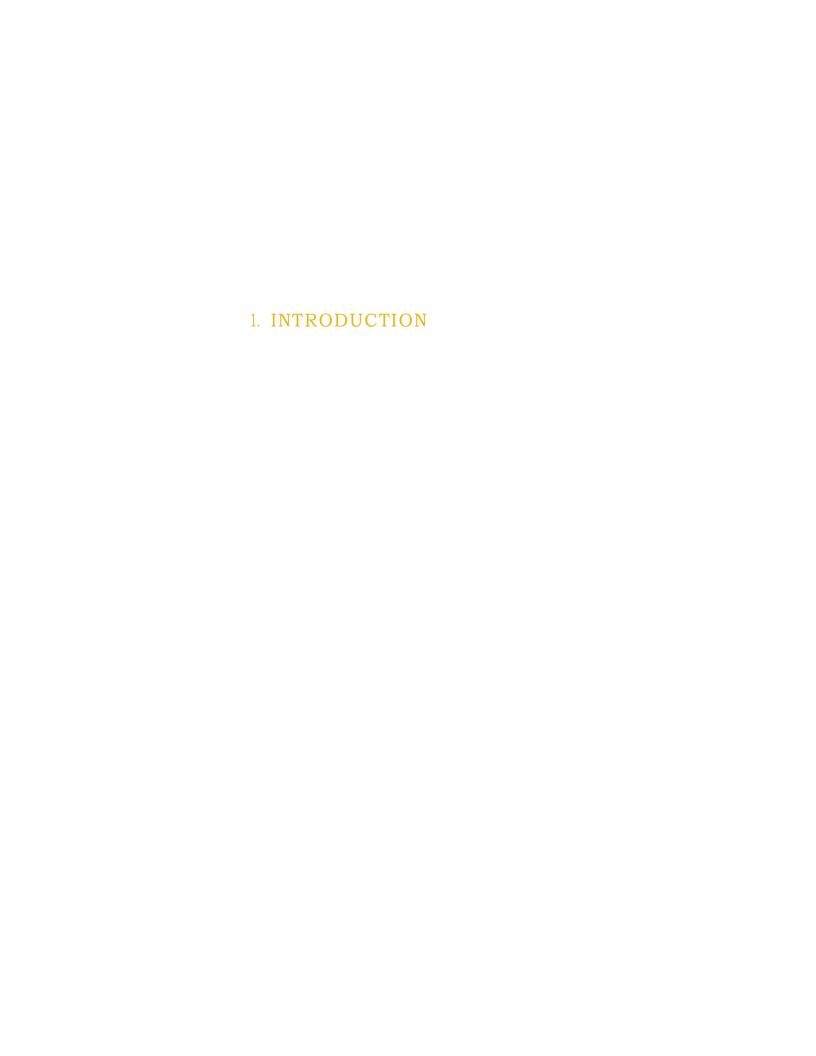
Planning Principles

Landscape

Parking

Quality of Design

## PROJECT TEAM 65



#### INTRODUCTION

Yale wishes to evaluate its experience using the Framework Plan over the past nine years. It has been a time of extensive activity. In addition to the ongoing renovations such as the residential colleges, the Art and Architecture Building (now Rudolph Hall), the Yale Art Gallery, Hewitt Quadrangle, and Hillhouse Avenue, 24 new building projects have been completed or are near completion, 5 are under construction, and numerous more are in the planning and design stages. There are five new O∞cers of the University, new heads of both Facilities and Planning, and a new design review process including the current and two former deans of the Yale School of Architecture. The University has made a significant acquisition of new research, o∞ce, and storage facilities to be known as the West Campus, which was the subject of a separate planning study. So it is timely to review the document and assess how well it is working and determine whether improvements might be made. The Framework Plan was intended, from the beginning, to be modified periodically as policies mature and conditions change. For instance, the theme of sustainability has broadened over the past decade, and the infrastructure that supports the university is ten years older. Attention to both these subjects is warranted now.

#### Methodology

The Supplement both looks back at campus development since the 2000 Framework Plan, and forward to update the planning principles, assess remaining development opportunities, and summarize planning and design considerations for the future.

The 2000 Framework Plan had 38 planning principles organized in six categories. The Supplement reviews how each principle was followed, determines if the principle is still valid, and gives examples of recent major projects that follow the principle. Of the 38 principles, 20 have been revised, and 11 new principles have been added, based on comments from the O∞cers in October 2007 and a comprehensive review by Yale sta≠ and consultants to address sustainability, utilities, and infrastructure. Most modifications are refinements rather than substantive changes.

The third section, Precinct Activity, highlights open space and development projects realized since 2000 (or submitted to the City for approval) and updates development opportunity sites in the five precincts of the Central Campus and at the Yale Athletic Fields. The scope of the Supplement does not include the Medical Center.

The fourth section lists projects completed for upgrading campus circulation, streetscape, signage, and lighting systems since 1999. A section on Updated Planning Considerations for Sustainability and for Utilities and Infrastructure follows. The Supplement ends with Update Summary Conclusions, which draws attention to some key, qualitative aspects of the Framework Plan.

#### Overview of Capital Investment Projects 1993–2009

The map at right, developed by the Yale Facilities Department, illustrates the University's significant investment in the growth and stewardship of facilities in the last 17-year period. During that time, there have been 51 projects with New Construction, 56 Major Renovation projects, and 86 Renovation projects at the Central Campus, Medical Center, Yale Athletic Fields, and Derby and Hamden facilities.

### New Construction on Central Campus and the Athletic Fields Since 2000

Arnold Hall

Bass Library

29-45 Broadway

Calhoun College addition (below-grade; under construction)

Class of 1954 Chemistry Research Building

Class of 1954 Environmental Science Center

353 Crown Street

Cullman-Heyman Tennis Center addition

32-36 Edgewood Avenue (Sculpture Gallery and Building)

Greenberg Conference Center

30 Hillhouse Avenue addition

Howe Street Garage

Ingalls Rink addition (below-grade; under construction)

Kenney Center (Yale Bowl addition; under construction)

Kroon Hall and Science Hill SW Service Node

Lanman Center (Payne Whitney Gymnasium addition)

Loria Center

Malone Engineering Center

Marsh Botanic Gardens Greenhouse 3

Morse and Stiles Colleges addition (below-grade; under construction)

Pierson College addition

Rose Center

8 Prospect Place

77 Prospect Street/89 Trumbull Street addition

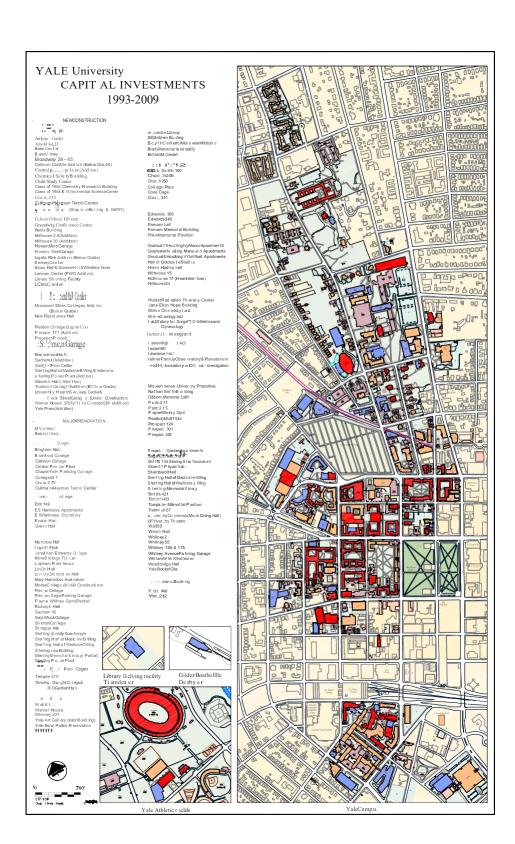
Prospect-Sachem Garage

Rosenkranz Hall

10 Sachem Street addition

Stoeckel Hall addition

University Health Services Center and Lock Street Garage (under construction)



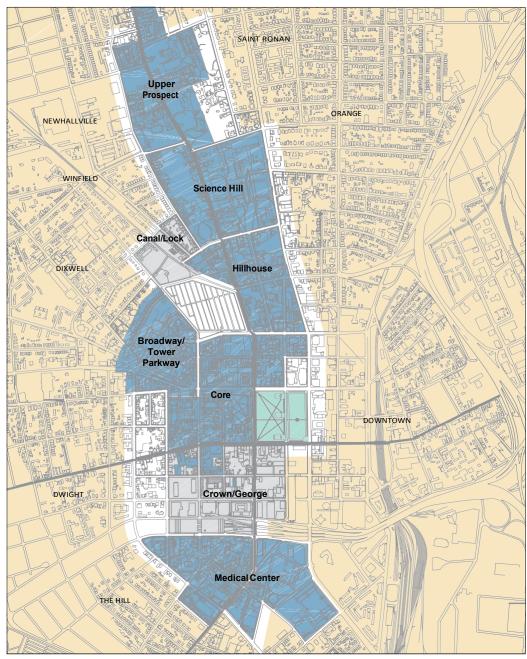
## **Planning Precincts**

The 2000 Framework Plan defined seven planning precincts, with five in the Central Campus as noted below. The plan also identified two areas of mutual interest to Yale and the City of New Haven: Crown/George and Canal/Lock. The assessment of building activity and of open space and development opportunities is organized according to these precincts. The Medical Center was not included in the scope of this study.

- Core
- Broadway/Tower Parkway
- Hillhouse
- Science Hill
- Upper Prospect
- Medical Center
- Yale Athletic Fields



**Yale Athletic Fields** 



2000 Framework Planning Precincts

# 2. PLANNING PRINCIPLES ASSESSMENT

Given the extensive process used to develop the planning principles in the 2000 Framework, revisions or new principles should not be considered lightly. In order to keep the Framework current and useful as a living planning tool, however, some principles have been updated to reflect the evolving nature of the campus and to support institutional priorities, such as sustainability. In some cases, project-specific principles have been revised to be more expressive of general intent. The resulting updated principles follow in this section, with an assessment of how each principle has been followed and an explanation of why a revision has been proposed, where appropriate. A new category of principle has been added to the six categories in the Framework Plan to reflect the importance of utilities and infrastructure for supporting future campus development.

- Uses
- Buildings
- Open Space
- Streets
- Signage
- Lighting
- Utilities and Infrastructure

#### **Updated Principles and Assessment**

#### Uses

Yale and New Haven intertwine both physically and functionally to the benefit of each. While the University is composed of distinct, overlapping planning precincts (each with its own characteristics, issues, and strategies), it also has a complex mix of academic settings that are integrated with uses and activities shared with New Haven residents.

- U.1. Continue to design residential colleges as self-contained, multiple-use residences with unique identities, while emphasizing their relationship with, and connections to, streets and open space.
  - Implementation pending
  - Principle still valid
- U.2. Strengthen graduate housing on upper Prospect Street and create other opportunities for graduate housing in select areas near graduate schools, which can facilitate opportunities for interdisciplinary contact.
  - Not implemented (graduate housing on upper Prospect pre-dates the 2000 Framework)
  - Principle revised to reflect the University's goals for graduate housing in more locations than upper Prospect, and for fostering interdisciplinary contact
- U.3. Consolidate undergraduate academic divisions, as well as the facilities of individual professional schools, as much as possible to increase exciency and maximize convenience for both faculty and students.
  - Implemented
  - · Principle still valid
  - Projects following this principle: Class of 1954 Environmental Science Center, Malone
    Engineering Center, Class of 1954 Chemistry Research Building, 32–36 Edgewood Avenue and
    Howe Street Garage, 10 Sachem Street addition, Loria Center, Kroon Hall, and Rosenkranz Hall
    are each adjacent to or near existing academic divisions.
- U.4. Employ a wide variety of design strategies (such as the use of landscaping and similar building scale, massing, and materials) to ensure compatibility with Yale's bordering neighborhoods and open spaces.
  - · Partially implemented
  - Principle still valid
  - Projects following this principle: 29–45 Broadway, Class of 1954 Chemistry Research Building,
     Rose Center, Arnold Hall, 32–36 Edgewood Avenue and Howe Street Garage

- U.5. Continue to reinforce arts, entertainment, and retail activities for the City as well as the University by designing new facilities with active uses at the ground level.
  - · Partially implemented
  - · Principle still valid
  - Projects following this principle: 29–45 Broadway, Arnold Hall, 32–36 Edgewood Avenue and Howe Street Garage, Loria Center
  - Projects deemed not appropriate to follow this principle: Class of 1954 Environmental Science Center, Malone Engineering Center, Class of 1954 Chemistry Research Building, Kroon Hall
- U.6. Reinforce significant retail locations bordering the campus (Broadway, Whitney/Grove, Audubon Street, and Chapel Street).
  - Implemented
  - · Principle still valid
  - Principle revised to reflect the addition of the Audubon retail area since 2000
  - Projects following this principle: 29–45 Broadway, Arnold Hall, Audubon area
- U.7. Encourage the distribution of public, social, and retail activities (including recreation and eating) on the campus that complement existing city amenities.
  - Implemented
  - Principle still valid
  - Projects following this principle: Rose Center, 32 Edgewood Avenue and Howe Street Garage, Bass Library, Loria Center
- U.8. Locate large-scale support structures, such as physical plant and grounds maintenance, at the perimeter of the campus, where they can meet functional and circulation needs more easily.
  - Implemented
  - Principle still valid
  - Projects following this principle: 344 Winchester Avenue facility for Buildings and Grounds

#### **Buildings**

Yale's urban architecture is generally three- to five-stories high, interspersed with spires and towers. The continuously blended fabric of University and City provides the dominant context for Yale's present and future physical assets.

- B.1. Continue looking to Yale's existing design vocabulary (visual structure, site conditions, and cultural context), both historic and contemporary, to shape new buildings, while recognizing that materials, scale, proportion, and building configuration all contribute to Yale's character.
  - Original principle partially implemented
  - Principle revised to reflect that both traditional and contemporary architecture contribute to the context of the Yale campus, depending on the area
  - Projects following the 2000 principle: Lanman Center, Class of 1954 Environmental Science Center, Class of 1954 Chemistry Research Building, 10 Sachem Street addition, Loria Center, Greenberg Conference Center, Rosenkranz Hall
  - Projects deemed not appropriate to follow the 2000 principle: Rose Center, 32–36 Edgewood Avenue and Howe Street Garage
- B.2. Design new buildings to shape and link open spaces rather than merely sit as an object in them.
  - Implemented
  - · Principle still valid
  - Projects following this principle: Class of 1954 Environmental Science Center, Malone
    Engineering Center, Class of 1954 Chemistry Research Building, Rose Center, 32–36 Edgewood
    Avenue, Kroon Hall, Rosenkranz Hall
- B.3. Continue to place towers and other prominent building elements at the ends of key streets and prominent view corridors.
  - Implemented
  - · Principle still valid
  - Project following this principle: Malone Engineering Center
- B.4. Build consistent street frontages. Continue framing streets in the densest parts of campus with building walls that are punctuated with distinctive gateways and passages to interior spaces and courtyards. Where structures are further removed from the street, repeat patterns of uniform setbacks and orientation.
  - Implemented
  - Principle still valid
  - Projects following this principle: Lanman Center, Class of 1954 Environmental Science Center, Malone Engineering Center, Rose Center, 32–36 Edgewood Avenue and Howe Street Garage, Rosenkranz Hall

#### PLANNING PRINCIPLES ASSESSMENT

- Encourage mixed-use development and buildings with active ground-level uses.
  - Implemented
  - · Principle still valid
  - Projects following this principle: 29-45 Broadway, Rose Center, Arnold Hall, 32-36 Edgewood Avenue and Howe Street Garage, Loria Center
- Consider opportunities to utilize many of the small buildings on campus by combining them with B.6. more excient floorplate buildings, where feasible.
  - Implemented
  - Principle still valid. Refined to omit reference to large floorplates to promote the use of daylighting
  - Projects following this principle: Warner House/370 Temple addition, <sup>1</sup> 77 Prospect/89 Trumbull addition, 10 Sachem Street addition, Stoeckel Hall addition, Greenberg Conference Center, Rosenkranz Hall
- B.7. Orient building entrances, whether in new construction or renovation projects, toward those streets or walkways that support the primary pedestrian system within the area and throughout the campus.
  - Implemented
  - Principle still valid
  - Projects following this principle: Class of 1954 Environmental Science Center, Malone Engineering Center, Rose Center, Prospect-Sachem Garage, 32-36 Edgewood Avenue and Howe Street Garage, Rosenkranz Hall
- B.8. Design buildings so that they use natural systems to conserve energy and improve comfort in the manner of traditional campus building forms. Such design strategies could include ample use of natural light to illuminate interiors, operable windows to enable natural ventilation, and building massing to enhance visual and physical connections to the surrounding campus landscape.
  - New principle to promote sustainable development
  - Projects following this principle: Malone Engineering Center, 32–36 Edgewood Avenue, Kroon Hall, Greenberg Conference Center, Rosenkranz Hall
- Support the campus transit system by providing enclosed or sheltered waiting areas in or near building entrances with visible access to transit stops.
  - New principle to promote sustainable development by coordinating building entrance design and transit considerations

 $<sup>^1\,</sup> The addition connecting Warner House and 370 Temple Street was completed in 1999 but was not included in the 2000 and the connection of the connection$ Framework Plan.

#### **Open Space**

The character of the Yale campus is felt in and defined by its open space as well as by the quality of its buildings. These landscape settings require a focused, intense stewardship to maintain their special role in life at Yale.

- O.1. Recognize the vocabulary and ecological potential of open space types on campus—including streets, walks, quadrangles, courtyards, and gardens—when creating new spaces and preserving existing ones.
  - Implemented
  - Principle still valid. Revised to promote sustainability
  - Projects following this principle: Class of 1954 Environmental Science Center, Hewitt Quadrangle, 77 Prospect/89 Trumbull addition, 32–36 Edgewood Avenue and Howe Street Garage, Kroon Hall, Rosenkranz Hall
- 0.2. Develop new paths, walks, and passages through buildings to provide clear pedestrian routes and shorten distances between key activities and destinations.
  - Implemented
  - Principle still valid
  - Projects following this principle: 32–36 Edgewood Avenue and Howe Street Garage, Kroon Hall, Rosenkranz Hall, Yale Health Center
- 0.3. Preserve passive landscape settings on Central Campus, while accommodating the demand to use some actively for such things as gatherings, ceremonies, and recreation.
  - · Implemented
  - · Principle still valid
  - Projects following this principle: Morse and Stiles addition, Bass Library, Rosenkranz Hall
- 0.4. Provide access between public streets, walkways, and interior open spaces in academic settings, particularly during daytime hours, consistent with appropriate security considerations.
  - · Partially implemented
  - Principle still valid. Revised to di≠erentiate access to public open space from semi-public space such as residential colleges for security purposes
  - Projects following this principle: Prospect-Sachem Garage, 32–36 Edgewood Avenue and Howe Street Garage, Kroon Hall, Rosenkranz Hall
  - Projects deemed not appropriate to follow this principle: Class of 1954 Chemistry Research Building, Science Hill projects in general

#### PLANNING PRINCIPLES ASSESSMENT

- 0.5. Generously landscape setbacks and moats between buildings and city streets to enhance the campus setting and ecology.
  - Implemented
  - Principle still valid. Revised to promote sustainability
  - Projects following this principle: residential college renovations, Malone Engineering Center
- 0.6. Create an expanded, safe, mixed-tra∞c bikeway system by slowing tra∞c, clearly marking preferred cycling routes, and providing adequate bicycle parking and support facilities.
  - Not implemented
  - Principle still valid. Revised to include reference to support facilities needed for bicycle use and to clarify the need
- 0.7. Reorganize the public and service facilities at Yale Athletic Fields to assist both intramural and varsity athletics and to enhance the experience for visitors.
  - · Partially implemented
  - Principle still valid
  - Projects following this principle: Yale Bowl renovation, Cullman-Heyman Tennis Center addition,
     Kenney Center, Jensen Plaza
- 0.8. Develop open spaces to clarify pedestrian routes, integrate facilities with their surrounding environment, and provide new amenities throughout the campus.
  - Implementation status of projects included in original principle:
    - a. Connections around Grove Street Cemetery: implemented
    - b. Hewitt Quadrangle: implemented
    - c. Sachem's Wood: implementation pending—under planning review
    - d. Landscape small parking lots on west side of Prospect: not implemented
    - e. Marsh Botanic Gardens and Farnam Memorial Gardens: not implemented—under planning reviews
  - The principle is still valid in its intent, but was revised to be more generalized, rather than recommending five particular open space enhancement projects.
- 0.9. Integrate ecological functions, such as storm water management, into campus landscapes.
  - New principle to promote sustainable development of campus open space
  - Projects following this principle: Kroon Hall, Morse College renovation

#### **Streets**

Yale is a highly urbanized university. The character of city streets should enhance the quality of the campus environment and provide safe pedestrian and bicycle ways that support a variety of transit options.

- ST.1. Support tra∞c-calming initiatives in select areas to enhance the safety of pedestrians and cyclists.

  These initiatives could include the conversion of select streets to two-way tra∞c, redesign of crosswalks, provision of bike lanes, and a reduction of street widths at key intersections such as Prospect/Grove and Elm Street between High and College Streets.
  - Revised principle ST.1 consolidates and simplifies four principles from the 2000 Framework Plan pertaining to tra∞c calming and enhancing the pedestrian experience and safety. The first principle, advocating conversion of one-way to two-way streets, has not been implemented. The second, supporting e≠orts to narrow streets to slow tra∞c and minimize crosswalk distance, has not been implemented. The third, which there has been no opportunity to implement, notes the importance of sidewalks to the pedestrian system when designing street rights-of-way. The fourth principle advocated on-street parking as a tra∞c-calming device; this principle has been reevaluated and consolidated into revised ST.1.
- ST.2. Consolidate parking in facilities (lots and garages) sized to meet demand and located close to primary destinations where possible and remotely when demand requires.
  - Partially implemented
  - Principle largely still valid. Amended to omit reference to "excess lots"
  - Two sites recommended in the Framework (Ashmun Street/Lot 78 and 451 College Street) have been removed from consideration as parking facilities.
  - Projects following this principle: Prospect-Sachem Garage, increased leased spaces at Whitney/ Grove Garages, Howe Street Garage
- ST.3. Consolidate and reduce service drives and loading areas wherever possible.
  - · Implemented
  - · Principle still valid
  - Projects following this principle: Class of 1954 Chemistry Research Building, Science Hill SW Service Node
- ST.4. Screen exterior loading areas and collection sites from street and building views with walls, fences, and landscaping complimentary to the architecture of the adjacent building.
  - Implemented
  - · Principle still valid
  - Projects following this principle: Class of 1954 Chemistry Research Building, Science Hill planning, residential college renovations, Bass Library, Rosenkranz Hall

#### Signage

The University needs a comprehensive, coherent, and consistent signage system throughout the campus that properly expresses its academic and cultural missions.

- SI.1. Welcome Yale visitors, New Haven and regional residents, tourists, potential students, new students, faculty and sta≠, while helping guide them to destinations within Yale.
  - · Partially implemented
  - · Principle still valid
  - Projects following this principle: campus signage project, including campus map display cases;
     Woolsey Hall display cases; University Theatre display cases
  - Projects needed to fulfill this principle: directional street signage, additional pedestrian orientation signage
- SI.2. Create an image of the institution that expresses its historic background as well as its importance as a contemporary center of cultural and academic activity.
  - Implemented
  - · Principle still valid
  - Projects following this principle: campus signage project, Woolsey Hall display cases, University
     Theatre display cases
- SI.3. Create a wayfinding system that integrates with the surrounding landscape, architecture, and urban environment.
  - Implemented
  - · Principle still valid
  - Projects following this principle: campus signage project, including campus map display cases
- SI.4. Create a signage system that is flexible and adaptable to diverse situations.
  - · Partially implemented
  - Principle still valid
  - Projects following this principle: campus signage project (vehicular directional signs and pedestrian directional signs are needed to fulfill the principle)

#### Lighting

Lighting the Yale campus at night should balance the needs of safety, energy conservation, and aesthetics: the campus can be as memorable at night as it is during the day.

- LI.1. Develop a pedestrian, parking, and roadway lighting system that illuminates destinations and reduces glare between those destinations by substituting low-glare, white, high color-rendering light for the high-pressure sodium light now prevalent throughout the City.
  - In planning
  - Principle still valid. Revised to be less technically specific and to address the range of circulation systems needing lighting
  - Campus lighting project reviewed by the Design Advisory Committee (DAC) and O∞cers.
     Requires more study
- LI.2. Selectively light building entrances or ground floors, prominent architectural features, and supporting landscape elements to reinforce the pedestrian and bicycle systems throughout the campus.
  - Partially implemented, further work in planning
  - To be determined if principle still valid
  - Campus lighting project reviewed by the DAC and O∞cers. Requires more study
- LI.3. Selectively light iconic structures to create an identifiable skyline at night that also helps provide direction and improves orientation within the campus.
  - In planning
  - Principle should be reevaluated
  - Campus lighting project reviewed by the DAC and O∞cers. Requires more study
- LI.4. Install lighting in parking lots and garages, for comfort and security, but with minimal glare and light trespass to the immediate surroundings.
  - Implemented
  - · Principle still valid
  - New lighting installed in Chapel-York Garage, Prospect-Sachem Garage, Howe Street Garage

#### PLANNING PRINCIPLES ASSESSMENT

#### **New Planning Principle Category**

#### **Utilities and Infrastructure**

- UI.1. Provide campus infrastructure capacity to maintain full operation of the steam and chilled water systems in the event of failure of the largest piece of equipment.
- UI.2. Provide redundant distribution of utility systems wherever possible.
- UI.3. Locate energy-generation facilities to allow connection to existing distribution systems and to allow space for future expansion.
- UI.4. Create and maintain "distribution corridors" for buried utility distribution systems that coordinate with planned campus expansion.
- UI.5. Where corridors already exist, coordinate campus expansion to reduce relocation of utilities.
- UI.6. Locate small-scale or integrated infrastructure (such as distributed power generation or storm water management) within building clusters where it can serve adjacent buildings without extensive infrastructural connections.
- UI.7. Locate major distribution points (electrical substations, PRVs, chilled water mains, etc.) within building clusters where they can serve adjacent buildings without extensive infrastructural connections.
- UI.8. Consider removal/relocation of aerial utility distribution on public rights-of-way within the campus.

# PLANNING PRINCIPLES ASSESSMENT

# 3. PRECINCT ACTIVITY: OPEN SPACE AND DEVELOPMENT OPPORTUNITIES

This section summarizes open space and building projects in each planning precinct completed or submitted to the City for approval since 2000 for the Central Campus and Yale Athletic Fields. It also updates the precinct maps to show remaining sites for Open Space and Development Opportunities. The site designations correspond to the site capacity identified in the 2000 Framework Plan, and new sites are identified. An overall summary plan of all projects realized since 2000 follows in the Update Summary Conclusions.

- Core
- Broadway/Tower Parkway
- Hillhouse
- Science Hill
- Upper Prospect
- Yale Athletic Fields

## Core

2000 Framework Plan
Open Space and Development Opportunities



# **Opportunity Sites**

Open Space = 3

Development = 6

## Legend

Open Space Opportunity Site



## Legend

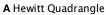
Open Space Project

Development Project

## PRECINCT ACTIVITY: OPEN SPACE AND DEVELOPMENT OPPORTUNITIES

## **Projects Realized Since 2000**







**B** BassLibrary



**C** Howe Street Garage



**D** 32 Edgewood Avenue (Sculpture Gallery)



**E** 36 Edgewood Avenue (Sculpture Building)



F Pierson College addition



**G** Loria Center

26



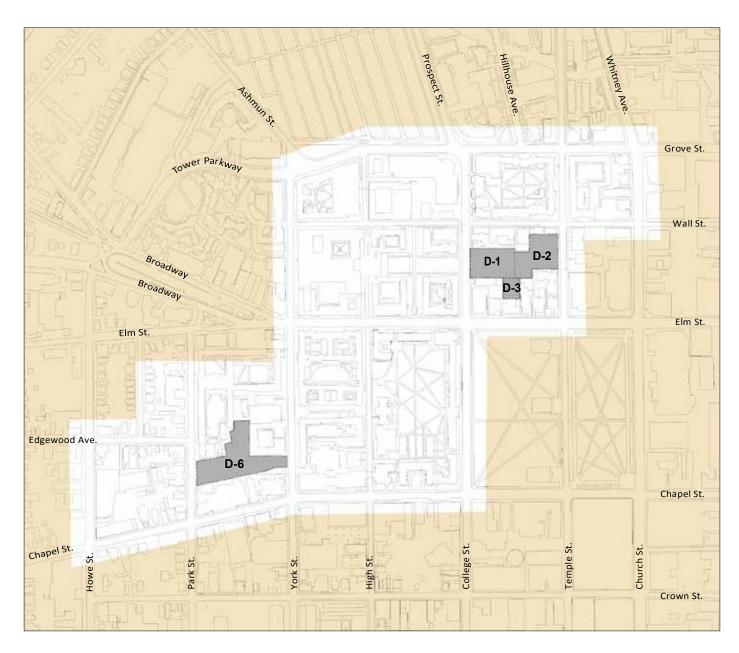
Supplement

H 353 Crown Street



I Stoeckel Hall addition

**J** Calhoun College addition (below-grade)

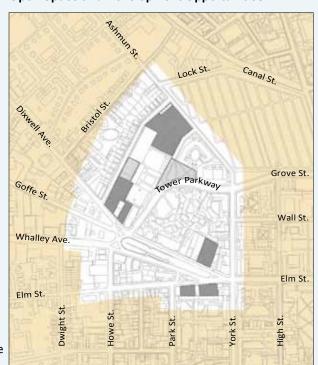


Remaining Sites: Core
Open Space = 0
Development = 4

Legend

# **Broadway/Tower Parkway**

2000 Framework Plan
Open Space and Development Opportunities

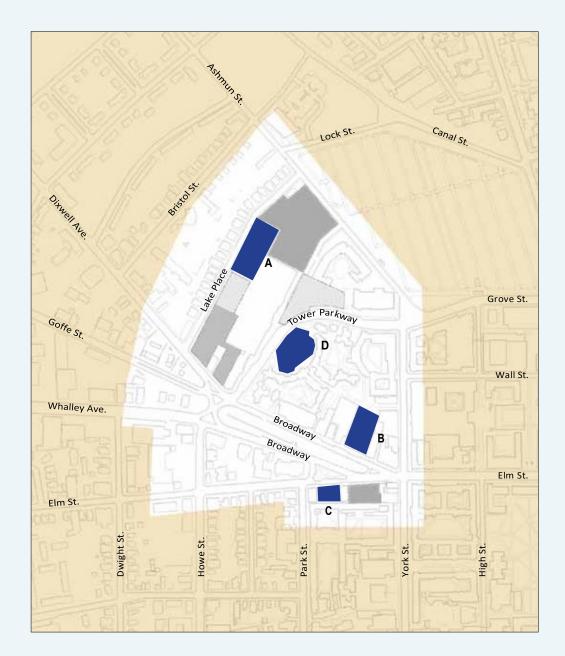


# **Opportunity Sites**

Open Space = 2 Development = 5

Legend

Open Space Opportunity Site



## Legend

Development Project

Open Space Opportunity Site

# PRECINCT ACTIVITY: OPEN SPACE AND DEVELOPMENT OPPORTUNITIES

## **Projects Realized Since 2000**



A Lanman Center (Payne Whitney Gymnasium addition)

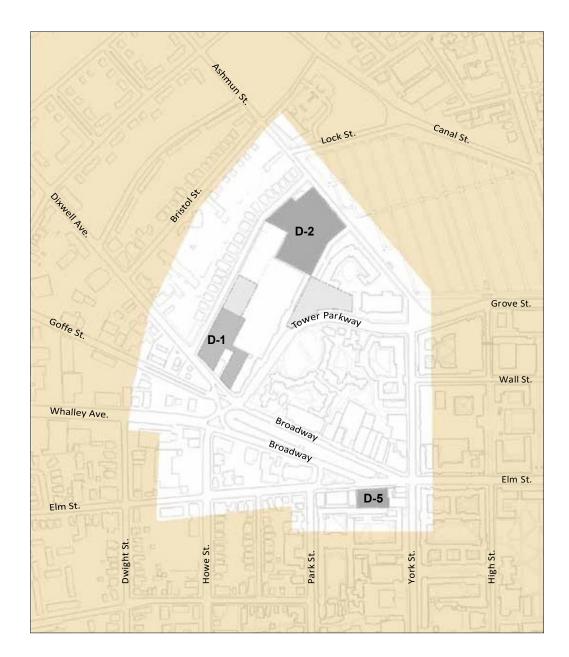


B 29-45 Broadway



C Arnold Hall

**D** Morse and Stiles Colleges addition (below-grade)



# Remaining Sites: Broadway/Tower Parkway

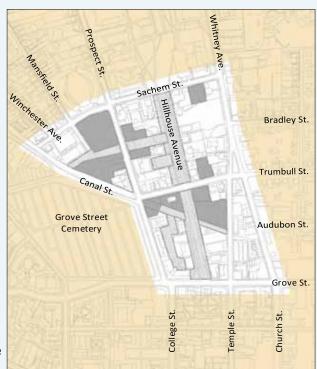
Open Space = 2 Development = 3

## Legend

Open Space Opportunity Site

# Hillhouse

2000 Framework Plan
Open Space and Development Opportunities



# **Opportunity Sites**

Open Space = 6 Development = 12

## Legend

Open Space Opportunity Site
Development Opportunity Site



## Legend

Open Space Project

Development Project

Open Space Opportunity Site

## **Projects Realized Since 2000**



A Malone Engineering Center



B 77 Prospect Street/89 Trumbull Street addition



C Hillhouse Avenue



**D** Rosenkranz Hall



F 30 Hillhouse Avenue addition



**G** 8 Prospect Place





J Farmington Canal Greenway



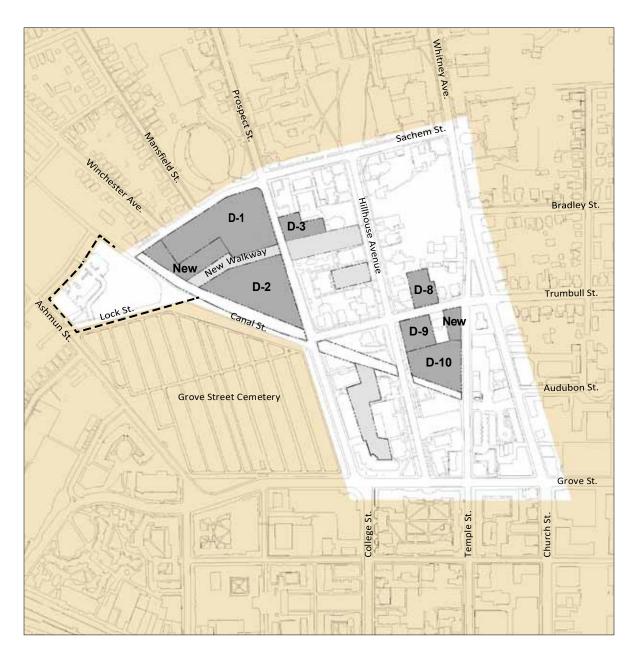
E 10 Sachem Street addition



**H** Rose Center



**K** Hillhouse Avenue pedestrian bridges



# Remaining Sites: Hillhouse

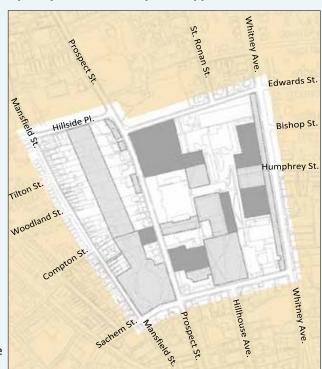
Open Space = 4 Development = 8

# Legend

- Open Space Opportunity Site
- Development Opportunity Site
- \_\_\_\_ Revised Precinct Boundary

# **Science Hill**

2000 Framework Plan
Open Space and Development Opportunities



# **Opportunity Sites**

Open Space = 12

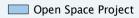
Development = 7

# Legend

Open Space Opportunity Site



# Legend





Open Space Opportunity Site

# PRECINCT ACTIVITY: OPEN SPACE AND DEVELOPMENT OPPORTUNITIES

# **Projects Realized Since 2000**



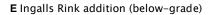
A Class of 1954 Chemistry Research Building



**B** Prospect-Sachem Garage

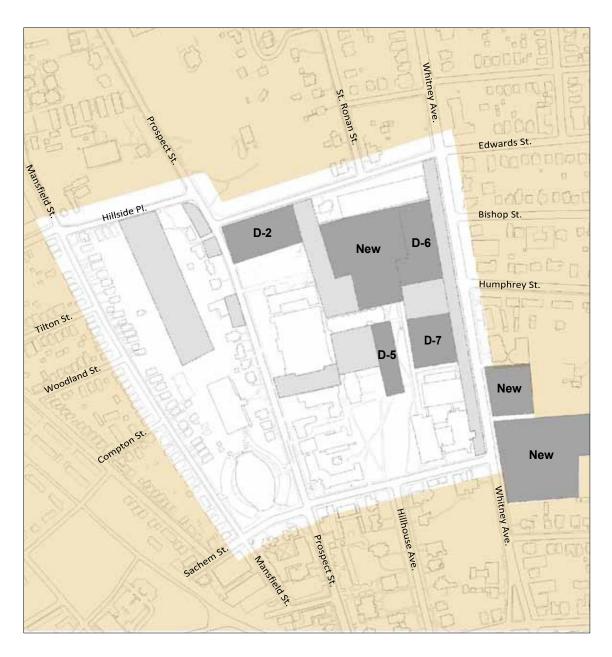


C Kroon Hall & Science Hill SW Service Node and courtyards





D Class of 1954 Environmental Science Center



# Remaining Sites: Science Hill

Open Space = 9

Development = 7

## Legend

Open Space Opportunity Site

# **Upper Prospect**

2000 Framework Plan
Open Space and Development Opportunities



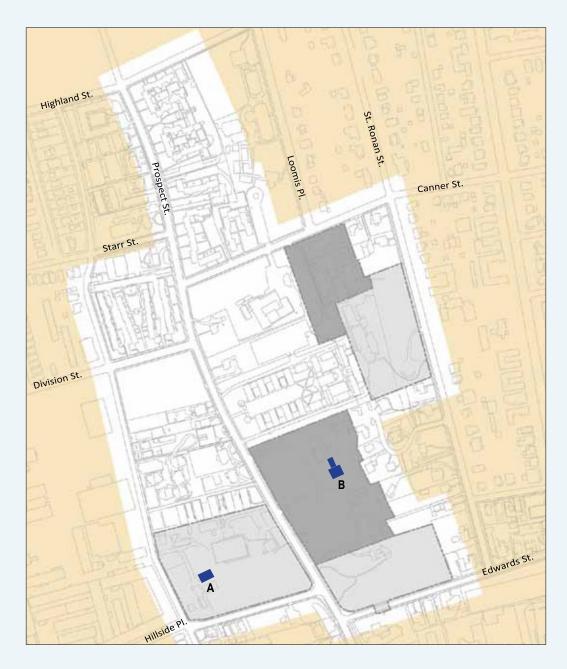
# **Opportunity Sites**

Open Space = 3

Development = 2

### Legend

Open Space Opportunity Site



# Legend

Development Project

Open Space Opportunity Site

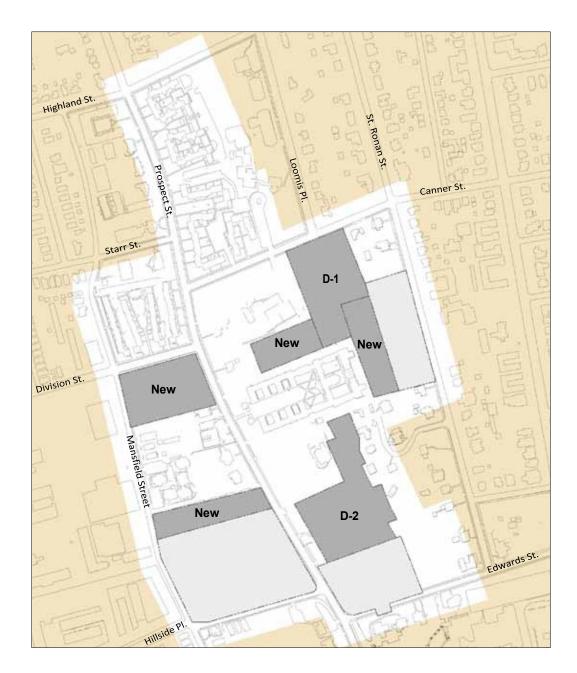
# **Projects Realized Since 2000**



A Marsh Botanic Gardens Greenhouse 3



**B** Greenberg Conference Center



# **Remaining Sites: Upper Prospect**

Open Space = 3 Development = 6

# Legend

Open Space Opportunity Site

# Yale Athletic Fields

2000 Framework Plan
Open Space and Development Opportunities



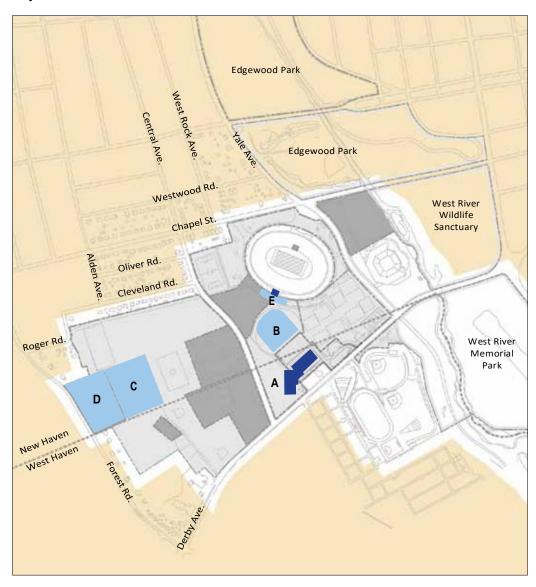
# **Opportunity Sites**

Open Space = 5 Development = 5

#### Legend

Open Space Opportunity Site
Development Opportunity Site

# **Projects Realized Since 2000**



## Legend

- Open Space Project
- Development Project
- Open Space Opportunity Site
- Development Opportunity Site

# PRECINCT ACTIVITY: OPEN SPACE AND DEVELOPMENT OPPORTUNITIES

# **Projects Realized Since 2000**



 $\textbf{A} \, \textbf{Cullman-HeymanTennisCenter} \, \textbf{addition}$ 



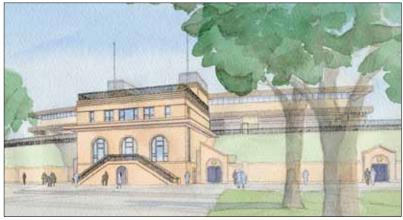
**B** Reese Stadium and Field



 ${\bf C}\,Johnson\,Field$ 

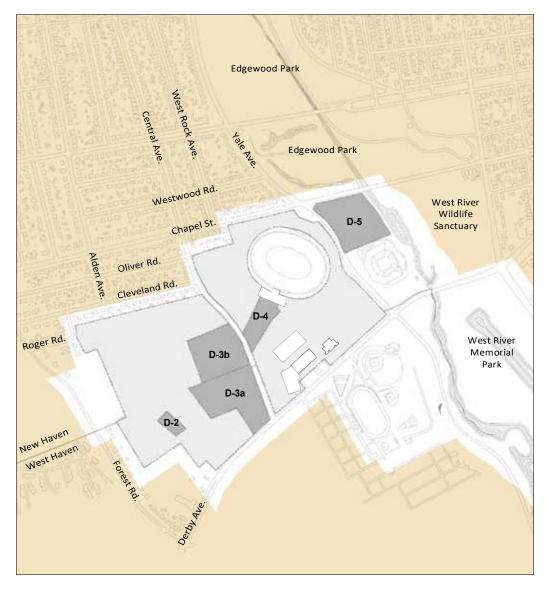


**D** DeWitt Family Field



E Kenney Center and Jensen Plaza

## Open Space and Development Opportunities: 2009 Conditions



## **Remaining Sites: Athletic Fields**

Open Space = 2

Development = 5

### Legend

Open Space Opportunity Site

## **Projects Realized Since 2000**

# 4. OTHER PLANNING ACTIVITY SINCE 2000

Yale has made considerable investment in the systems that comprise the public realm and connective fabric of the campus since 2000, in many cases in response to the recommendations of the Framework Plan. These completed projects and other planned initiatives are described in this section.

- Circulation
- Streetscapes
- Exterior Lighting
- Exterior Signage

#### OTHER PLANNING ACTIVITY SINCE 2000



Hillhouse Avenue

#### Circulation

- The Pierson-Sage Garage has been renovated, new parking garages have been constructed on Science
  Hill and on Howe Street, one is in design at the new University Health Services Center, and one is being
  planned. Strong pedestrian connections from the garages to the areas served are a part of each project.
- The University has created several visitor parking lots, increasing the number of visitor parking spaces from 113 to 210.
- Transportation options and commuter choice programs have been introduced, including ride-sharing matches, parking discounts for car pooling, an on-campus Zipcar vehicle sharing program, pre-tax benefits to promote public transit use, exploration of telecommuting options, implementation of a "Y-Bike" program providing bikes to departments, and installation of bike racks and showers at key locations.
- Improvements to Yale's shuttle service include use of biodiesel in all shuttle vehicles, new buses, and a reconfiguration of routes to ensure a reliable transportation option for faculty, students, and sta≠; the service now provides more than one million rides annually.
- Technological improvements to the shuttle service include an automated dispatch service, a global
  positioning feature to track shuttles live online via PDA and computer, and a unified night operation
  with shuttle and security dispatch to better coordinate passenger needs.
- One concealed service node has been completed on Science Hill, one is in progress at the new University Health Services Center, and one is in design on Science Hill.
- A pedestrian route around the north and west sides of the Grove Street Cemetery was established with
  the construction of the Rose Center and is being improved as part of the University Health Services Center.
  Another portion of this route is under development with the construction of Rosenkranz Hall. This route
  will be completed with the new residential colleges.
- A tracc signal was installed on Tower Parkway at the intersection of York Square Place to provide a safe pedestrian crossing to and from the swing dorm (100 Tower Parkway).
- A program of sidewalk reconstruction has improved walking surfaces throughout the campus.
- The Kroon Hall project includes two new landscaped courtyards to the north and south of the new building, and a new piazza to the west creates a nexus between itself, Sage Hall, Osborn Memorial Laboratory, and Prospect Street.
- Hewitt Quadrangle was renovated to improve its appearance and to create accessible routes to University Commons, Woolsey Hall, and Woodbridge Hall.
- The landscaping of a portion of the Cross Campus was renewed as part of the Bass Library project, and the entrances to the Bass Library now complement the surrounding architecture.
- Trash collection areas have been constructed in several locations throughout the Central Campus, improving the pedestrian experience by concealing trash storage. Service areas are being consolidated to reduce the number of collection points and reduce collection vehicle trace.
- A pedestrian connection from Fraternity Row to 32–36 Edgewood Avenue has been completed.
- The University is leasing space in Science Park as a result of planning studies under way.
- The Yale Biology Building project, which is in design, will include pedestrian connections around the building as well as a bicycle connection from Humphrey Street to Sachem Street.



Farmington Canal Greenway

#### Streetscapes

- A landscaping project on the upper block of Hillhouse Avenue has improved the pedestrian experience by reducing the density of vegetation adjacent to walkways and by softly lighting buildings to improve illumination while reducing glare.
- A section of the Farmington Canal Greenway from Prospect Place to Hillhouse Avenue was completed.
   Landscape improvements were made to the Greenway between Prospect Place and Bristol Street, and further Greenway improvements are planned, including a southern extension beyond Hillhouse Avenue.
- The bridge carrying Hillhouse Avenue over the Farmington Canal Greenway is being replaced with the
  partial assistance of the University. This project includes separate pedestrian bridges preserving the
  alignment of the sidewalks and allowing more light on the Greenway.
- Grove Street has been repaved from Church Street to College Street. College Street has been repaved from Wall Street to Grove Street. Other streets in the area will be repaved soon as part of a Development Agreement with the City of New Haven.
- Extensive streetscape improvement projects for the area around Prospect Street are in progress.
- The University contributed toward the improvement of Scantlebury Park, just to the north of the Rose Center.

#### **Exterior Lighting**

- Preliminary design was begun for a prototype bridge lighting system on York Street and a mockup was conducted, but the project was deferred pending resolution of aesthetic and energy concerns.
- Additional walkway lighting fixtures were installed in isolated locations, but specific recommendations from the Framework Plan regarding glare-free lighting were not implemented.
- Parking garage lighting was converted from high-pressure sodium to metal halide at the Chapel-York
   Garage and the Pierson-Sage Garage. New garages are provided with metal halide lighting.
- The accent lighting on Harkness Tower was improved.

# **Exterior Signage**

- Directional signs have been installed on I-91 and I-95.
- · Campus maps have been installed in six locations.
- Freestanding signs have been installed for some graduate/professional schools and prominent venues, and others are in process.
- Building identification signs have been installed for most of Central Campus and the Medical Center, and planning is under way for signage at the Athletic Fields.
- Miscellaneous signs (e.g., accessibility, no trespassing, regulatory) have been installed for most of Central Campus and the Medical Center, and planning is under way for signage at the Athletic Fields.
- Parking and transit signs have been installed. A new system for parking signs has been approved at the
  design stage but not implemented.
- New display cases have been installed in front of Woolsey Hall and the University Theatre. Similar
  cases could also be provided for other public venues such as the Peabody Museum, Ingalls Rink, Payne
  Whitney Gymnasium, and the Yale Cabaret.



Building signage program

# 5. PLANNING CONSIDERATIONS

The 2000 Framework Plan included planning considerations for accessibility, historic preservation, environmental aspects, direct economic impact of Yale in New Haven and Connecticut, information technology, and utilities. The Supplement updates two of these topics to summarize major sustainability initiatives, a significant priority for the University, and to provide an overview of utilities and infrastructure system upgrades.

- Sustainability Overview
- Utilities and Infrastructure Overview



36 Edgewood Avenue, LEED Platinum certified for sustainable design

#### **Sustainability Overview**

Yale University has developed a national and international reputation as a leader among campuses committed to sustainable development. To ground this commitment, Yale has embraced the underlying principles of sustainable development established by the Bruntland Report, entitled *Our Common Future* and produced by the United Nations World Commission on Environment and Development (WCED). Sustainable development "seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future." Yale's commitment to become a sustainable campus is a complex and long-term endeavor. The purpose of this section is to place the challenges of becoming a sustainable campus into the context of the Framework Plan for the campus. Yale is now challenged to adjust the physical planning of the campus to better meet the emerging campus sustainability goals. Some of these goals are defined, such as a reduction in greenhouse gas emissions, while others are being developed (water conservation, air quality, biodiversity, renewable energy).

Yale's sustainability commitment calls for an ongoing assessment of the current state of the campus and the development and implementation of a plan of action; o≠ers a tool for communicating the complexity of sustainability in a simplified model; and provides room for growth and evolution as the commitment takes root. The University's strategy is divided into three constructs:

- 1) Use of natural resources and environmental services: air, water, land, energy, food, forests, soil (not a finite list).
- 2) Systems and processes: building design and construction, energy production and consumption, procurement, land use and landscape, water management and conservation, transportation, waste management and recycling, food production and service, building management (i.e., cleaning).
- 3) Culture: curriculum, research and scholarship, human health, governance, employee responsibility.

As outlined by the three constructs, the process begins by understanding how Yale is consuming and impacting its natural resources. This is followed by developing an understanding of how the current systems and processes rely upon the natural resources. Such an analysis aims to determine if the systems and processes lead or can lead to a sustainable system. In a similar context, a plan needs to be established to determine how sustainability principles will be integrated into the physical planning and expansion of the campus. In 2009 we set out to develop a sustainability strategic plan (2010–2013) that calls for a series of ambitious yet achievable three-year sustainability targets.

### State of the campus

In the midst of committing to becoming a sustainable university, Yale has grown since the year 1990 at an average rate of approximately 1.5% per year. Yale owns 400 buildings with 16.75 million gross square feet on 573 acres (Central: 311 acres, Medical: 26 acres, Athletic: 100 acres, West Campus: 136 acres). Although Yale has an urban campus, it also owns a 500-acre golf course and nature preserve in New Haven and West Haven and 11,000 acres of forest land in Connecticut, New Hampshire, and Vermont. The University has 5,275 undergraduate students, 2,655 graduate students, and 3,363 professional school students. With

WCED, The Bruntland Report: Our Common Future (Oxford: Oxford University Press, 1987), 43.

3,625 faculty and 9,267 sta≠, Yale is the largest employer in New Haven and the fourth-largest employer in the state of Connecticut and has an operating budget of \$2.5 billion. The campus now boasts one LEED certified Platinum building, one LEED certified Gold building, one LEED certified Silver building, and three LEED certified Gold laboratories at the School of Medicine.² There are six buildings and five laboratories completed or under construction seeking certification from Silver to Platinum, and four buildings and three laboratories in design seeking Gold and Platinum.

#### Historic roots

The integration of sustainability into the Framework Plan is a recent endeavor. Yale's commitment to sustainability began with the development of a Recycling Program in 1990. In the spring of 1998, environmental issues (not yet referred to as sustainability) received heightened attention on campus when a group of undergraduate students produced the Yale Green Plan and submitted its findings and recommendations to Yale College administrators. In 2001, the Advisory Committee on Environmental Management [ACEM], consisting of faculty, sta≠, and students, was established to advise the Provost and the Vice President for Finance and Administration on environmentally related management activities at Yale.

In the spring of 2002, the ACEM submitted an interim report to the Provost entitled "Proposals for the Adoption of Environmental Principles and the Enhancement of Environmental Management at Yale." With the support of the Yale Corporation and the approval of the President and the Provost, the University committed itself to these principles.<sup>3</sup>

The adoption of the Environmental Principles shifted the e≠ort from one grounded in community-based reform to one embraced as a challenge and commitment by the University administration. Yale's financial commitment to sustainability also commenced in 2002 with the creation of a \$1 million pilot project fund, known as the Green Fund, that was to be distributed through a proposal process over a three-year time frame. The process encouraged sta≠, faculty, and students to apply for seed money to support the development of both short- and long-term projects. Grants were awarded to a variety of proposals ranging from the development of LEED standards for lab renovations to sustainability education outreach in the residential colleges to the creation of an organic garden on campus to a program that subsidized the purchase of hybrid cars. In 2004, Yale committed to the establishment of a more formal leadership role by hiring a director. A year later in 2005, President Levin endorsed the creation of the O∞ce of Sustainability.

<sup>&</sup>lt;sup>2</sup> 32–36 Edgewood: LEED – NC 2.1 and 2.2, Platinum; Malone Engineering Center: LEED – NC 2.1, Gold; Class of 1954 Chemistry Research Building: LEED – NC 2.1, Silver; SHM C–Wing, 3rd fl renovation: LEED – Cl, Gold; SHM I–Wing, 1st fl renovation: LEED – Cl, Gold; 10 Amistad Street: LEED – Cl, Gold.

<sup>&</sup>lt;sup>3</sup> Yale Environmental Principles:

a. Managing its operations and facilities in a manner that protects and enhances the local and global environments, assesses the impact of its operations and facilities on the environment, sets quantitative goals for environmental performance, and monitors its environmental progress.

b. Striving for outstanding environmental performance in the design, renovation, and construction of its facilities.

c. Defining and moving toward environmental sustainability through wise use of resources, purchasing recycled products, conservation, reuse and recycling of materials and supplies, waste minimization, and energy management.

d. Incorporating environmental education, management, and training into its objectives and practices.

 $e. \, Striving \, for \, continuous \, environmental \, improvement \, across \, the \, entire \, range \, of \, its \, operations.$ 

#### PLANNING CONSIDERATIONS













Sustainability pledge elements

#### Sustainability: An institutional commitment

The Yale O∞ce of Sustainability was charged with the task of integrating sustainable principles into the operational functions and educational mission of the institution. In addition to the O∞ce of Sustainability, Yale has a Recycling Department, the Yale Sustainable Food Project, and a sustainable transportation initiative. The O∞ce of Sustainability is responsible for supporting these initiatives as well as working across the institution on issues of procurement, energy use and production, land management, water management and conservation, waste management, and sustainable design and construction. The o∞ce established several sustainability committees to engage students, sta≠, faculty, and administration to assess and make recommendations in each of these areas. Students, sta≠, and faculty are engaged in these issues via a combination of professional responsibility, educational outreach, and policy development. A successful example of student engagement has been via a peer to peer educational outreach program through the Student Task Force for Environmental Partnership, and sta≠ are engaged via the recently established Sta≠ Sustainability Leadership program.

In addition to the focus on operational systems, the o∞ce also serves academic interests on a variety of fronts. An undergraduate course, Sustainability: From theory to practice in institutions, is o≠ered in the Environmental Studies program by the director of the o∞ce. This spring-term course demonstrates how the campus can be valued as a learning laboratory for evaluating and understanding the complexity of energy systems, waste management, land use, and other related topics. During the academic year, o∞ce projects are supported by a team of twenty undergraduate and graduate student research assistants. During the summer, the o∞ce hosts Sustainability Fellows from national and international peer institutions.

#### Greenhouse gas reduction

A primary component of Yale's sustainability commitment—and one that must be addressed in the Framework Plan—is the greenhouse gas reduction target. In 2005, President Levin committed to reduce greenhouse gases by 10% below 1990 levels by 2020 (43% below 2005 levels). This commitment is in line with the Connecticut Climate Action plan and the Climate Change Action Plan of the New England Governors and Eastern Canadian Premiers. This target has guided the development of an aggressive and informed response to perhaps the most challenging issue facing our world today: global warming. The challenge facing Yale is the same as the challenge facing the industrialized world: to drastically reduce emissions while also planning for future growth and development.

In the case of Yale, we are challenged to reduce our greenhouse gas emissions in the context of a 1.5% annual growth rate. At the outset, this target set Yale apart from its peer institutions and caused Yale to reshape the way in which we think about campus energy—systems and demand. Three years later this commitment is beginning to reshape the way we think about building design, construction, renovation, and now campus planning.

Yale's priority is to achieve greenhouse gas reductions by implementing initiatives on the campus and owned land, with the balance of planned reductions being achieved by partnering with outside entities. Currently it appears that as much as half of all reductions will be achieved on Yale's campus and land. As new, cleaner technologies emerge in this expanding industry, we hope to increase this percentage significantly. Energy conservation and alternative energy projects requiring significant capital investment



Fisher Hall, photovoltaic panel installation



Becton Center, wind turbine installation

by the University need to be evaluated on the basis of "resulting carbon reduction per dollar of interest and amortization incurred." Projects yielding the largest return are undertaken first so that emission reductions can be achieved as quickly as possible.

For the purpose of the Framework Plan, campus carbon emissions tied to buildings need to be clearly defined on all renovation and new construction projects. One of the greatest challenges faced by Yale in the next decade is the challenge of reducing emissions despite the general direction of campus design and construction toward making buildings more energy intensive. This is demonstrated by renovation projects that have added air conditioning systems to old buildings and the construction of science and lab buildings that by nature have reduced or no reliance on natural ventilation and daylight.

#### Leadership and vision

Integrating sustainability into Yale requires a process that reconciles a shared vision of a sustainable institution with the complexity, abstraction, depth, and moral and ethical obligations that sustainability implies. Yale's commitment to sustainable development has a wide range of benefits, from the local to the global level. Yale's global reputation provides an opportunity to contribute to and advance the national and international dialogue on sustainable development while combining world-renowned scholarship with operational practices. On the local level, Yale's innovative actions and investments lead to changes in operational behavior, long-term cost savings (i.e., energy), and public health and environmental health benefits. At a keynote address in Copenhagen in 2008, President Levin articulated Yale's commitment to becoming a sustainable campus. He stated:

We have a comprehensive sustainability framework that includes protection of natural ecosystems, conservation of our water resources, recycling of materials and the use of natural, locally grown food in our dining halls. We aspire to leadership in all [of these] dimensions of sustainability, and we hope to inculcate in our students a lasting consciousness of what it means to live on a planet with finite resources in full awareness of how human action today a \( \pm \) ects the future of both humanity and the natural environment.

As President Levin suggested, Yale will only succeed if students, sta≠, faculty, and administrators are engaged across the University community.

Yale's commitment to sustainable development is a complex endeavor. Looking out ten and twenty years, we still need to ask ourselves, what will Yale look like and what decisions are we making today that will have a lasting impact on the Yale campus and the community. We are constructing and renovating buildings today that will be occupied by members of the Yale community in 2050. Are we designing the highest performance buildings today that will allow us to incorporate new and improved energy systems? Are we building for a future that calls for massive carbon reductions? Are we building for a future that relies upon renewable energy sources? Are we investing in the ecosystem health and human health of the Yale campus?

The vision of a sustainable campus calls for an integrated framework that embraces the relationship among the built environment, the natural ecosystem, and the local watershed while planning for transportation

#### PLANNING CONSIDERATIONS

options and the human interface. The Framework Plan addresses some of these issues at the broadest level within the principles, and the campus planning principles now recognize that fundamental decisions about building, planning, and configuration need to both pursue current best practices and enable future sustainable operation. However, the development of a sustainable campus vision warrants further discussion and the creation of a detailed Sustainability Guideline in support of the Framework Plan. The planning principles document enables sustainable development by recognizing open space as an important component of an integrated campus resource management system, but the next level of planning must happen at the guidelines level. A clear set of sustainability guidelines is being established that defines standards for design, construction, and renovation; transportation; material flow; water use and conservation; and landscape ecology and maintenance. The transition from development as usual to the goal of sustainable development must be intentional.

#### **Utilities and Infrastructure Overview**

The utilities and infrastructure supporting the Yale campus are comprised of a network of various systems, some owned by the University and others that are public utilities.

#### Yale-owned Utilities/Infrastructure include:

- Electrical generation and campus distribution to unit substations
- Steam generation and distribution to building Pressure Reducing Valves (PRV) or house valves
- Chilled water generation and distribution to house valves
- High pressure water distribution loops from high pressure pumps (fire pump) to building main valves
- Voice and data communications switching and distribution to desktops
- On-site storm water management
- In some areas, storm and sanitary mains from multiple buildings to point of connection with public systems
- In some areas, domestic water mains from public utility to multiple buildings
- · Cable television service from local utility to multiple buildings

#### Public Utilities/Infrastructure include:

- Sanitary (or combined) sewer system
- Storm sewer system
- Electrical distribution
- · Voice and data communications
- · Cable television
- · Natural gas

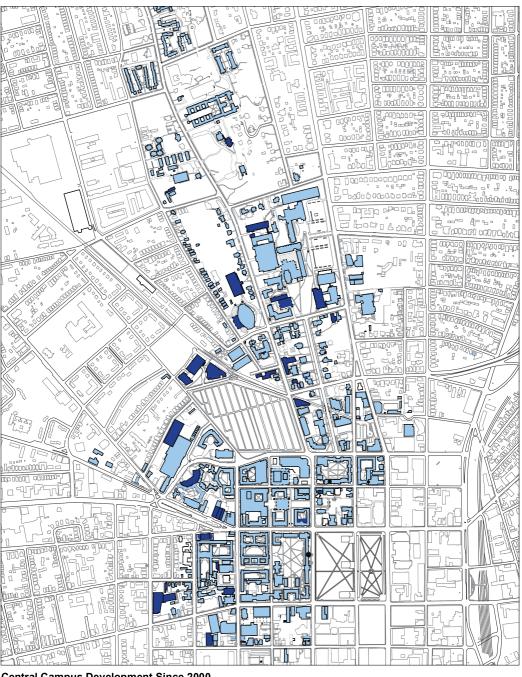
Since publication of the Framework Plan in 2000, several infrastructure projects have been completed, including the consolidation of Central Campus steam generation in the Central Power Plant by decommissioning the Pierson-Sage Power Plant. The installation of an additional steam line has provided increased reliability of steam distribution to Science Hill. Projects to install additional chillers have increased the chilled water generation capacity at the Central Power Plant.

Two significant infrastructure projects are in procurement: a new chilled water plant and distribution for Central Campus, and two new boilers and a diesel generator for the Central Power Plant. A Cogeneration facility at Sterling Power Plant is under construction; it will provide self-generated electrical service while reducing energy purchase costs and significantly reducing direct and indirect CO2 emissions.

UPDATE SUMMARY CONCLUSIONS

6.

Since the publication of the Framework Plan in 2000, Yale has to a great extent followed the plan's suggested siting, density, and massing of new buildings. The area of the 24 projects completed or near completion on the Central Campus and at the Athletic Fields in this time frame totals 1,117,000 gross square feet. The area of the 5 projects under construction will total 330,000 gross square feet. This accounts for 1,447,000 gross square feet since 2000, a pace that will substantially exceed the historic average of approximately one million gross square feet per decade.



Legend **Existing Buildings** 

NewConstructionSince 2000

**Central Campus Development Since 2000** 

Following are key conclusions in five areas:

#### **Design Process**

A design review mechanism has been formalized to provide guidance on design issues to the O∞cers. The Design Advisory Committee (DAC) includes the Dean of the School of Architecture, Robert Stern, and two former deans, Cesar Pelli and Thomas Beeby. The role of the DAC is to assure that the quality of Yale architecture is both excellent and appropriate in the context of the Yale campus. The DAC meets with the O∞cers monthly and serves to stabilize the review process. The Buildings and Grounds Committee of the Yale Corporation reviews projects periodically for final approval.

#### **Planning Principles**

Among the original 38 planning principles guiding the design and construction of new projects, 20 have been revised (generally minor refinements), and 11 new ones have been added to incorporate sustainability and utilities and infrastructure.

#### Landscape

Six projects have been completed: the Hewitt Quadrangle, the Cross Campus, the Old Campus, Hillhouse Avenue, the Farmington Canal Greenway (to Hillhouse Avenue), and the Yale Bowl area. Programming and initial design have begun on Marsh Botanic Gardens, and Sachem's Wood improvements await a timely sequence with the completion of Kroon Hall and the anticipated construction of the Yale Biology Building.

#### **Parking**

The 2000 Framework suggested consolidating parking in facilities (lots and garages) close to primary destinations to maintain a walkable campus. A long-term parking study, completed in 2008, suggests a second option that achieves a similar total parking figure without building as many new garages on the Central Campus. It would utilize remote parking lots and expansion of the current campus shuttle bus system.

## Quality of Design

The level of excellence achieved across the campus has been extremely high. Within the 29 new building projects, 13 are traditional in style and 16 are contemporary. The predominantly neo-gothic core campus gracefully incorporates the contemporary language as demonstrated by the Yale University Art Gallery (Kahn), the Malone Engineering Center, and the new Loria Center. This blending tends to provide a distinctive variety to a generally homogeneous campus. As in the past, signature architects dominate the selection process. While names like Kahn, Saarinen, Rudolph, Johnson, and Bunshaft have built on the campus for up to 50 years, new names, some as lustrous, are now in evidence: Pelli, Gwathmey, Kieran, Koetter, Bolin, Rawn, Beeby, Hopkins, Stern, Roche, Simon, Schwarz, Berke, Tai Soo Kim, and most recently, Foster for the School of Management, represent the upper echelon of the design profession. One cannot speak of quality of design at Yale without mention of the remarkable accomplishment in renovating the existing building stock, including the residential colleges, the Law School, the Yale University Art Gallery, and the Art and Architecture Building (now Rudolph Hall). While not addressed in the 2000 Framework, these renovation projects deeply support the quality of the campus in equal measure with the new buildings.

#### **PROJECT TEAM**

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# Yale