

Duke

UNIVERSITY

ARCHITECTURAL DESIGN GUIDELINES

2ND EDITION, JANUARY 2018

CREATING DUKE'S TOMORROW TODAY



TABLE OF CONTENTS

1 INTRODUCTION

1.1 Purpose	4
1.2 Overview of “Historic Architectural Expression and Style”	4
1.3 The Campus Guide, 2nd edition, Foreword to the Campus Guide	6
1.4 University Master Plan, Principles, And Illustrative Plan	8
1.5 Sustainability	11

2 WEST CAMPUS

Existing Architectural Vocabulary Map	13
2.1 Existing Architectural Vocabulary - Style	
West Campus - Traditional	14
West Campus - Transitional Contextual	16
West Campus - New Paradigm	18
2.2 Height & Building Footprint	20
2.3 Open Space & Orientation Of Buildings	21
2.4 Materiality & Color	22
Duke Stone & Stonework	22
Duke Brick Blend	23
Architectural Precast Concrete & Cast Stone	24
Architectural Metal	25
Glass	26
Roof Material	27
Other Materials	27
Interior Public Space Materials	28
2.5 Composition, Scale & Variety In Buildings	29
Vertical vs Horizontal Composition	30
Symmetry & Asymmetry	32
Unity Without Uniformity (Or With Variety)	34
2.6 Architectural Patterns, Elements & Details	35
Towers	36
Roof Elements	38
Bays	39
Windows & Fenestration	40
Archways/Passages & Entrances	42
Structural Expression	43
Parapets, Finials, & Medallions	44

3 EAST CAMPUS

Existing Architectural Vocabulary Map	47
3.1 Existing Architectural Vocabulary - Style	
East Campus - Traditional	48
East Campus - Transitional Contextual	50
East Campus - New Paradigm	51
3.2 Height & Building Footprint	52
3.3 Open Space & Orientation Of Buildings	53
3.4 Materiality & Color	54
Brick Blend	54
Stone	55
Roof Material	56
Other Materials	56
Interior Public Space Materials	57
3.5 Composition & Scale	58
Double Height Elements	58
Symmetry, Vertical Composition & Human Scale	59
Scale	60
Symmetry & Vertical Composition	62

3.6 Architectural Patterns, Elements & Details	
Building Façade Off-Sets & Projections	64
Three Sided Courtyards	64
Roof Elements	65
Entries, Loggias & Passageways	65
String Courses	66

4 NEW CAMPUS & MEDICAL CENTER

4.1 New Campus	69
4.2 Medical Center	70

5 APPENDIX

5.1 Parking Garages	73
5.2 Duke Brick Blend	
History of Duke Brick Blend	74
2018 Duke Brick Blend Guideline	79
5.3 Requirements for Duke Stone	81
5.4 Other	
Historic Drawings & Photos	82
University Illustrative Plans	83
Photo Grid	84
Credits	85

See also, the companion to this document:
Duke University Landscape Design Guidelines



1.1 PURPOSE

The Architectural Design Guidelines are intended to aid architects, campus designers and stewards of the environment at Duke in creating a cohesive campus. One which learns from architectural work from the past, while allowing progress and innovation to meet the future needs of the University.

These guidelines, along with the Duke University's Landscape Guidelines and Illustrative Master Plan, set out a basis for advancing a successful campus environment, building on the existing as projects develop in the future. The guidelines are not intended to create uniformity, Duke is not uniform, but are intended to develop a sense of visual unity and consistency in the environment. An environment that will continue to be memorable as Duke University's Campus

1.2 OVERVIEW OF "HISTORIC ARCHITECTURAL EXPRESSION AND STYLE"

In discussion of new architecture on historic colleges and university campuses, the question of appropriate "architectural expression or style" often is an initial topic. At Duke, which actually has many types of architectural expression, a careful review of the subject is necessary by users of these guidelines, particularly, with regard to location on campus. To aid in this, basic background and illustrations of existing "architectural expression and style" are included in this document. However, consultants should develop this review further and in relevance to specific new buildings.

Generally, Duke University is known for its Collegiate Gothic West Campus and its Georgian East Campus the origins of which follow:





WEST & EAST

When the decision was made in the mid-1920s that the newly named Duke University would consist of two separate campuses, located a mile apart within very different contexts, it was decided that each would be created using separate architectural styles. William Preston Few—who had been the president of Trinity College and would become the first president of Duke—along with Frank Clyde Brown—a Professor of English and comptroller during the construction of both East and West Campus—traveled to a number of colleges and universities, taking notes and making sketches of different styles. Along with James B. Duke and the architect Horace Trumbauer, the decision was made that the flat, more urban East Campus (Women's College) would follow the Georgian model seen at the University of Virginia, while the West Campus (Trinity College) would emulate the Collegiate Gothic style seen at Princeton and the University of Chicago.

The Georgian buildings on East Campus were arranged by Horace Trumbauer's office and the Olmsted Brothers landscape architecture firm as an extension of the four existing Trinity College buildings designed by C.C. Hooks architects from Charlotte—East and West Duke, Aycok (now East) and Jarvis residence halls. While there is no recorded history as to why Georgian was chosen for East, the colonial heritage and Jeffersonian influence were likely important factors in the decision. Blackwell, Randolph, and Belltower residence halls are the best examples of recent architecture based on the historic Quad buildings.



The Cross Axial Beaux Arts plan of the West Campus was designed to appear as if it had been carved out of the natural Piedmont forest, even though most of the property had been previously farmed or settled. The iconic Duke Chapel was located close to the top of the ridge to emphasize its stature as the focal feature of the campus. By creating a series of closed quadrangles atop of ridgeline, the original designers left little room for continuing upon the established pattern. As later buildings step down from the ridge, they address site conditions in varying ways, but the goal of siting them in ways that respond to, and shape open space, remains consistent. The scale, proportion and general materiality of the historic Quad buildings remains the model for West Campus building. Schwartz Butters, Fitzpatrick, Bostock Library and von der Heyden Pavilion are good examples of contemporary adaptations of the original buildings.

*As the campus grew away from the West Campus Quad, a suburban planning model was used to develop Science and Towerview Drives. Modernist (the original Fuqua building), Brutalist (Gross Hall), and Postmodern (Sanford) buildings joined red brick buildings designed by the Trumbauer firm (Biological Sciences, Physics and Hudson Hall) and Six Associates (Law School). Contemporary additions and modifications have transformed many of these buildings over time.**

Further illustrations will follow in specific sections on West Campus (Section 2) and on East Campus (Section 3).

* *Duke University Campus Guide, 2nd Edition.* Ken Friedlein, with John Pearce 2015



1.3 THE CAMPUS GUIDE, 2ND EDITION FOREWORD TO THE CAMPUS GUIDE

Users of the Architectural Guidelines should acquire and review Duke University's, *The Campus Guide*, 2nd edition by Friedlein and Pearce (or latest version). The foreword to *The Campus Guide* by the Executive Vice President Tallman Trask III is included and provides a succinct background to understanding the campus:

Foreword:

Upon hearing that Trinity College would become Duke University in 1924, a disgruntled alumnus wrote: "Nothing short of a miracle can ever establish a truly great university in a place like Durham." Tobacco baron James Buchanan Duke (1856-1925) had just signed the indenture that would launch the small school on its path to prominence, with facilities and reputation to match. At that time, neither our West Campus nor its 210-foot-high Duke Chapel (1932) existed; neither did the business, medical engineering, or divinity schools. East Campus was a smattering of buildings housing all of 180 students, who, upon learning the news, must have looked around themselves and blinked, wondering if they were dreaming.

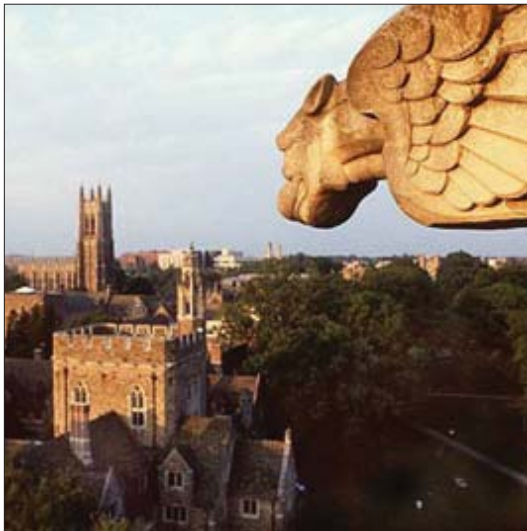
Duke University literally grew up during the last three-quarters of the twentieth century, coming into full flower along with its home city. Few could have foreseen the transformation from the struggling college, located on a former racetrack, into one of the world's top teaching and research institutions.

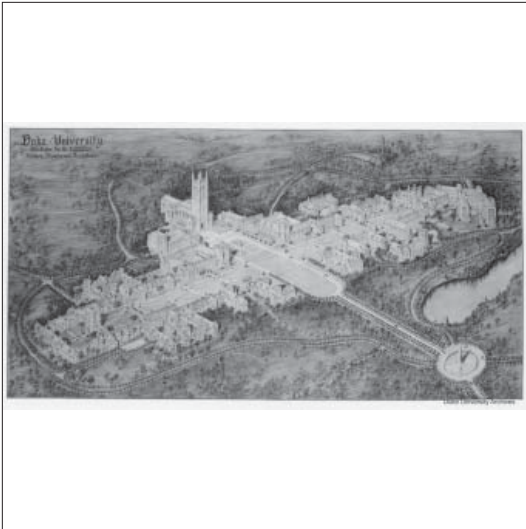
Place signifies. Architecturally as well as academically, Duke University had nothing if not "outrageous ambition," as former president Terry Sanford (1917-1998) said. While at the outset many Northerners argued that the South could never spawn a truly great university, today others suggest that Duke in fact became a great university in part because it looked like one from the start (including artificially worn stair treads). J.B. Duke himself wanted it this way, and he spent not only much money but also a great deal of personal time on the original plans, worrying about everything from architectural detail and landscaping to whether there should be less of the yellow and gold color" in the stone mix.

In 1931, President William Preston Few (1867-1940) told the graduating class, "These buildings have been constructed...to be the home of the soul of the University and in the belief that these appropriate and beautiful surroundings will have a transforming influence upon students generation after generation and even upon the character of the institution itself."

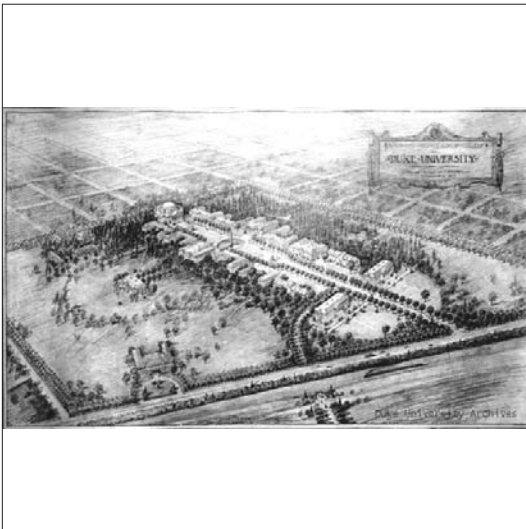
He hoped that the buildings would remind those who worked and studied here of their high mission to nurture erudition et religio while defining a sense of place that fostered camaraderie, spiritual and intellectual growth, a sense of infinite possibility, and infinite yearning. At the same time, the grotesque and gargoyles that grace the facades, rooftops, and entryways of West Campus—many of which seem to represent priggish professors—were to keep us from taking ourselves too seriously. Renaissance architects had talked openly about how buildings could shape the souls of people in them. These no-nonsense industrialists believed it and acted on that belief.

Aldous Huxley, writing in 1937, described a trip through the pine forests of North Carolina, a land "where one would never expect anything in





West Campus rendering, Office of Horace Trumbauer



East Campus rendering, Office of Horace Trumbauer

particular to happen. And then, all of a sudden, something does happen... There, astonishingly, is by far the largest Gothic building one has ever seen. The eye wanders amazement, "he continued, "over a whole city of grey stone... These buildings are genuinely beautiful...{f}or this huge and fantastic structure which houses a large university...is the most successful essay in neo-Gothic that I know."

It is one of the great ironies of our brief institutional history—and perhaps an odd tribute to the farsightedness of our founders—that the practical dreamer behind most of the campus, a man whose relationship with Duke University lasted nearly a quarter century and whose portrait sits just the entrance of our administration building, could not have gained admission during his lifetime because he was black. What President Few and Huxley acknowledged with astonishment and humility was largely the product of the mind of Julian Francis Abele (1881-1950), chief designer for the architecture firm of Horace Trumbauer (1868-1938) in Philadelphia. So far as we know, Abele never visited his creation in person, deterred from travel by the South's Jim Crow laws.

Be that as it may, his masterpiece would remain, from his point of view, a virtual project through his death in 1950, visible in his mind's eye and in the magnificent drawings he left, grand in scale and exquisite in detail. One of the last buildings he designed, and one of the few with his name alone on the drawings, was Cameron Indoor Stadium (1939), a shrine of college basketball and a symbol of one of the few American universities that has remained consistently superb, academically and athletically.

The unity of Abele's vision was itself rooted in Eurocentric history and his training in Paris, France. On East Campus, the flatness of the land and the style of the existing Trinity College buildings made Georgian architecture a sensible choice. Baldwin Auditorium (1927)—recently renovated in a magical way—still stands as a crown jewel in that coherent assemblage. On West Campus, of course, Gothic architecture was to prevail, but a Gothic updated and intelligently modernized so as to underscore ties with old-world knowledge while demonstrating with clan that Duke University would give the world something quite new as well.

*We're proud to preserve it, display it, and honor it. May this book give you some sense of the spirit of this place.**

*Tallman Trask III
Executive Vice President
Duke University*

* Ibid, p. 11

a. "Duke University Architecture Discussed by President W.P. Few," *Duke University Alumni Register* 17, No.6 (June 1931): 195-97.

b. Aldous Huxley, *Duke University Alumni Register* 23; No.9 (September 1937):238. Originally published in *Time and Tide*, unspecified Issue.

INTRODUCTION



1.4 UNIVERSITY MASTER PLAN, PRINCIPLES, AND ILLUSTRATIVE PLAN

The University maintains an illustrative master plan, which is derived from work begun by Weinstein and Copeland in 2000 and has been updated periodically. The plan includes a set of guiding principles and these follow, along with the most recent illustrative plan. These should be studied and referred to by architects and other users of these guidelines on new projects.*

PRINCIPLES:

DUKE IS A PREMIER UNIVERSITY:

Ensure the quality of all buildings, landscapes, and infrastructure as an expression of the University and as a reflection of the values of the institution

- by supporting strong master plan oversight with a process for continuous review and
- by following design and construction guidelines that support a high- quality built environment.

DUKE IS A HISTORIC AND DYNAMIC CAMPUS:

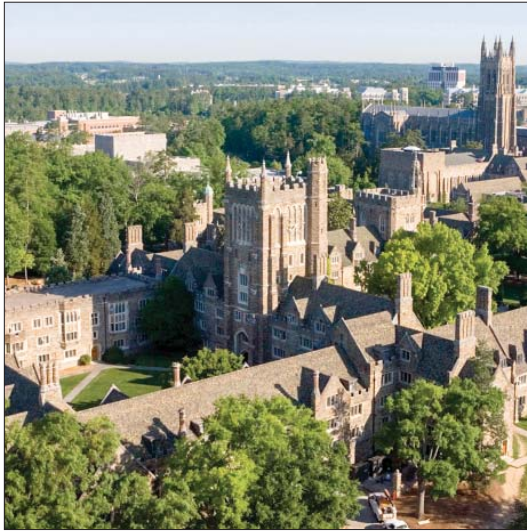
Strengthen the identity of the Duke campus as a continuously evolving environment with a unique historic beginning

- by identifying selected buildings and landscapes that should be preserved;
- by ensuring that new development contributes to, rather than detracts from, the existing environment; and
- by respecting and responding to Duke's historic architectural and landscape character while incorporating contemporary design where appropriate.

DUKE IS A UNIVERSITY IN THE FOREST:

Preserve and strengthen the identity of the Duke campus as a community within a forest

- by identifying natural areas to be preserved, particularly selected areas of the Duke Forest,
- by identifying natural areas that need to be conserved and restored, limiting construction and interventions to those that maintain the quality and character of the natural environment;
- by limiting expansion and using infill development where possible; and
- by identifying means of preserving tree canopy, habitat and air & water quality.



* The selected Master Plan Guidelines noted have been chosen for their applicability to these Architectural Design Guidelines and are not a representation of all of the Master Plan Guidelines.



DUKE IS A COLLECTION OF MEMORABLE PLACES:

Direct development toward the creation of human-scale open spaces with distinct character

- by ensuring that all buildings and landscapes be viewed as part of their context, not in isolation;
- by ensuring that the landscape contributes to the campus aesthetic experience
- by seizing opportunities to improve the quality of the campus; and
- by relating building entries to streets, open spaces, plazas, and other buildings.

DUKE IS A LEADER IN ENVIRONMENTAL STEWARDSHIP:

Ensure that buildings, landscapes and natural areas are created and sustained to create a campus community that conserves natural resources, restores environmental quality and protects biodiversity.

- by being mindful of the interrelationship of human and natural systems;
- by designing to meet or exceed accepted standards for sustainability;
- by conserving energy, water and other natural resources;
- by reducing greenhouse gas emissions and solid waste;
- by developing and encouraging alternative transportation options;
- by fostering a healthy ecosystem and diverse habitat through the use of native plants; and
- by recognizing the built and natural environment as a 'living classroom' for the University and Durham community.

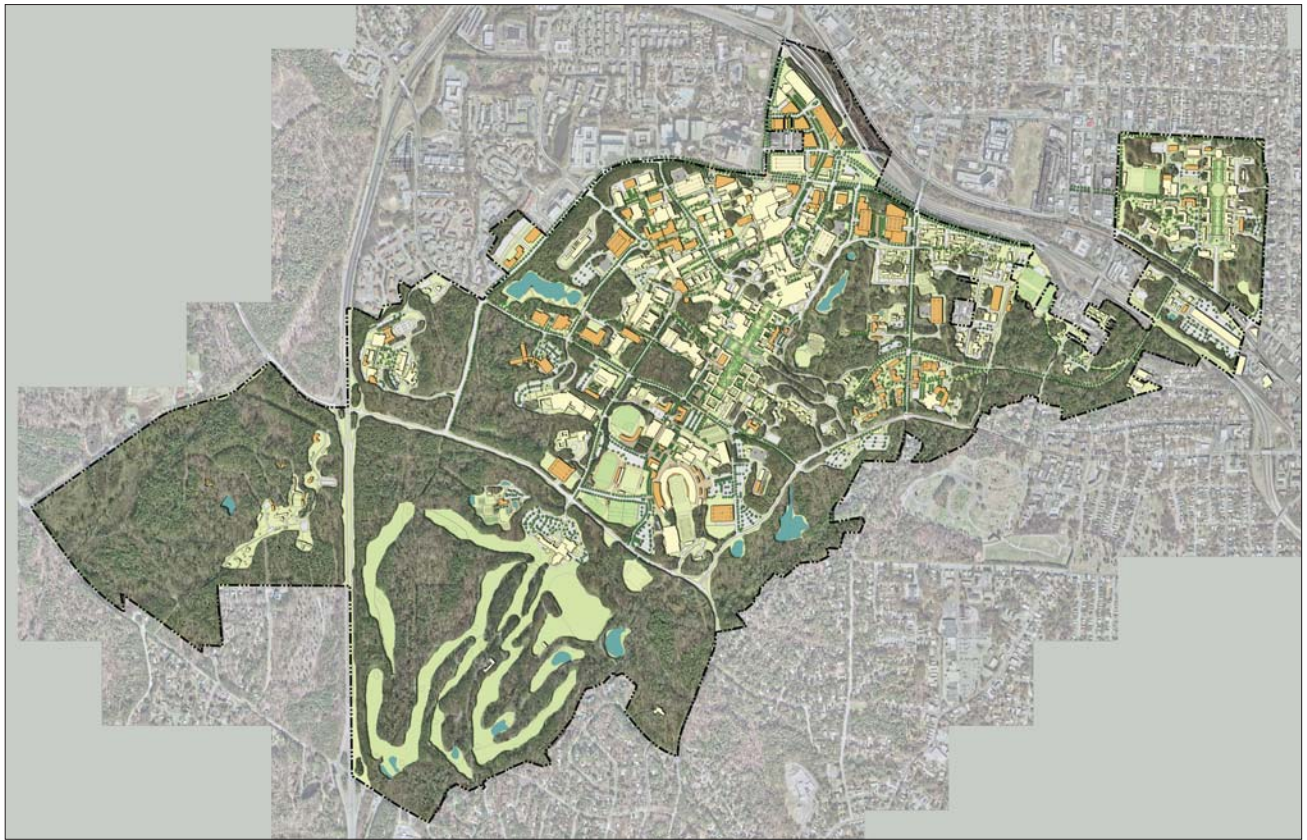
DUKE IS A PEDESTRIAN CAMPUS:

Redefine the movement systems throughout the campus to be functional, safe and comprehensible, built on a visible logic that supports wayfinding, "placemaking," and the cohesiveness of the overall campus

- by clarifying points of entry into the campus;
- by reducing vehicular through-traffic on campus;
- by creating universally accessible buildings and landscapes where possible;
- by integrating pedestrian, bicycle and transit circulation into the overall movement system, separating such systems where appropriate; and
- by exercising caution in the location of parking areas



INTRODUCTION



ILLUSTRATIVE MASTER PLAN 2024

The original Duke University Illustrative Master Plan 2000 was updated in 2014 as the updated Illustrative Master Plan 2024 and is shown here for reference. Additional information is included in the Appendix.

INTRODUCTION



Home Depot Smart House, LEED Platinum

1.5 SUSTAINABILITY

Duke University has been a national leader in sustainability in the building environment with 35 Leadership in Energy and Environmental Design (LEED) building projects completed totaling 4 million square feet as of March 2017. Also, initiatives such as the elimination of coal use for production of campus steam and a major storm water reclamation park and pond have been completed.

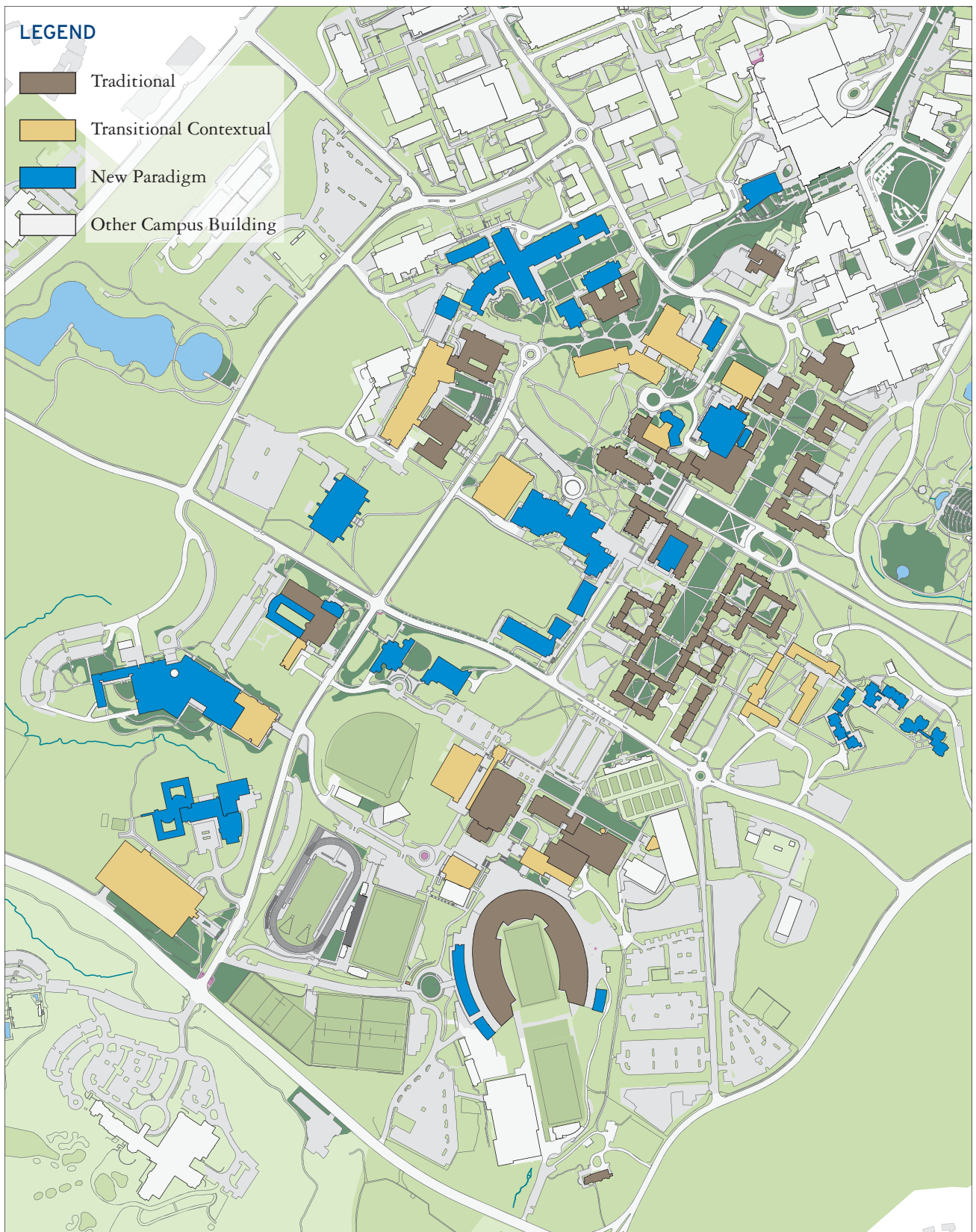
Sustainability guidelines are not included here, however, issues of sustainability should be fundamental to the architectural work on campus. Duke has modified its requirements to LEED Plus and further adjustments are expected in the future. Consultants should seek the level and requirements for sustainability for a particular project from the administration and project management at the time of the project.



Rooftop solar panels, Bryan Center



WEST CAMPUS



EXISTING ARCHITECTURAL VOCABULARY MAP

2.1 EXISTING ARCHITECTURAL VOCABULARY - STYLE

WEST CAMPUS - TRADITIONAL

Traditional (West Campus) – As architectural critic Alexandra Lange writes in the Campus Guide “The Chapel and its flanking quadrangles, all designed in a refined neo-Gothic style by African American architect, Julian Abele of the office of Horace Trumbauer, are the highlights of Duke’s built environment.”* The original campus has no remaining sites fronting on the historic open space, however, there are possible building sites nearby and for any new projects, the traditional West Campus architecture should either be used or the new project should be related to it.

Illustrations of the traditional neo-Gothic architecture follow:

* Ibid, p. 17

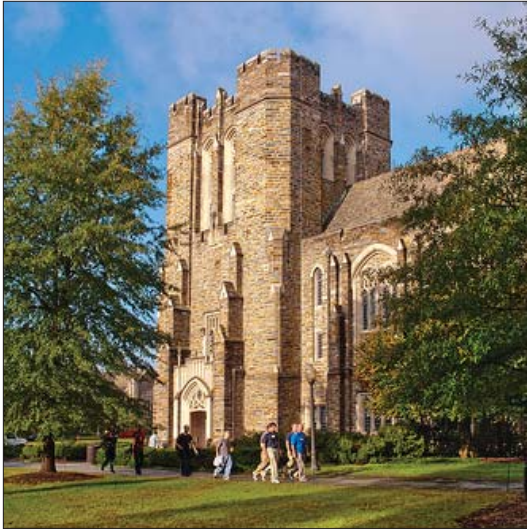
WEST CAMPUS - TRADITIONAL



Duke Chapel



Goodson Chapel, Divinity



Rubenstein Library



Bostock Library, quad side



Card Gym



Crowell Residence Hall clocktower

2.1 EXISTING ARCHITECTURAL VOCABULARY - STYLE

WEST CAMPUS - TRANSITIONAL CONTEXTUAL

The original West Campus, by Trumbauer (led by Julian Abele), with its formal intersecting axes combined with the less formal and picturesque neo-Gothic architecture created one of the most distinctive collegiate places in the country. Paraphrasing Paul Venable Turner in his book *Campus*^{*}, a place grand in scale, clearly organized and open combined with the irregularity and asymmetry and introspective aspects of neo-Gothic architecture.

However, with a center this successful, what to do around it has been a challenge since that time. Beginning in 1990 and continuing to this date, for sites not fronting or seen from the historic original space, a transitional architecture, responding to its context on campus, has been developed successfully by multiple architects. These building forms respond to their specific location and create a visual transition from the original architecture. Quadrangles are completed, gateways are created and large building footprints are broken into smaller elements. These buildings may incorporate towers or bay windows in a contemporary way or they may relate by use of materials. Bostock Library (by Shepley Bulfinch), Fitzpatrick Center CIEMAS. (Zimmer Gunsul Frasca) and K4 at Keohane Quad (William Rawn) are good examples of Transitional Contextual architecture on campus:

* *Campus*, Paul Venable Turner, p. 215

WEST CAMPUS - TRANSITIONAL CONTEXTUAL



Bostock Library, away from quad



McClendon Tower, Keohane Residence Hall



Fitzpatrick Center CIEMAS



K4 Residence Hall



French Family Science Center



Schwartz-Butters Athletic Center

2.1 EXISTING ARCHITECTURAL VOCABULARY - STYLE

WEST CAMPUS - NEW PARADIGM

At particular locations, due to a special use or the architect selected, new types of architectural expressions have been introduced and could be introduced in the future at Duke. These new expressions may be referred to as contemporary, modern, iconic or the result may be described as an object building. These buildings can suggest a new model or paradigm.

Examples of this at Duke range from the Nasher Museum of Art (Rafael Vinoly) to the much earlier, original Fuqua School of Business (Edward Larrabee Barnes) with its simple modern forms. Both are successful places, sited at significant distance from the neo-Gothic West Campus center. Other examples are closer to the center. These include the Penn Pavilion (Shepley Bulfinch) and the recently completed West Campus Union renovation - Brodhead Center (Grimshaw). In the latter, an extensive use of glass relates by contrast and the historic architecture is highlighted by the transparency of the new. The Penn Pavilion, partly due to its use (as temporary dining and special events), its site near both the Brodhead Center and a new glass entry to the Bryan Center (Jamie Carpenter) introduced this extensive use of glass near the original West Campus. One other example, important to include, is the Schwartz-Butters Athletic Center (Caesar Pelli). The Pelli firm still considers the building to be the introduction of a new paradigm. Pelli's development of a Duke brick blend, which is compatible with Duke stone walls and extensive detailed metal and glass fenestration, was a new and influential development. Parts of the project have influenced other buildings since its completion. From today's vantage point, Schwartz-Butters could also be seen as a transitional and contextual building.

Architectural ambition has been strong at Duke and creativity is encouraged. However, it is important to point out that a campus made of unique object buildings, each competing for visual attention or trying to create a new paradigm, would not create the campus unity and cohesiveness desirable for a memorable collegiate environment. Therefore, the new paradigm approach should be used sparingly as directed by the University.

WEST CAMPUS - NEW PARADIGM



Nasher Museum of Art



Fuqua School of Business



von der Heyden Pavilion, Rubenstein Library



Nicholas School of the Environment



Penn Pavilion, Events



Brodhead Center

2.2 HEIGHT & BUILDING FOOTPRINT



3 stories plus roof, Old Chemistry

HEIGHT & BUILDING FOOTPRINT

The University is fortunate to have an abundance of land contiguous to West Campus. Therefore, excessive height is not necessary. Typical buildings on West Campus should not exceed three to five stories and in immediate adjacency and highly visible from the historic open space, should be no more than three or four stories.* Floors expressed as roofs, attics or setback may exceed these limits by one story. Also tower elements with relatively small footprints may be one to two stories taller. Topographic “fall-off” from the average grade of a primary open space may allow an additional floor away from the primary open space. (See K4 or Davison).

Space programs for current facilities, often result in large floors and building footprints that are difficult to relate to a collegiate environment. For buildings with footprints over 25,000 SF, effort should be made to reduce the visual impact of the large floors by breaking the mass into parts with various architecture elements, such as towers, bays and courtyard setbacks.



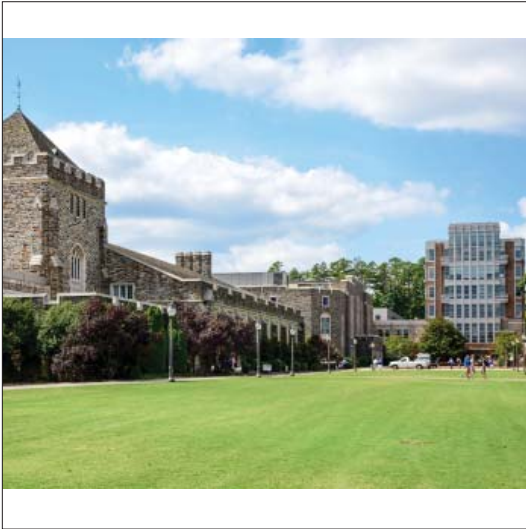
Large footprint broken into smaller parts, Fitzpatrick Center CIEMAS

* Height three to five stories: can be assumed to be 40' to 64', care should be taken to match floor to floor heights in immediate proximity to traditional, original buildings to the extent feasible.

2.3 OPEN SPACE & ORIENTATION OF BUILDINGS



Fitzpatrick Center CIEMAS



Krzyzewskiville Plaza



West Campus Steam Plant / Trent Semans Center
Greenway

OPEN SPACE & ORIENTATION OF BUILDINGS

All projects are to have landscape plans that are developed integrally with the building design. Landscape design guidelines have also been developed for Duke University and should be reviewed. Due to the importance of open space, some background and directions are also included here in the Architectural Guidelines. Campus Planner, Lee Copeland wrote in the University Master Plan 2000, “the campus beloved spaces...are the result of coordinated planning of buildings and open space” the document goes on to say that “place-making – the creation of discrete outdoor spaces activated by harmonious architecture – is central to the Duke Master Plan”^{**} These ideas remain highly important to the design and development of the campus and the following guidelines should be used in designing new buildings and their adjacent open spaces:

A building’s scale and mass needs to be considered in relation to both adjacent open space and other campus buildings.

Buildings should front open spaces pedestrian way, plan as and/or other buildings.

Buildings, particularly their entryways, should be sighted and designed to support campus pedestrian circulation and legible wayfinding. Architectural features and details such as tower or other elements may be used for this purpose.

Interior gathering spaces should be oriented to adjacent open spaces. Connections between interior and exterior should be made to maximize opportunities for both indoor and adjacent outdoor activities.^{**}

Visiting landscape architect and past advisor to Duke, Laurie Olin, has said “get the open space right and the buildings on campus will be easier to do.” The following examples illustrate the importance of open space coordinated with the building architecture:^{***}

* 2000 University Master Plan document, Lee Copeland

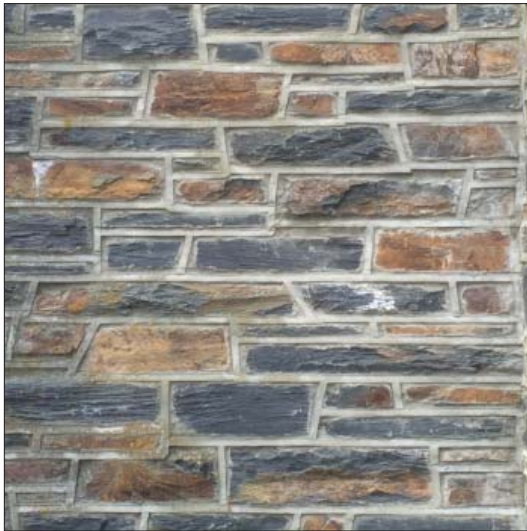
** Ibid

*** Laurie Olin presentation to Facilities and Environment Committee, 2010

2.4 MATERIALITY & COLOR



Duke Stone detail, trim & windows “interrupting” Duke Stone



Duke Stone detail, joints

MATERIALITY & COLOR

The exterior material and color of Duke’s West Campus architecture has been fundamental in creating its distinctive character and certainly will be an important factor in future architectural work. In general, and at this point in the campus architectural development, if a material has not been successfully used at Duke, it is likely not something that should be used*. This actually provides a reasonable range of choices, including materials suggested by modern construction practices. There are examples of material use that the University would not want repeated (for example Duke Stone laid up on its side or in precast panels) and there are others which are seen as successful and desirable. These examples are included in the guidelines for future use.

DUKE STONE & STONEMWORK

Duke Stone is an indigenous stone from a quarry in Hillsborough North Carolina owned by the University. The stone is found in seven main colors, ranging from blue-gray to burnt sienna and ochre. The blend of colors gives the West Campus its much beloved warm grey and brown color (understanding and relating to this color we believe, is key to compatibility of new architecture on campus). The University has re-introduced quarry processes to provide the best possible stone for today’s use. Likewise in architectural application, Duke Stone is to be laid in the historically correct manner with struck mortar joints and the correct horizontal proportion for the stone (1:4 minimally to 1:5 & 1:6). Depending on location, most new buildings on West Campus are to use Duke Stone in some way. This can range from landmark elements to inserts at key locations in facades or in the landscape as site walls. Interior accent walls may omit the struck mortar joints required for exterior use. A project mock up wall and approval is required when using Duke Stone. The Appendix includes additional information regarding Duke Stone. See also Duke Facilities Management Design and Construction Standards.

Cream colored, Indiana Buff limestone was used extensively with Duke Stone for window surrounds, copings, string courses, finials and other details. The limestone reduces large, unrelieved areas of Duke Stone, which is an important consideration for use of this stone in facades. Limestone may also be used more extensively as a façade material to emphasize entries or other purposes.

* Interview: Tallman Trask III, Executive Vice President, Duke University, 2016

2.4 MATERIALITY & COLOR

DUKE BRICK BLEND

In the 1990's, major projects in the athletic precinct near Cameron Indoor Stadium led the University and its architects to consider the challenge of new larger buildings adjacent to Duke Stone buildings. For these new projects, schedule, cost, and a desire for something progressive, suggested a compatible alternative to an extensive and exclusive use of Duke Stone. To achieve compatibility, the color became a primary characteristic in developing a multi-hued blend of brick to be used on West Campus. The history of the West Campus Duke Brick Blend and guidelines for the blends

are described in detail in the Appendix.* Use of a particular blend depends on the context and other materials used in a project. The University Construction Standards provide further detail on the brick and mock-up walls are required.

* Academic Duke Brick Blend or Athletic Duke Brick Blend from Cloud Ceramics, Concordia Kansas and Tri-State Brick.



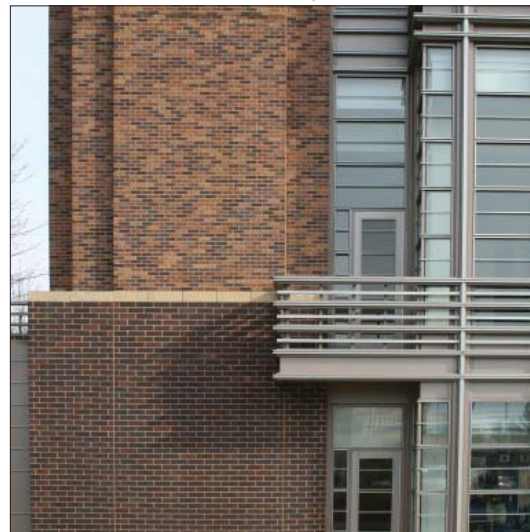
Brick Blend Medium, Transitional



Brick Blend Medium & Dark, Transitional



Brick Blend Medium & Dark, Transitional



Brick Blend Medium & Dark, detail, Transitional

2.4 MATERIALITY & COLOR

ARCHITECTURAL PRECAST CONCRETE & CAST STONE

Modern architectural precast, carefully detailed, is allowed for buildings away from the neo-Gothic center of West Campus, such as the Nasher Museum of Art or for utilitarian buildings such as parking garages. The color of this material should relate to Indiana limestone, unless a contextual relationship suggests otherwise. Also, cast stone to match the limestone color may be used in lieu of limestone (except when adjacent to a historic original building and fronting on the main historic quadrangles). Illustrations of use of this material follows:



Fuqua School of Business, New Paradigm



Nasher Museum of Art, New Paradigm



PG 4, Transitional



PG 1, Transitional

2.4 MATERIALITY & COLOR

ARCHITECTURAL METAL

Historically, metal on the West Campus only included the Chapel's lead-coated copper roofs, grey metal steel windows of the typical original buildings, roof gutters and downspouts. Their weathered colors have influenced recent use of metal when needed in new buildings. The recent uses include the enclosure of rooftop equipment and penthouse, (Fitzpatrick Center CIEMAS, YOH Football Center), window wall and curtain wall mullions and spandrel (Schwartz-Butters Athletic Center, small tower at Wilson Recreation Center, Starr Commons at the Law School) and in a few discrete instances, façade metal has been used starting at the ground (Penn Pavilion and Krzyzewski Center for Athletic

Excellence). The colors of the metal used (aluminum) ranges from silver/grey to a light brown. Future uses of architectural metal should draw from this palette:



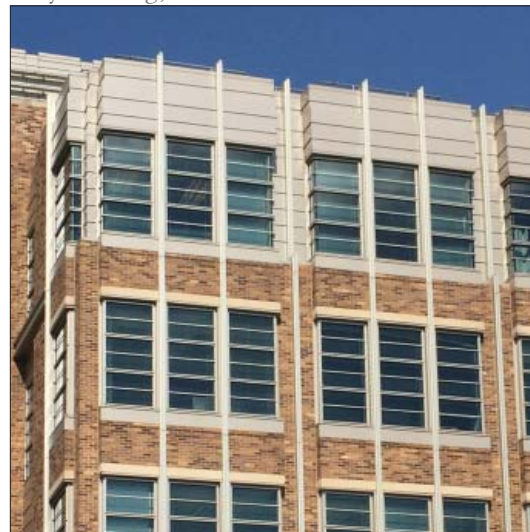
Wilson Recreation Center, Transitional



Gray Building, Traditional



Krzyzewski Center, Transitional



Schwartz-Butters Athletic Center, Transitional

2.4 MATERIALITY & COLOR

GLASS

In the last ten years, new buildings on campus including von der Heyden Pavilion (2005), Star Commons (2008), Penn Pavilion (2014) and most recently the Brodhead Center (2016) have introduced architecture that is primarily glass. This was driven by the interior functions needed for transparency and light, as well as, a desire to highlight rather than compete or extend adjacent architecture. Other examples feature relatively large sections of glass curtain wall to emphasize an entry or special function, these include French Family Science Center (2006), K4 Residential Hall (2012) and Environment Hall (2014). The latter occupies a perimeter area site with LEED Platinum daylighting goals

and has an entire north-facing façade of glass. Because of these precedents, a thoughtful and appropriate use of glass elements is a possibility at Duke in the future. The glass should be clear and should have no green tint in any sun conditions (low emissivity and low iron glass). Curtain or window wall metal and sun shading should be used to add texture and scale to glass areas. Recent research on making glass areas safer for birds in flight should be employed. Simple ceramic fritting may also be used to reduce solar heat gains. Mock-ups for approval are required.



Star Commons, Law School, New Paradigm



von der Heyden Pavilion, New Paradigm



Penn Pavilion, Events, New Paradigm



Brodhead Center, New Paradigm

2.4 MATERIALITY & COLOR

ROOF MATERIAL

Ludowicci tile roofing is a material that is not to be used in new construction. However, architects should be aware of the roofing on the typical, original pitched roof buildings. Ludowicci tile is only to be used in restoration of the original buildings on West Campus. For future pitched roofs, slate roofing or, in some locations, approved metal roofing may be used.

OTHER MATERIALS

There is one new material at this time, terra cotta, used successfully at the Brodhead Center and the new Science Drive Garage. In baguette form, it has also been used as an interior material at the Brodhead Center. Terra cotta is considered promising for certain applications because of its potential color and masonry character. It could be considered in the future.



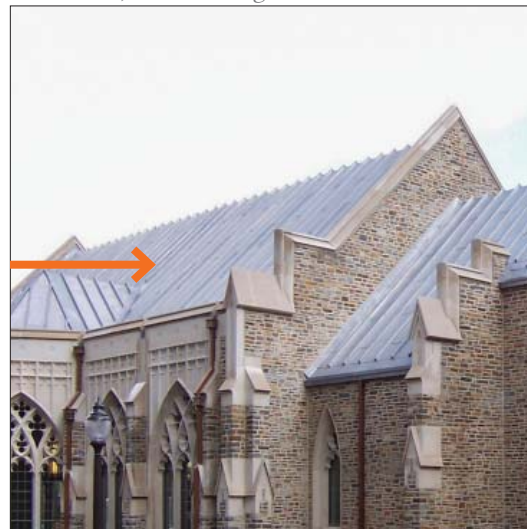
Ludowicci tile roofing, Traditional



Terra cotta, New Paradigm



Slate, Transitional



Metal, Traditional

2.4 MATERIALITY & COLOR

INTERIOR PUBLIC SPACE MATERIALS

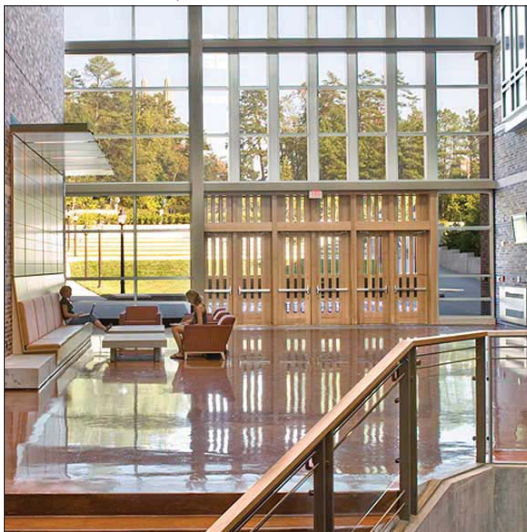
For interior public areas, such as lobbies or gathering spaces connected to the entry or exterior space, preferred flooring materials include slate and terrazzo. Near main entries, wood paneled or stone accent walls related to historic buildings may be used. Unique or unrelated wood or stone finishes should be avoided:



Terrazzo & wood, Brodhead Center



Slate & wood, Star Commons, Law School



Polished concrete & wood, French Family Science Center



Slate, terra cotta & wood, Brodhead Center

2.5 COMPOSITION, SCALE & VARIETY IN BUILDINGS

COMPOSITION, SCALE & VARIETY (BUILDINGS)

The Duke Chapel is certainly the highlight of West Campus architecture and one of the best known buildings in the State. Seen either from a distance or by a pedestrian approaching to enter, it is possible to relate visually to the Chapel at multiple scales. The perpendicular Gothic form established the visual identity of the institution; however, the Chapel is unique and the more typical original buildings have “Duke Characteristics” that can be useful in dealing with the challenges of new buildings on West Campus. These are summarized as follows:



Monumental scale, Duke Chapel



Unity without uniformity, Crowell, Abele Quad



Human scale, Duke Chapel arcade



Symmetry & asymmetry, Kilgo Quad

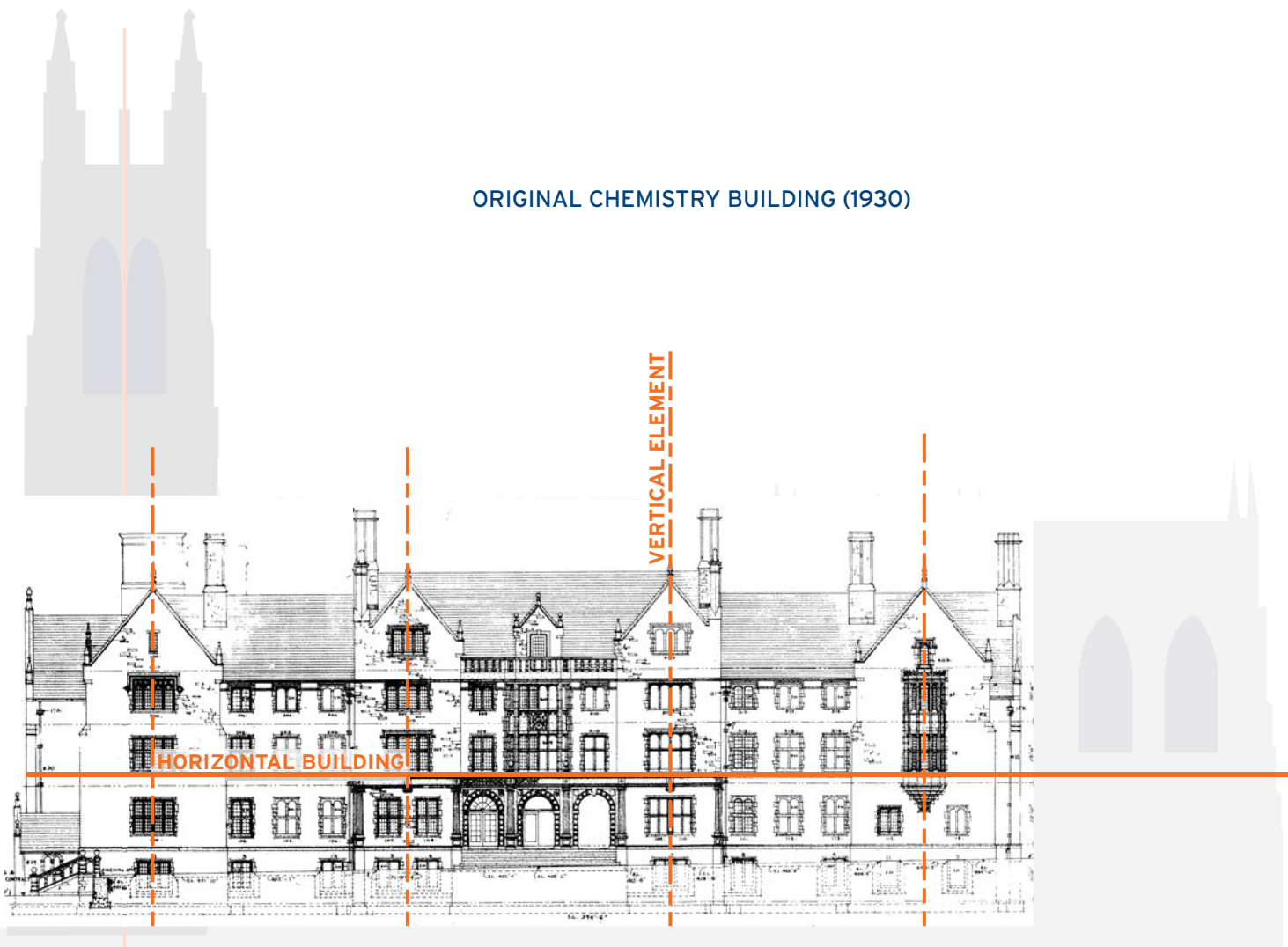
2.5 COMPOSITION, SCALE & VARIETY IN BUILDINGS

VERTICAL VS HORIZONTAL COMPOSITION

The plan area and height of the original buildings generally resulted in a horizontal form, much wider than tall but these forms were enhanced by vertical elements, corner towers, gables, bay windows, pilasters and chimneys, which served to divide these compositions into vertical elements that can be related to better by a person (human scale).

Similarly, new buildings, with footprints that are often larger today, should make use of their own version of vertical elements to divide the composition and mass of new buildings.

ORIGINAL CHEMISTRY BUILDING (1930)



VERTICAL VS HORIZONTAL COMPOSITION

FITZPATRICK CENTER CIEMAS (YEAR 2004)



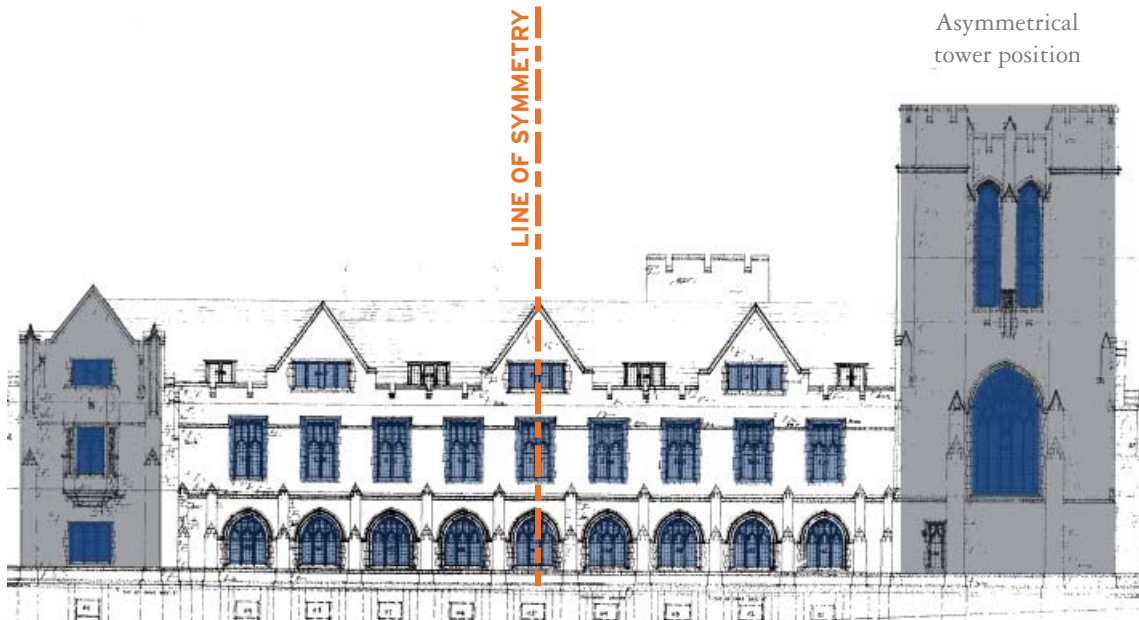
2.5 COMPOSITION, SCALE & VARIETY IN BUILDINGS

SYMMETRY & ASYMMETRY

The original West Campus buildings combine both symmetrical and asymmetrical composition in their forms. The asymmetry allowed response to site or interior function, while symmetry highlights entries and more formal, axial relationships to the campus. The Davison Building is a good example of this as it terminates the Campus's secondary axis with a symmetrical entrance, but Davison is an asymmetrical plan beyond the entry. Also, the "Old Chemistry" Building, which is symmetrical, has a two-story bay window on one end and single-story windows on the opposite end of its elevation. Sometimes subtle and sometimes obvious, this combination of symmetry and asymmetry in the buildings created variety and visual interest.

New building sites and internal program requirements that result in asymmetrical forms may find a combination of symmetry within asymmetry useful in composing new forms.

PERKINS LIBRARY (YEAR 1930)

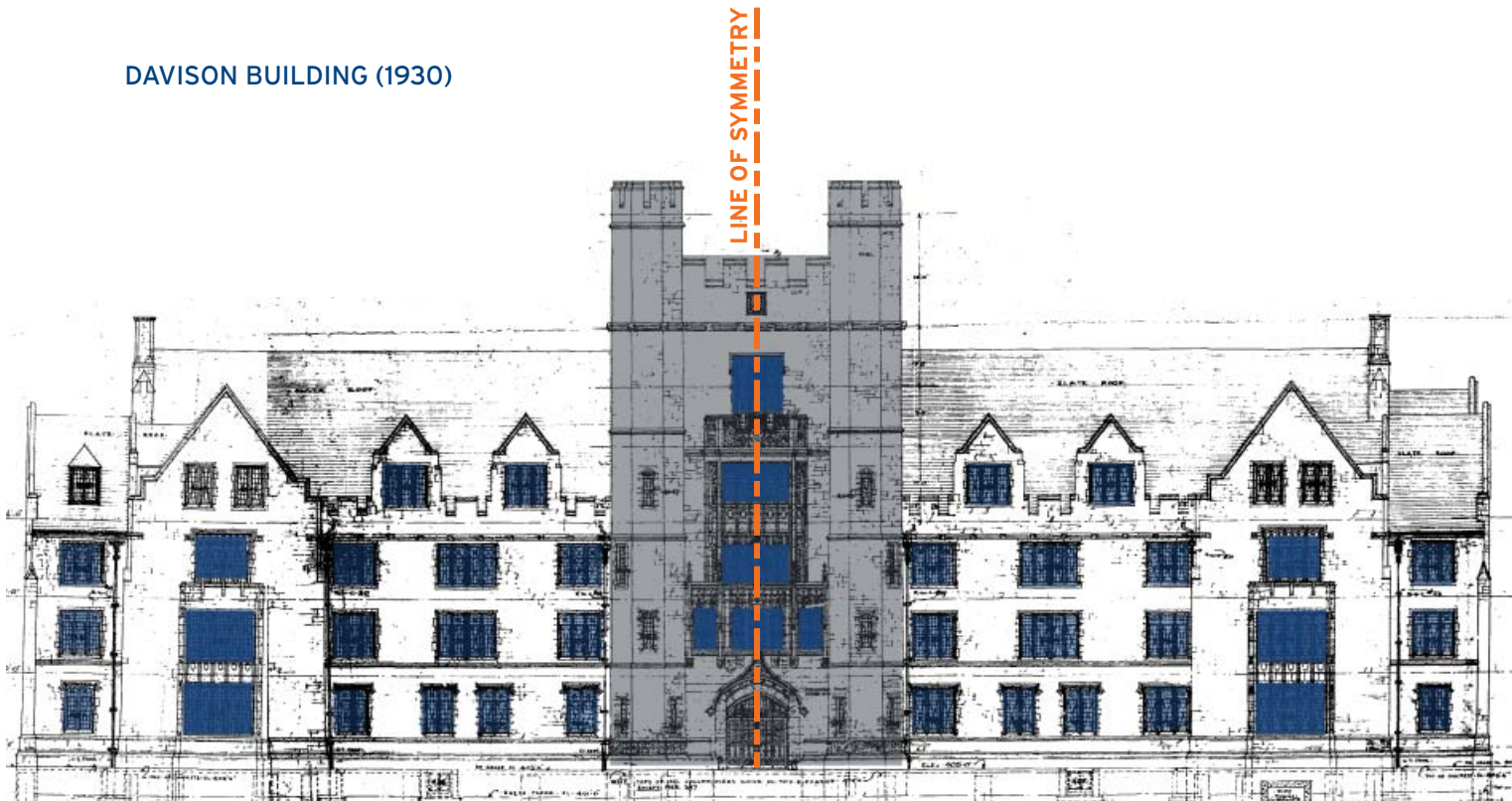


SYMMETRY & ASYMMETRY



Davison Building in plan view.
Asymmetrical behind the facade.

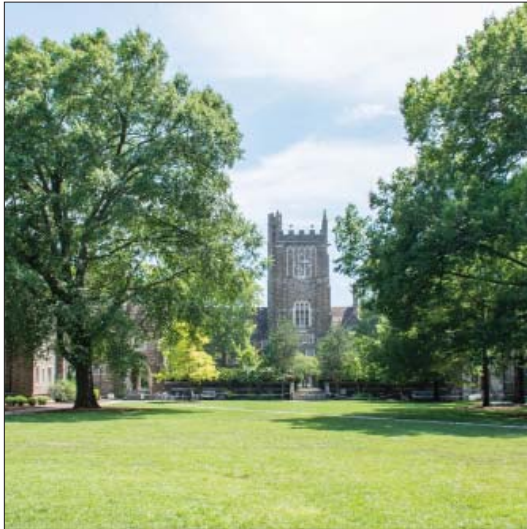
DAVISON BUILDING (1930)



2.5 COMPOSITION, SCALE & VARIETY IN BUILDINGS



Office of Horace Trumbauer, Crowell, Abele Quad



Crowell, Abele Quad



Kilgo Residence Hall

UNITY WITHOUT UNIFORMITY (OR WITH VARIETY)

Visiting architects and campus designers including Robert Frasca and Laurie Olin, in the last decade, back to Caudill Rowlett and Scott (CRS) in the mid-1960's have noted that of the best qualities of the original West Campus is its visual unity without being uniform.*

To paraphrase: within the framework of the original open space, consistent material and color, a remarkable variety of plan, height, roof-scape and fenestration can be found.

Observers will also find a successful proportional relationship maintained between building height and open space width on the original West Campus (at 170'; neither too wide or too narrow for 50-60' building height on either side), and the buildings have a relatively consistent three-part, vertical composition (base, middle, and top/roof). However, beyond these features, variety in form exists.

This variety served the original desire for the picturesque in neo-Gothic collegiate architecture. It can today, if carefully considered, be useful in meeting the needs of the future buildings with varied and changing needs.

The Laurie Olin quote bears repeating, addressing the Board of Trustees Facilities and Environment Committee in 2011, "get the open space right and the buildings can be more varied."**

* *Duke University Planning Study 1966*, Caudill, Rowlett and Scott, p. 60.

** Laurie Olin, in Presentation to Trustees, 2011

2.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS



“At a glance, the West Campus strikes the eye as an architectural unit. Looked at more closely, each building seems to emerge from the group and to express it’s own character.”

The Architecture of Duke University, 1939, William Blackburn, p. 9

so fold will lie flat next to coil

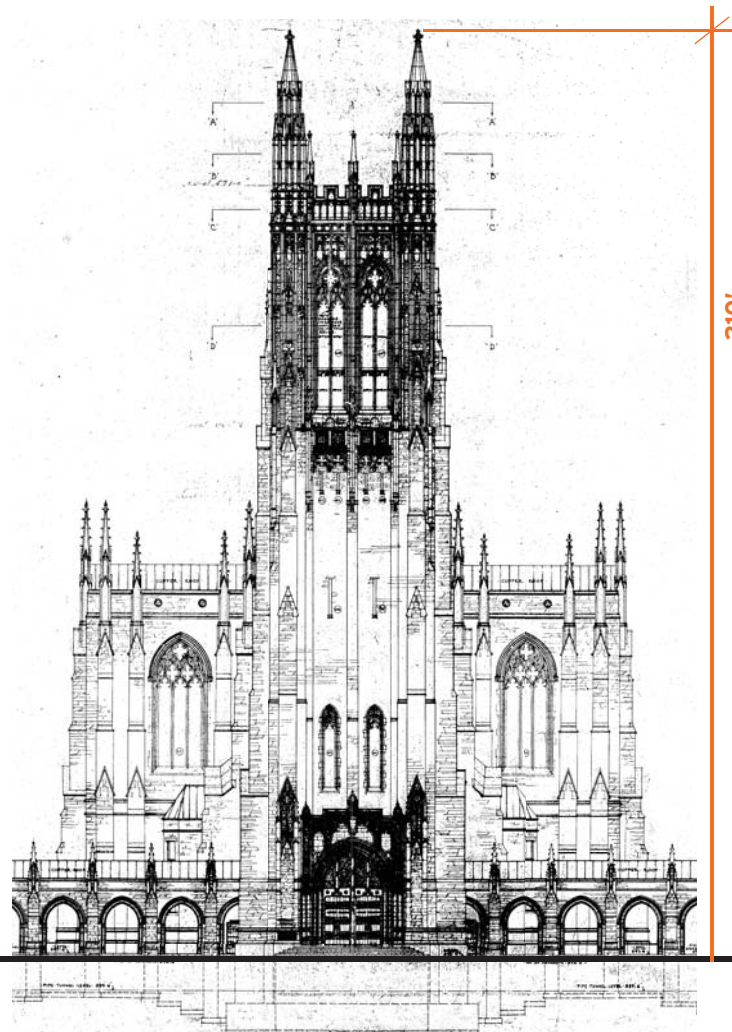
2.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

West Campus architectural details and their characteristics which may be useful in new building compositions are described and illustrated as follows:

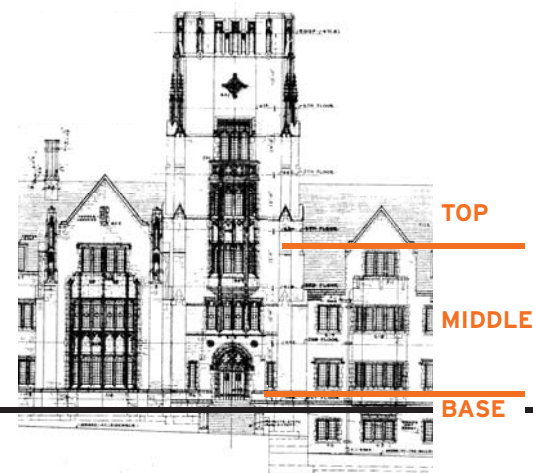
TOWERS

Creating a vertical element that can be read as a tower, within a larger building form, has been successful at a number of recent buildings. This has served to reduce scale or building mass, create an identity and other purposes. Stairs, elevators and stacked conference rooms have been used to make tower elements. In appropriate locations and for appropriate uses, towers are encouraged for future buildings.

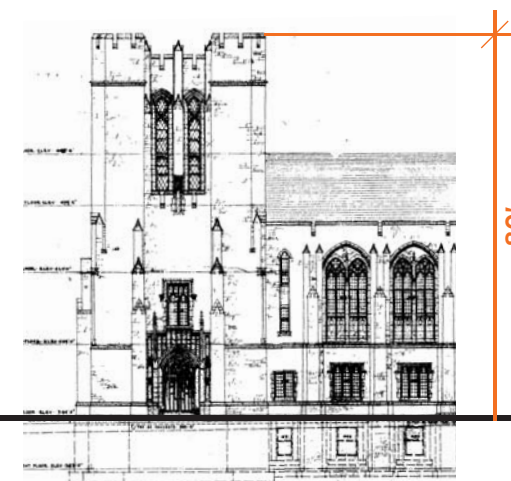
DUKE CHAPEL



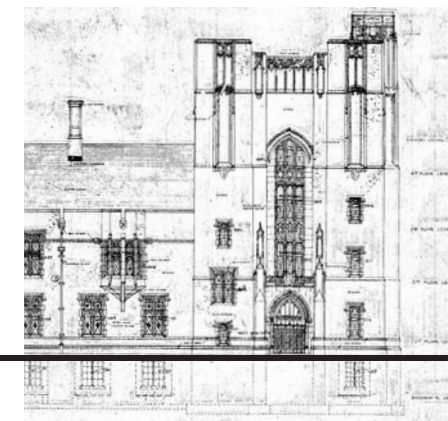
ALLEN BUILDING



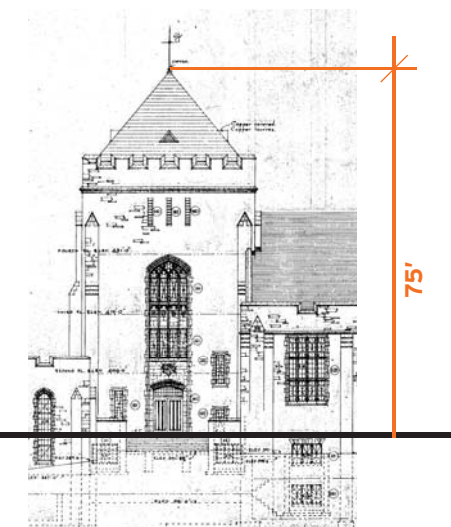
PERKINS LIBRARY



WEST CAMPUS UNION



CARD GYM



VERTICAL COMPOSITION

KILGO TOWER

FEW QUAD

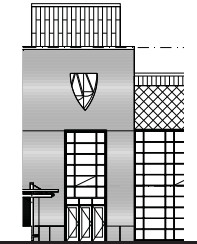
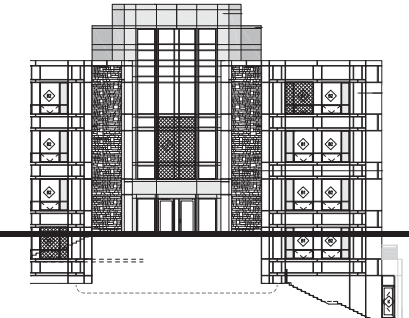
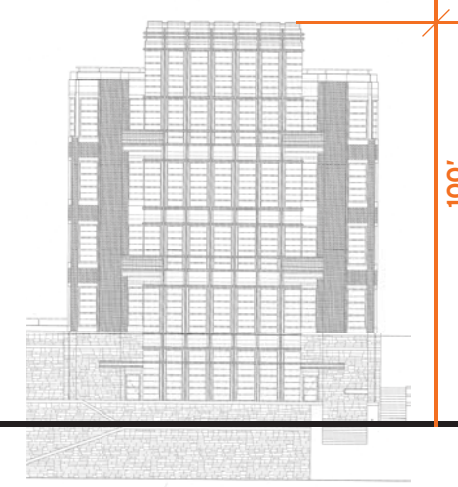
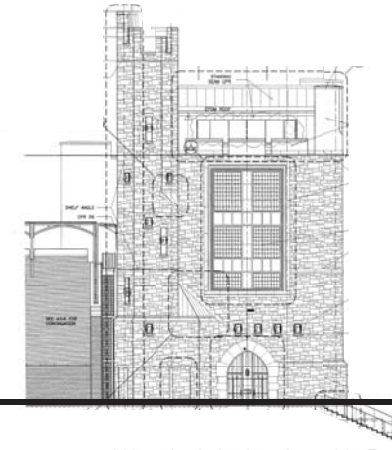
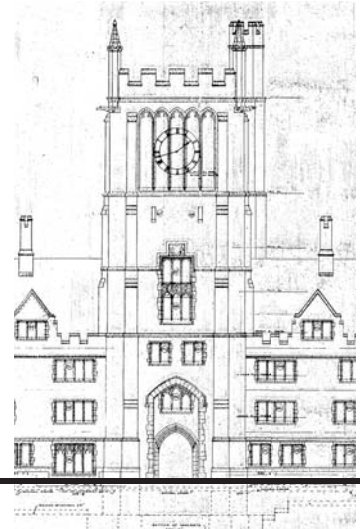
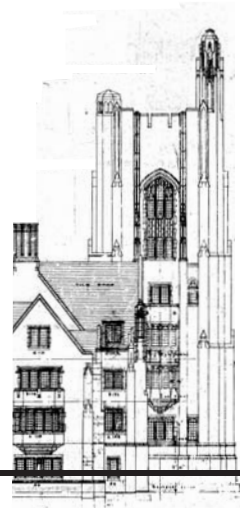
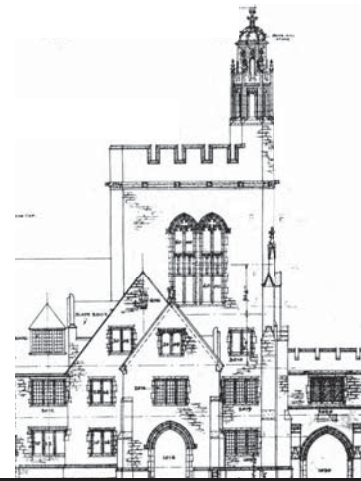
CROWELL CLOCK TOWER

MCCLENDON TOWER

SCHWARTZ-BUTTERS
ATHLETIC CENTER

FUQUA SCHOOL OF
BUSINESS

LAW

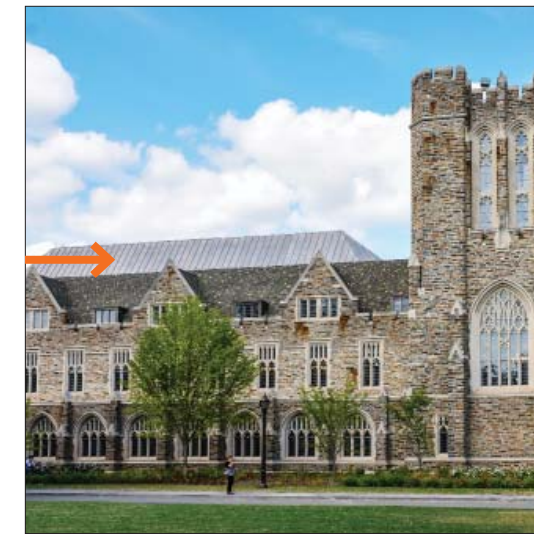


SYMMETRY / ASYMMETRY

Cut 1/2" off flap so fold will lie flat next to coil

ROOF ELEMENTS

There is quite a bit of variety in the form of roofs on campus. Roofs may be pitched or flat depending on location. Rooftop equipment should be screened, and architectural techniques for dealing with laboratory exhaust should be developed appropriately for the building expression and location. In the use of a flat roof, high albedo roofs should be used to reduce heat island effect. There has been mixed success and ongoing concern regarding maintenance which lead to not currently recommending green roofs. However, where highly visible, they may be considered for limited use in coordination with environmental goals.



Perkins Library



French Family Science Center



Environment Hall green roof



Fitzpatrick Center CIEMAS

Cut 1/2" off flap so fold will be flat when closed

2.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

BAYS

Windows may be grouped or special elements within a building may be projected to make a vertical bay expression. This can serve to reduce scale and mass of a building and add vertical emphasis.



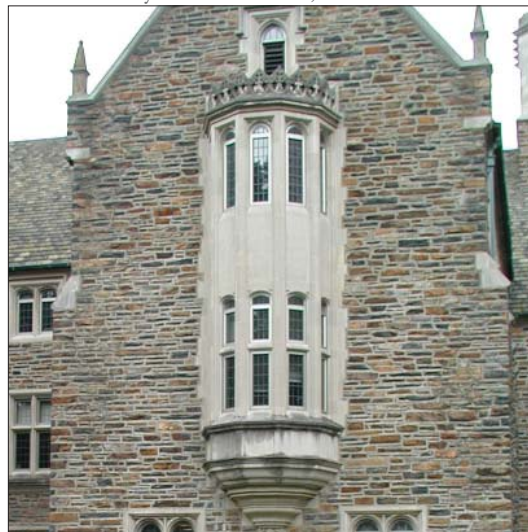
Residence Hall, Traditional



French Family Science Center, Transitional



Goodson Chapel, Divinity, Traditional



Old Chemistry, Traditional

2.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

WINDOWS & FENESTRATION

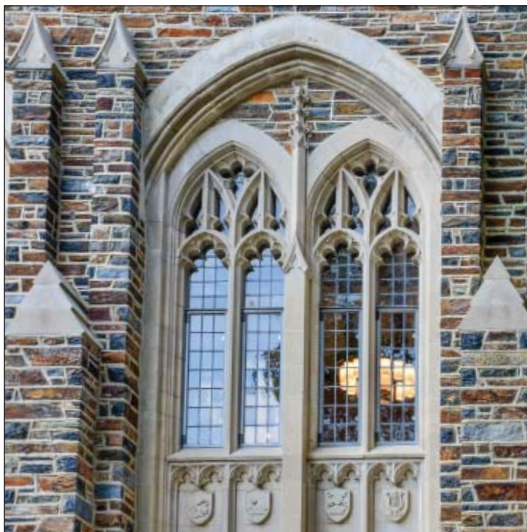
Historic windows and fenestration examples are included for reference. The historic windows are vertically proportioned, have depth relative to the walls they are in and their glass is subdivided into smaller lights (in Duke Stone walls they have limestone trim). These characteristics are generally desired in individual windows in new buildings.



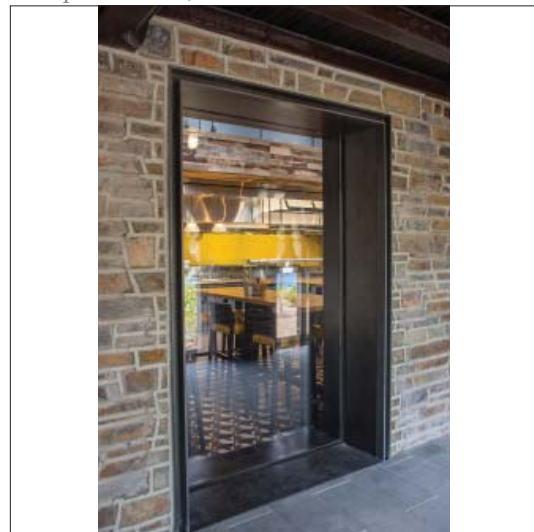
Individual window - Traditional



Grouped window, Traditional



Double window with limestone trim, Traditional



Individual window, New Paradigm

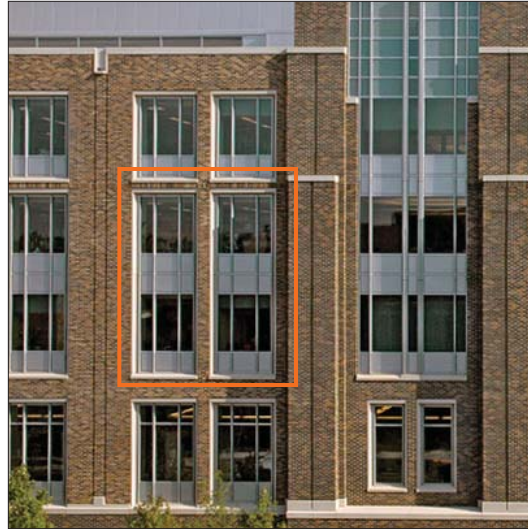
2.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

WINDOWS & FENESTRATION

Groupings of windows may be used to create vertical expression, double floor height readings or to create more highly glazed areas, approaching window walls if internal use suggests more transparency. In locations where there are reasons for highly glazed walls, custom window metal to create depth, shadow and appropriate texture for a collegiate context should be included. All glass with required low emissivity is also to be clear (also see section on materials).



Window grouping, vertical expression, Traditional



Window grouping, double height, Transitional



Window grouping, double height, Transitional



Window grouping, fenestration, window wall, Transitional

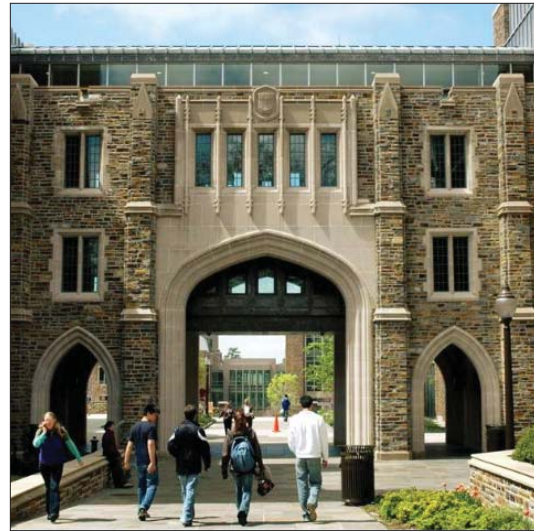
2.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

ARCHWAYS/PASSAGES & ENTRANCES

Historically on West Campus, important portals into quadrangles or important routes from one campus area to another were often marked by archways and passages. These were to join two parts of buildings or an archway may pass through a tower element. More recently, archways have been successfully made in new projects with various forms and these are also illustrated. For future projects, when there is an opportunity to make an important portal, “archway” elements should be incorporated along thru paths and to make primary entries to buildings.



Crowell Clocktower, Traditional



Bostock Library, Traditional



Crowell Residence Hall, Traditional



Fitzpatrick Center CIEMAS, Transitional

2.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

STRUCTURAL EXPRESSION

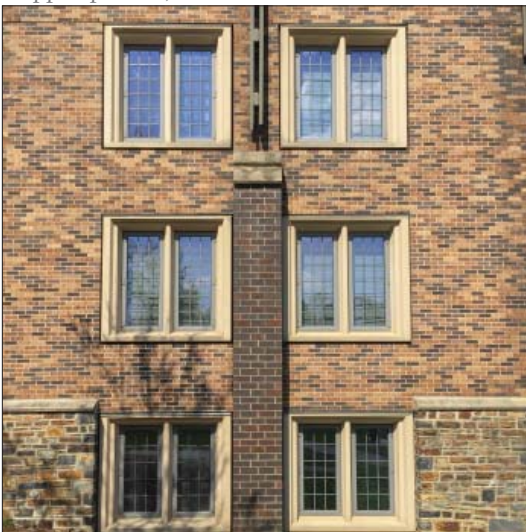
Much has been written on structural expression in Gothic and neo-Gothic architecture and that is not the purpose here. However, a few elements are seen on West Campus and are highlighted for potential use with new buildings. First is the stepped pilaster (or buttress expression), which creates a vertical façade element on many of the historic buildings. In recent buildings, there have been “expressed columns” which have proved useful in mitigating the horizontal form of recent parking garages or to add interest in a facade. Secondly, the use of a segmented arch or portions of arches to create interior interest in several buildings on campus has been well received and could be used in the future.



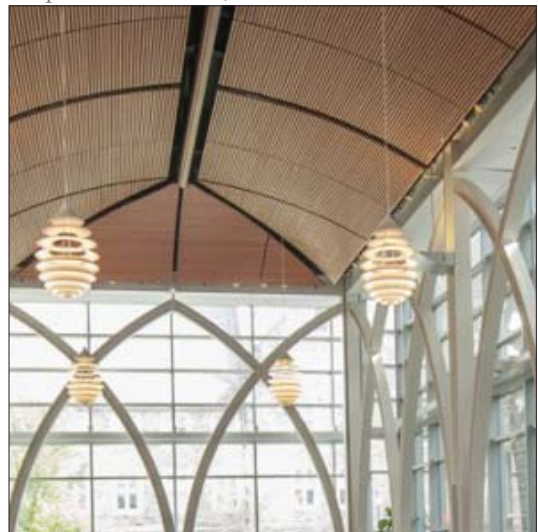
Stepped pilaster, Traditional



“Expressed columns”, Transitional



Stepped pilaster, Transitional



Segmented arch detail, New Paradigm

2.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

PARAPETS, FINIALS, & MEDALLIONS

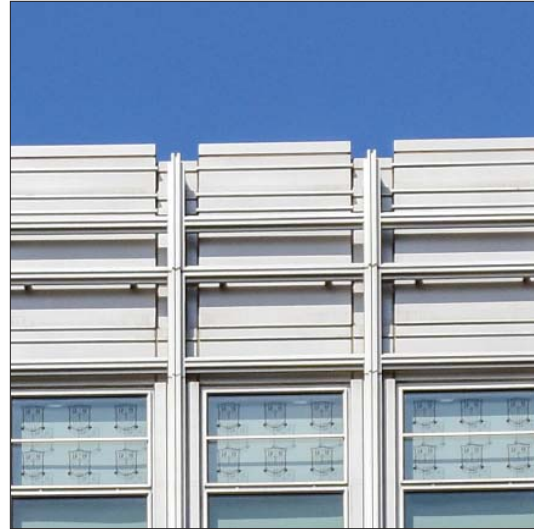
For safety, most buildings should have parapets at the roof (flat roofs) and the parapet design offers an opportunity to create visual interest at the top of facades against the sky. This can be seen in the profile of the historic buildings and has been used subtly in some new areas. Techniques have included: varying the parapet height, continuing vertical elements through the parapet cap height (often referred to as finials or spires, although very simplified compared to the neo-Gothic) to enhance verticality. Regardless of the form this may take in the future, attention to the parapet design and expression is suggested in future buildings.

Cast and carved medallions are found on West Campus in the historic buildings. New buildings have made some use of both new and salvaged medallions in facades to create interest, emphasize entries and honor tradition. In appropriate locations, and with approved content, this is encouraged in the future.

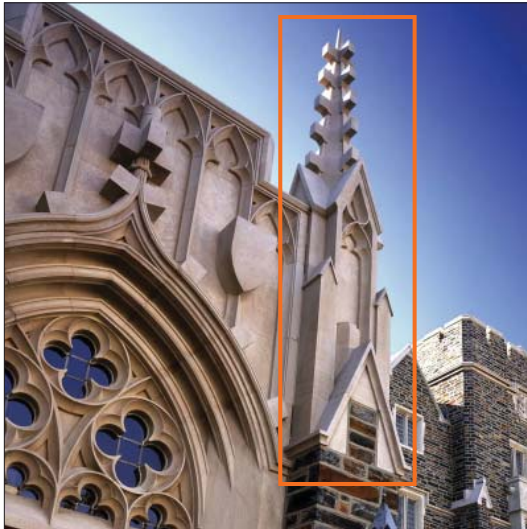
In a place as varied as Duke's West Campus, other details can certainly be found. Beautiful oak doors, limestone tracery, gargoyles, lanterns to weather vanes may inspire future projects, and the process of looking and learning from this special place should continue.



Finial & parapet, Traditional



Parapet, Transitional



Finial & parapet, Traditional



Medallion, Transitional

2.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

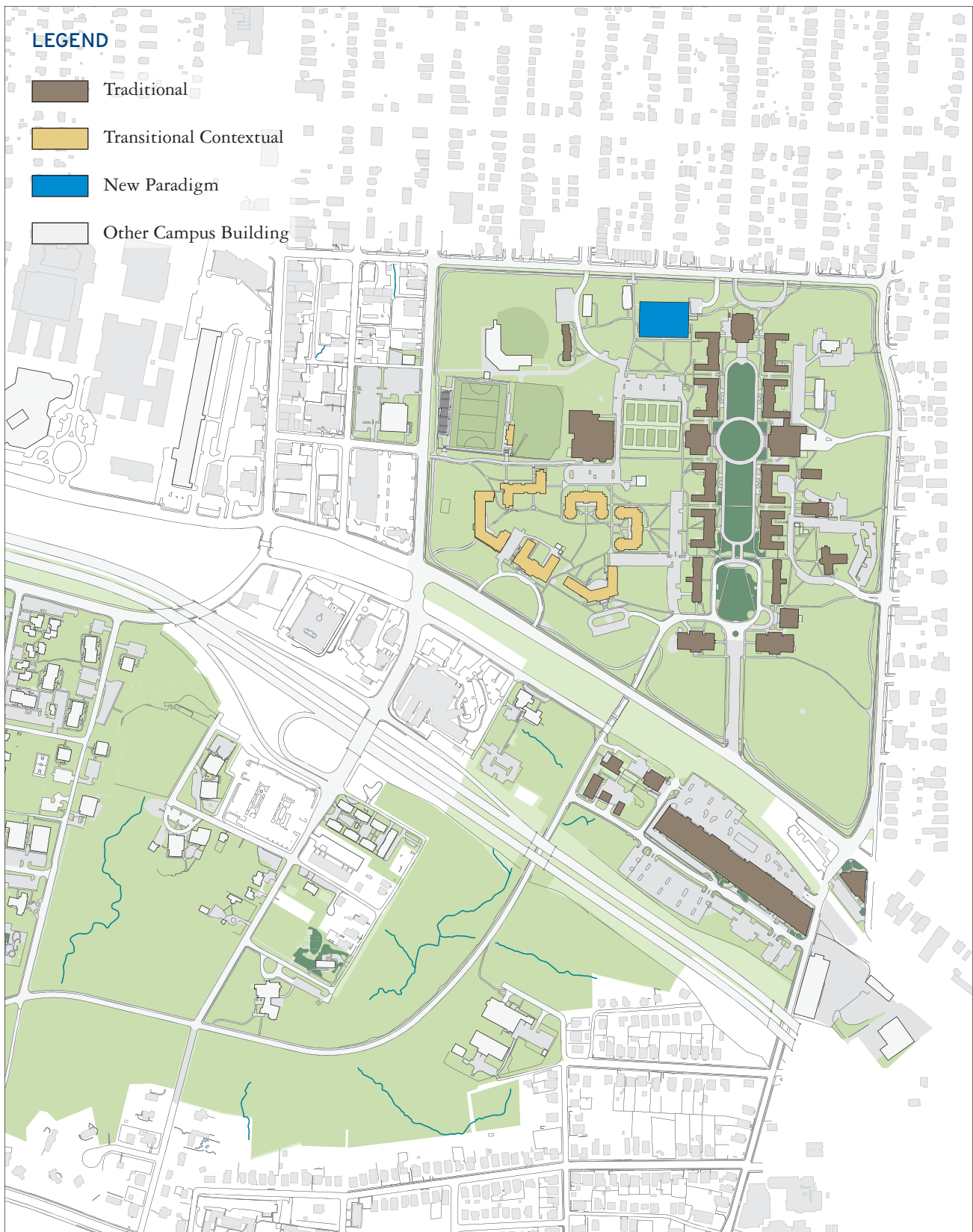




Regarding East Campus: “The formal unity declares it’s Eighteenth Century origin and exhibits the characteristics of architecture associated with that period: symmetry, order, balance and repose.”

The Architecture of Duke University, 1939, William Blackburn, p. 4

EAST CAMPUS



EXISTING ARCHITECTURAL VOCABULARY MAP

3.1 EXISTING ARCHITECTURAL VOCABULARY - STYLE

EAST CAMPUS - TRADITIONAL

Duke's East Campus is generally known for its symmetrical Georgian campus with red brick buildings trimmed in white marble. However, East's planning and development actually results in a place that is not that simple in its architectural expression or plan organization.

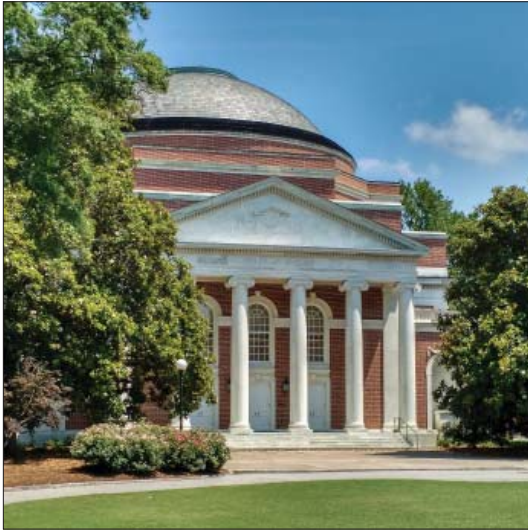
The original East Campus Trinity College buildings from the 1890's were of several vernacular styles (two remain today and one partially remains) and were followed, prior to World War I, with a more unified group of buildings. Designed by North Carolina architect, C.C. Hooks, in a neoclassical style, they feature warm white brick, limestone detail and green tile roofs. A pair of similar, well detailed buildings with porticos (East and West Duke) established an axial open space, away from the earlier Trinity buildings, creating an entry facing Main Street. This also anticipated a future axial open space organization of the campus. Hooks's work was then followed in 1925 by the Trumbauer Plan (led by Julian Abele) which incorporated these buildings as a wider forecourt to a more extensive axial open space, with red brick Georgian buildings terminated by the domed Baldwin Auditorium.

The 1925 Plan was a practical re-use of the existing pattern, but there is no recorded reason found for the change to red brick and Georgian. The Georgian architecture's symmetry and formality relate to the earlier neoclassical, however, with the change to red brick and a redefined open space, the change is distinct. The result is that East Campus, like most older campuses, has multiple traditional architectural expressions including Georgian and neoclassical. Due to the extent of the red brick Georgian (eleven buildings) it certainly predominates today.

In the future, it appears that there are no sites immediately on the Georgian portion of the open space. However, if there ever is a site, it should be consistent with and based upon the Georgian tradition.

Jarvis and East Residence Halls, part of the original C.C. Hooks group of buildings facing each other across the open space and next to East and West Duke, are anticipated to be demolished and replaced. As a guideline, it is expected that the façade line or the main open space would be maintained and that the replacement buildings would be similar in appearance and height on the open space. Sited between the neoclassical (East and West Duke) and the Georgian, these two sites are expected to extend the more predominant red brick. However, the replacement buildings could introduce a transitional expression.

EAST CAMPUS - TRADITIONAL



Baldwin Auditorium



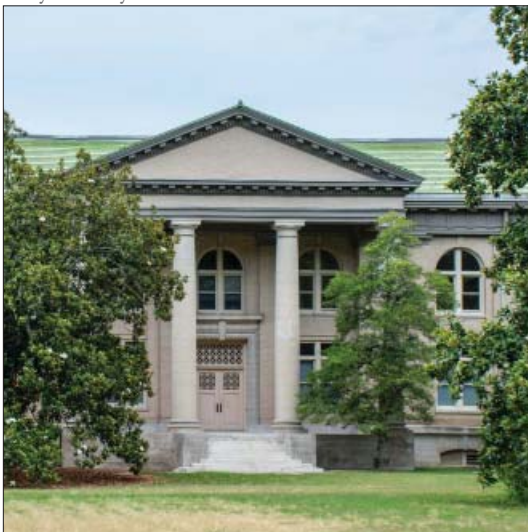
Friedl Building



Lilly Library



East Campus Union



East Duke, front elevation



West Duke, side elevation

3.1 EXISTING ARCHITECTURAL VOCABULARY - STYLE



Bell Tower Residence Hall

EAST CAMPUS - TRANSITIONAL CONTEXTUAL

There has been substantially less new buildings on East Campus compared to West. However, a series of dormitories were built from the mid-1990's to 2006, which coincided with emergence of East as the freshman campus at Duke. These buildings have used some elements of the Georgian, such as light stone string courses, window trim in brick facades and pitched slate roofs all relating to the traditional. Although the buildings have dark grey brick for the top floor, which visually unites the top floor with the roof, making the four-story building look more like three with a roof. This was something new and transitional on East based on the context. Located on the western side of East Campus and with some distance from the primary open space, this group of buildings also transitions away from the strict symmetry of Georgian to accommodate modern student housing needs. The most recent building, Bell Tower Residence Hall, culminates with an asymmetrically placed tower (and Trinity bell). Seen from the off campus area to the west, it provides a landmark.

Since a three building precedent exists, future buildings in this area of East Campus should work with this expression, although further development is possible.



Blackwell Residence Hall

3.1 EXISTING ARCHITECTURAL VOCABULARY - STYLE



Biddle Music

EAST CAMPUS - NEW PARADIGM

With a lighter building program over the years on East, there exists little in the way of new models for architectural expression. In 1974, Edward Durrell Stone produced the distinctive Mary Duke Biddle Music Building in Stone's contemporary classical style. However, it remains "one of a kind" and did not set a new direction for the future. A small addition to Brodie Recreation Center in white stucco introduced a new expression although this is not extensive enough to set a direction.

As a campus of multiple types of expression from its beginning, given the right location and use, there could be opportunities for a new paradigm on East in the future to enliven the campus. Recently, the Epworth Building has been identified for replacement and the opportunity may exist there.



Brodie Recreation Center

3.2 HEIGHT & BUILDING FOOTPRINT



Friedl Building



West Duke

HEIGHT & BUILDING FOOTPRINT

On East Campus' primary open space, the typical Georgian buildings are two stories with a roof/attic story (in a mansard roof) should there ever be a site in this row, this height should be maintained. Topography does allow another day-lit floor on the downhill side of these buildings. Building heights in the Georgian area are to be matched.

At the neoclassic entry area or forecourt, for sites adjacent to East and West Duke, a height of three floors plus a roof element is possible.* Also, topography may allow additional day-lit floors on the downhill sides, away from the primary open space.

For site areas to the West of the primary open space, a height of four stories with a roof expression is possible.** Again, topography may allow an additional day-lit floor away from (opposite side) the primary adjacent open space or entry. (Consultants should be aware of a 250' setback from perimeter streets in the City's UC(D) for East Campus if sites are near the perimeter).

To the east side of East Campus, heights may be the same as the west side, provided sites are 250' as required from Buchanan Boulevard and the Trinity Heights neighborhood.

For any large building footprints (exceeding 20,000 SF on East), effort should be made to reduce the visual impact and resulting massing of large floors by breaking the plan forms into parts using various architectural elements (bays, setbacks, courtyards or other elements).

* Three floors plus a roof element: defined as 36' to 40', care should be taken to match existing floor to floor height in proximity to traditional original buildings to the extent feasible.

** Four stories plus a roof: 60'– 70'

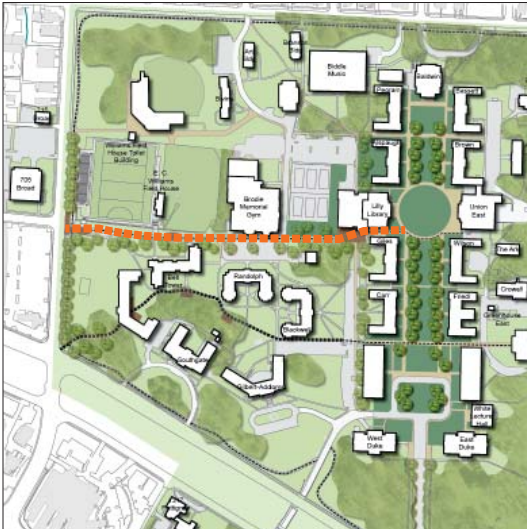
3.3 OPEN SPACE & ORIENTATION OF BUILDINGS



East Campus main quad



Bell Tower Residence Hall & pedestrianway



East Campus Pedestrianway Master Plan 2016

OPEN SPACE & ORIENTATION OF BUILDINGS

Similar to West Campus, the ideas and guidelines from the Copeland University Master Plan 2000 are applicable to East and are as follows:

A building's scale and mass needs to be considered in relation to both adjacent open space and other campus buildings.

Buildings should “front” on open spaces pedestrian ways, plaza and/or other groups of buildings. (Certain streets or drives could be as seen in open spaces).

Interior gathering spaces should be oriented to adjacent open space. Connections between interior and exterior should be made to maximize opportunities for indoor and outdoor activities.*

In summary, new buildings on East Campus should seek to reinforce the existing and contribute to the making of open space and extending them as a system of connected places on campus.

* 2000 University Master Plan document, Lee Copeland

3.4 MATERIALITY & COLOR

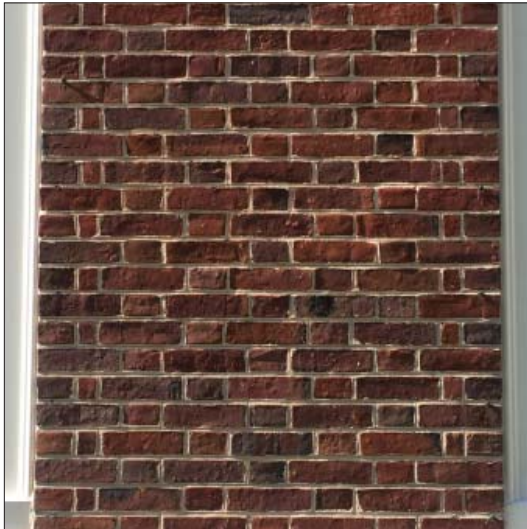
MATERIALITY & COLOR

East Campus is a brick campus, primarily a red brick blend.* However, there are other colors, most notably the buff color (warm white) of East Duke, West Duke and original buildings near them, along with darker and lighter variations of red. The more recent residence halls are a red blend of Cimarron and Black Diamond.

* Old Virginia Brick Co., Salem, VA; Blend: Old Georgetown Mods (mock-up required).



Brick blend, Old Georgetown Mods, Traditional



Old Georgetown Mods detail, Traditional

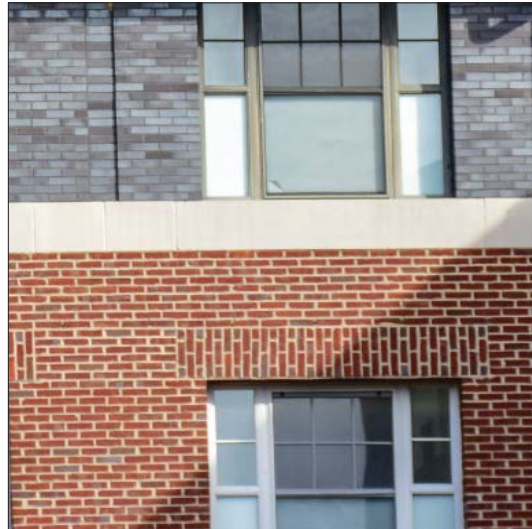
BRICK BLEND

For new buildings on East it is expected that they will be brick facades, using the red brick blend.* In certain locations some variation or alternative color may be considered with direction and approval of university administration (see Bell Tower Residence Hall area).** (see Duke Design Construction Standards)

** East Campus transitional residence halls on the west side of campus: Cloud Ceramics, Concordia, KS (mock-up required).



Brick blend, Cloud Ceramics, Transitional



Cloud Ceramics detail, Transitional

3.4 MATERIALITY & COLOR

STONE

The Georgian and neoclassical original buildings have light colored stone architectural trim and detail, either white marble or limestone. New buildings requiring trim, copings, sills or string courses are to use these materials. If not in the immediate traditional context and not a restoration, these materials may be matched in terms of color with cast stone or architectural pre-cast concrete.

The East Campus low perimeter wall and Stagg Pavilion made of granite are unique historic elements from the early 1900's and are not expected to be repeated internally on campus. Any site walls are to be of the red-blend brick (see Duke Landscape Guidelines).



Stone & marble, Traditional



Stone & marble detail, Traditional



Pre-cast concrete, Transitional



Pre-cast concrete detail, Transitional

3.4 MATERIALITY & COLOR



Slate roof, Traditional



Copper roof & downspout, Traditional



Slate & metal roof, Transitional

ROOF MATERIAL

The traditional sloped roof material on East is slate and any future buildings in the immediate vicinity of slate roofs to include pitched roofs should be slate. The green tile roofs of the original, C.C. Hooks, neoclassical buildings are not expected to be repeated.

There is a small amount of metal roofing at Bell Tower Residence Hall (Tower), and other small roofs. Small roofed elements in the future may use metal to match and for one story support buildings at the athletic fields, pitched metal standing seam roofing has been used and may be used for this type of small ancillary building in the future, provided it matched in color (warm brown).

Flat roofs may be of the latest technology and per FMD Building Standards. High albedo roofing should be used. There has been mixed success and ongoing concern regarding maintenance which lead to not currently recommending green roofs. However, where highly visible, they may be considered for limited use in coordination with environmental goals.

OTHER MATERIALS

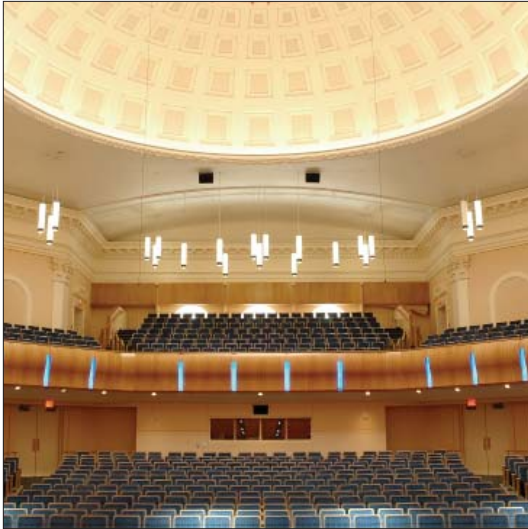
Except for flashing and downspouts (copper) there is no extensive use of metal (metal panel) in facades on East and none is anticipated to be used to any extent in the future.

Also, there has not been an extensive use of glass (window or curtain wall) on East as there has been on West. However, there could be locations and uses in the future, where it may be suitable and considered with approval of university administration. If so, the guidelines for use on West Campus related to clear glass color, window metal characteristics and protection of birds in flight would apply.

3.4 MATERIALITY & COLOR

INTERIOR PUBLIC SPACE MATERIALS

For interior public space on East Campus, Lilly Library, East Campus Union and Baldwin Auditorium provide precedents. In general, lighter tones of terrazzo, marble flooring, lighter color range, wood wall paneling and wall color are characteristics of these spaces and should provide a guide for future spaces. This leaves opportunity for creative or new contemporary expression in public interiors, provided they have some basis in the context.



Light wood paneling & walls, Baldwin Auditorium



Wood paneling & terrazzo, East Campus Union



Light wood paneling & walls, Lilly Library



Light wood paneling & tile, East Campus Union

3.5 COMPOSITION & SCALE



Baldwin Auditorium

COMPOSITION & SCALE

The Georgian and neoclassical architectural expression of East Campus are inherently less compositionally complex than West's collegiate neo-gothic and this should be taken into consideration for new buildings on East.

DOUBLE HEIGHT ELEMENTS

The most significant East Campus building, Baldwin Auditorium, similar to the rotunda at the University of Virginia, terminates an axial open space. Seen from a distance it has a scale that addresses the entire area with its dome shape and double height portico, and the building's scale emphasizes its important position and function. East and West Duke, now flanking entry buildings, use double height arched windows and porticos to make an impactful scale. Also, Lilly Library and East Campus Union have double height porticos facing each other across the quad, signifying their importance with the scale of their architectural expression.

For future buildings on East this technique could be used carefully and only when a building's siting and use justify it. The intent is to not over use and reduce the impact of the existing buildings.



Lilly Library

3.5 COMPOSITION & SCALE



Friedl Building



Bell Tower Residence Hall

SYMMETRY, VERTICAL COMPOSITION & HUMAN SCALE

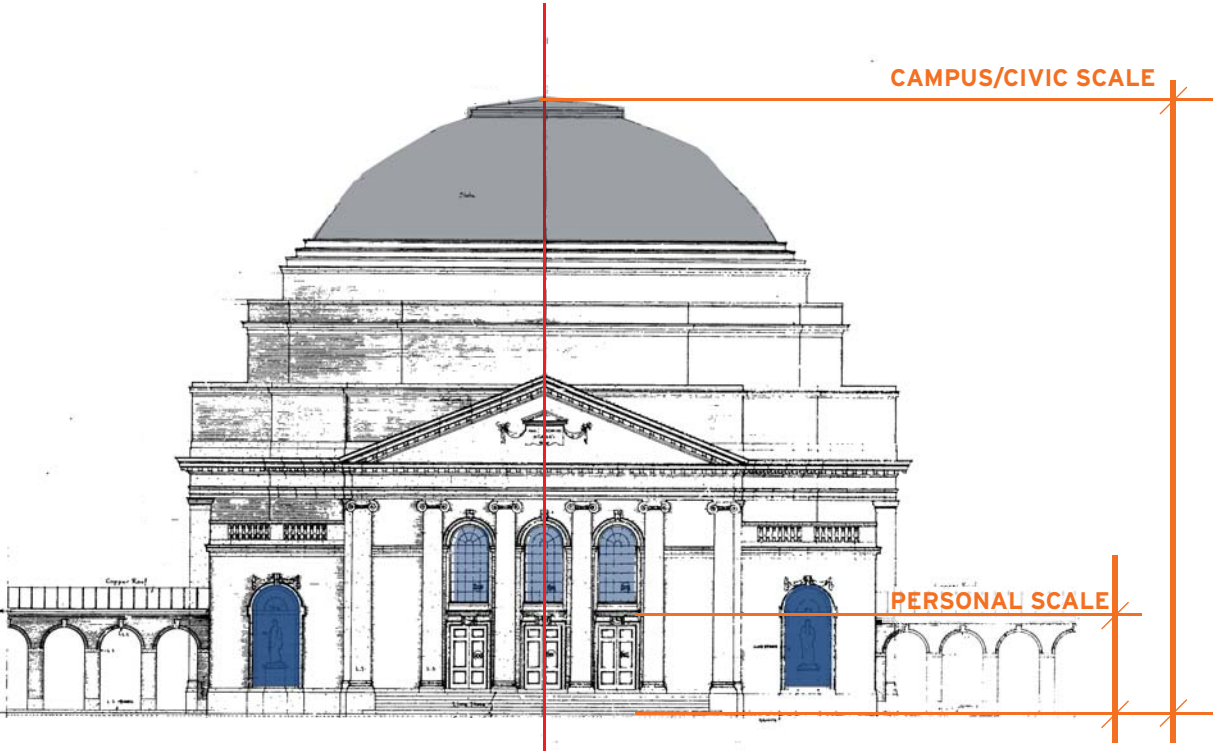
The more typical traditional buildings on East are symmetrical without the asymmetrical features found on West Campus. The buildings do tend to be organized with a vertical composition of base, middle and top (roof) similar to West, and they display a scale more immediately related to the size of a person (human scale). These building's entrances tend to be "on-center" and emphasized by gabled bay expressions in the façade. Their relatively long horizontal forms are further reduced with end bays made with slight off-sets, roof expressions and stone detail, but the result is a symmetrical composition on the original open space. The end bays also form three sided courts facing away from the primary open space. This continued, to some extent, with the more recent Randolph and Blackwell Residence Halls. However, symmetry gives-way to an asymmetrical form, responding to site and use, with the most recent Bell Tower Residence Hall. Bell Tower is furthest from the original open space. Based on these observations, for any potential building sites on the primary open space (Quad), symmetry will need to be considered relative to the existing and included. For sites away from the primary open space, more asymmetrical compositions, responding to site or use are possible. New buildings in all locations should acknowledge to some extent a three-part vertical composition and the smaller, human scale in their expression.

3.5 COMPOSITION & SCALE

SCALE

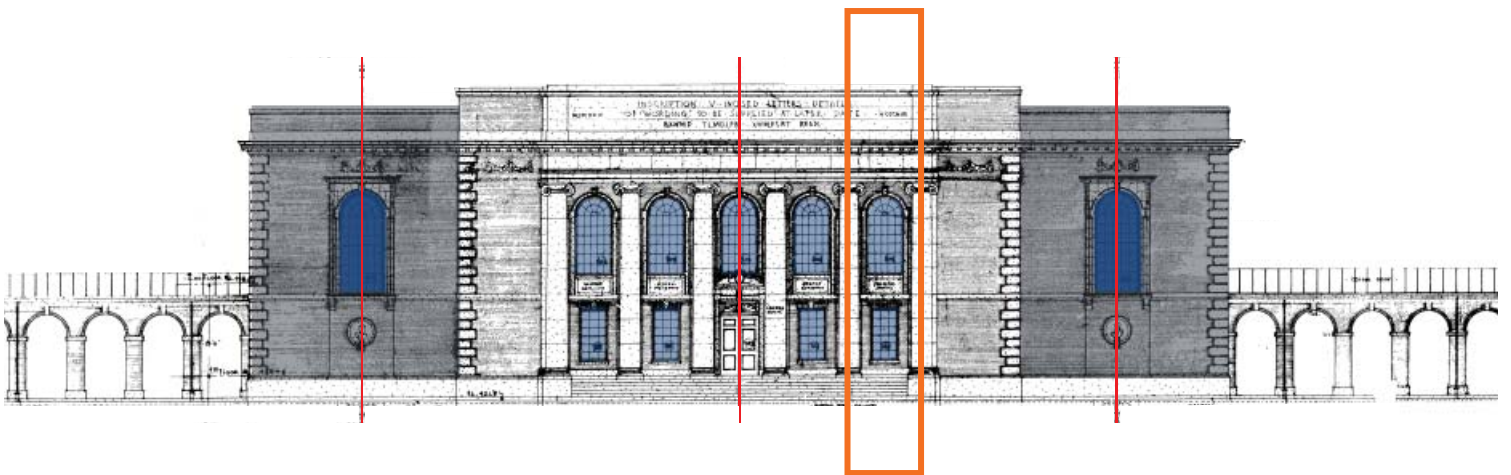
Baldwin's campus scale combines with a personal or human scale below. Lilly Library's double height elements used where the importance of the building justifies scale emphasis.

BALDWIN AUDITORIUM (1927)



LILLY LIBRARY (1927)

Double height
expression



3.5 COMPOSITION & SCALE

SYMMETRY & VERTICAL COMPOSITION

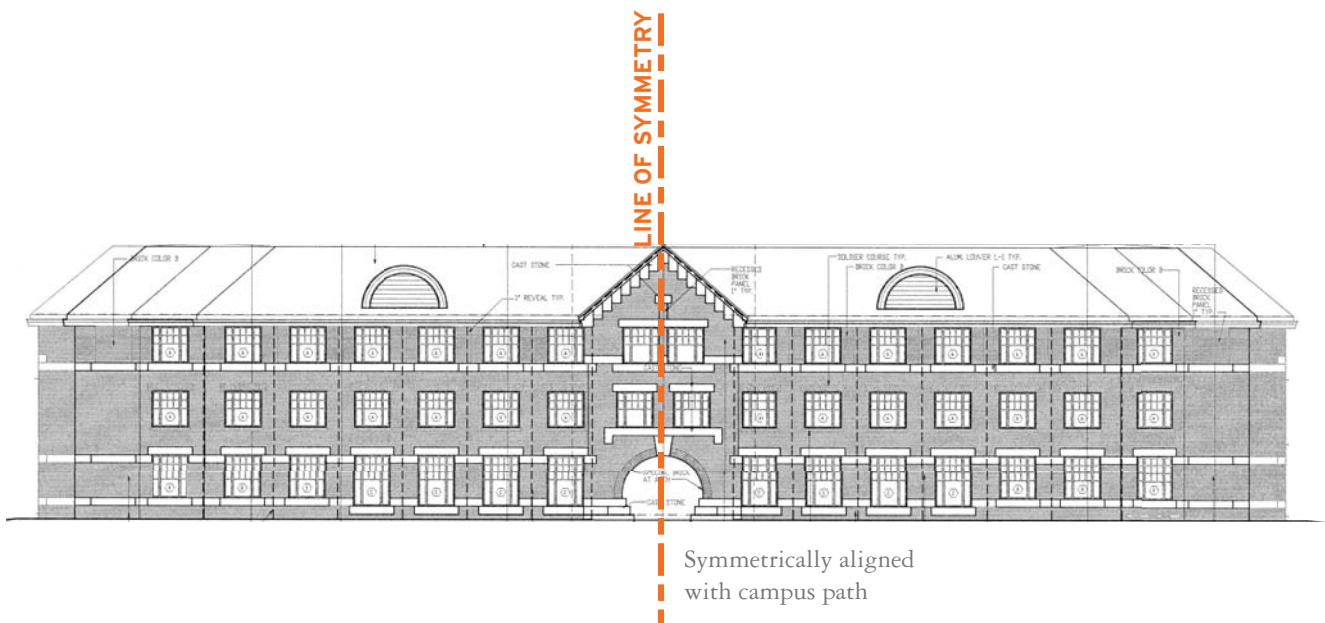
Symmetry of traditional East Campus architecture illustrated below.
Vertical composition: base, middle and top.

PEGRAM RESIDENCE (1926)



SYMMETRY, VERTICAL COMPOSITION & HUMAN SCALE

RANDOLPH RESIDENCE (1994)



3.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

East Campus architectural patterns, elements and details, which may be useful in new building compositions are described and illustrated as follows:

BUILDING FAÇADE OFF-SETS & PROJECTIONS

Similar to the traditional buildings, new buildings, likely with horizontal massing and facades, may benefit from relatively small façade “off-sets or projections” to create a more vertical bay to mitigate horizontally of a form.

THREE SIDED COURTYARDS

The massing and functional use of new buildings may benefit by being broken into wings, like the massing of the traditional buildings, to form a three-sided courtyard.



Offset bay, Traditional



Offset bay, Traditional



Three-sided courtyard, Traditional



Three-sided courtyard, Transitional

3.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

ROOF ELEMENTS

The pitched roofs of the traditional buildings on East help to unify the campus and reduce the apparent number of floors and mass of the buildings. Roofs could be useful for these purposes in future buildings, as well as, for providing screening of any rooftop equipment. Rooftop elements, like dormers or similar projections, may provide venting or natural light and can also be used to emphasize an entry or other aspect of a new building (see Bell Tower Residence Hall).



Roof elements, dormers, Traditional



Roof elements, Vent, Transitional

ENTRIES, LOGGIAS & PASSAGEWAYS

Smaller entry elements, seen on the side of East and West Duke or other quad facing buildings, established a “person-related scale,” help with wayfinding, identity and therefore, could be useful in future buildings.

Loggias and passageways seen on East, serve to connect and give a sense of entry to open spaces and buildings. For buildings in the future, use of these should be considered where opportunities occur.



Loggia, Traditional



Arched passageway, Transitional

3.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS

STRING COURSES

Extensive use of white marble trim is not anticipated on East Campus, except in restoration of original buildings. However, light colored stone bands or string courses have been used in recent buildings and could be useful in the future to articulate three-part vertical facades or unify architectural compositions.



Marble string course, Traditional



Marble string course detail, Traditional



Pre-cast concrete string course, Transitional



Pre-cast concrete string course detail, Transitional

3.6 ARCHITECTURAL PATTERNS, ELEMENTS & DETAILS





NEW CAMPUS & MEDICAL CENTER

4.1 NEW CAMPUS



Duke Illustrative Master Plan 2024

NEW CAMPUS

It is expected these architectural guidelines will be expanded to cover the New Campus (Central Campus) area and transition areas to New Campus in the future. Until that time, refer to the latest Duke University Illustrative Plan and studies by both Pelli Clark Pelli and Ayers Saint Gross.



New Campus Master Plan, Ayers Saint Gross 2016

4.2 MEDICAL CENTER



Medical Campus Master Plan 2006

MEDICAL CENTER

In the future, it is also intended to expand the architectural guidelines to Duke University Medical Center. Until that time, refer to the latest University Illustrative Plan, the 2006 Cooper Robertson Medical Center Framework Plan (incorporated in the University Illustrative Plan) and recent buildings completed through 2014/2015.



Duke Medical Campus 2016



APPENDIX

5.1 PARKING GARAGES



PG 9

PARKING GARAGES

Future parking garages should, in most situations, be flat floors with speed ramps. This is to make for better wayfinding, fit campus settings, reduce maintenance, and allow future, possible re-use (versus sloped floor garages). See Parking Garage 4 (PG4) and PG9. Long horizontal floors, which are publicly viewed, should have facades which stress verticality and reduce the scale of these large buildings using details such as pilasters, towers or other details described in the guidelines. See PG9, PG4, and PG1 as examples.



PG 4



PG 1

5.2 DUKE BRICK BLEND

HISTORY OF DUKE BRICK BLEND

History and specifics of the blends and their uses.

INTRODUCTION

The following is both a review of and an update to the use of the Duke Brick Blend (DBB) for new buildings on the West Campus. This is a supplement to the University's Architectural Guidelines of 2016 and will supersede other earlier guidance on the brick in architectural standards on-line or elsewhere.

In developing this update, key major projects were toured and their respective blends identified with the assistance of Tri State Brick Company, which has been involved from the beginning of the DBB use in 1999. Further, the architects of the first building projects, as well as the Executive Vice President, who directed their efforts were interviewed. The architects included, Phil Freelon (Graduate Admissions), Turan Duda & Jeff Paine formerly of Cesar Pelli's office (Schwartz-Butters) and Phil Szostak (Yoh Football). The conclusion of the update includes a new and simplified guideline for future use of the DBB, to reach that, some historical review is required first.

WHY USE A DUKE BRICK BLEND? IT'S PURPOSE

In the late 1990's, several building designs were being developed for sites considered, at that time, to be less central west campus sites. These were at various distances away from the Abele Quadrangle, with one actually being between East and West Campus on Campus Drive, one behind an original residential scale building on Campus Drive near Duke University Road and Anderson Street and lastly, one in the Athletic area adjacent to Cameron Indoor. Two sites were well within site of original buildings of Duke Stone.

The Architects interviewed described a desire to use Duke Stone for the contextual relationship and identity of their projects, however the use of these buildings, cost and availability of large quantities of stone at that time led to development of a multi-brick blend intended to be compatible with and relate to the stone. Cesar Pelli led the effort and collaborated with Freelon, Szostak and Richard Gurlitz (Freeman Center) under direction from EVP Tallman Trask and University Architect John Pearce.

Graduate Admissions and the Freeman Center for Jewish Life (both 1999) were the first completed buildings with a version of the Duke Brick Blend, using a four and five brick blend respectively. The blend was adjusted to attain a more subtle effect at the Schwartz-Butters Building shortly after and this building became the standard for future buildings at that time. Schwartz-Butters modular brick blend consisted of 50% brown tweed, 19% Cimarron, 16% brown ironstone, 9% light autumn and 6% driftwood from Tri-State Brick and the Cloud Ceramics Plant in Kansas.

Several projects followed using approximately this standard DBB along with a two brick darker accent bands to create horizontal emphasis, pilasters or bases to buildings. But the next significant change came with the Fitzpatrick (CIEMAS) Building by Zimmer Gunsul Frasca, Bostock Library by Shepley Bulfinch and French Science by Moore Ruble Yudell. In these projects from 2002 to 2005, a three brick blend was used. This simpler blend was considered successful, and simpler for larger projects and accepted in lieu of the four and five brick blends of the first projects.

Today, buildings from this second wave, using a three brick blend, are sometimes mistaken for the four brick blend. This is because, before 2008 the Cimarron brick had a good bit of variation from the kiln and looks like more than one brick color. After 2008 and the start of the "Great Recession", Cloud Ceramics closed their older plant in Kansas and concentrated production in their newer plant.

5.2 DUKE BRICK BLEND

This change led to less variety in the brick used in the blend starting in 2008. Primarily this updated blend was used for the significant new building program in the Athletic area. Mostly seen from a greater distance, this less subtle, slightly coarser, three brick blend has nevertheless been considered successful. However, for more recent projects, with more intimate sites closer to the Abele Quad, architects have sought qualities of the earlier blend and pursued four brick blends to achieve the subtlety achieved by the earlier three brick blend. The four blend brick tends to actually be lighter and due to this, time can be expended trying to fine tune or reinvent the blend.

The following visual survey tracks this description.

1996-1999 - ORIGINAL 4-5 BRICK BLEND



1. Undergraduate Financial Aid, 4-brick blend, Freelon, 1996



2. Freeman Center for Jewish Life, 5-brick blend, Gurlitz, 1999

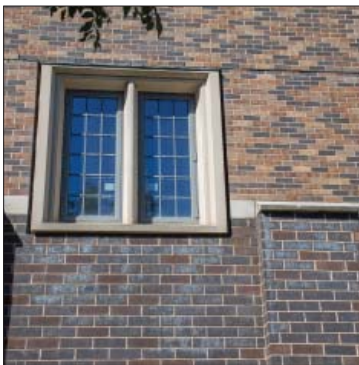


5.2 DUKE BRICK BLEND

1999-2004 - MODIFIED 5 BRICK BLEND TO ATTAIN A MORE SUBTLE EFFECT



3. Schwartz-Butters Athletic Center, 5-brick blend, Cesar Pelli, 1999



4. Keohane Quad, 5-brick blend, Kieran Timberlake, 2002



5. Yoh Football Center, 5-brick blend, NBBJ/Szostak, 2002

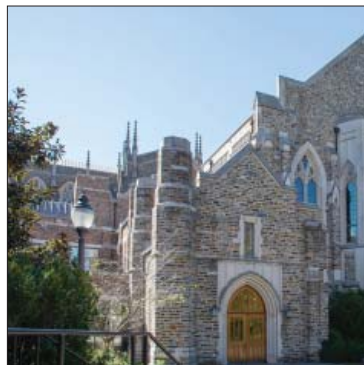


5.2 DUKE BRICK BLEND

2004-2008 - SIMPLIFIED 3 BRICK BLEND MADE TO LOOK LIKE THE ORIGINAL 5 BRICK BLEND



6. Fitzpatrick Center CIEMAS, 3-blend brick, Zimmer Gunsul Frasca, 2004



7. Westbrook Building - Divinity, 3-blend brick, Harman-Cox, 2005



8. Bostock Library, 3-brick blend, Shepley Bulfinch, 2005

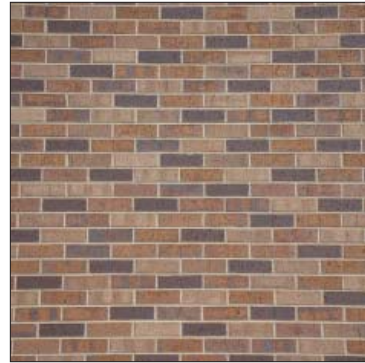


9. French Family Science Center, 3-brick blend, Moore Ruble Yudell, 2006



5.2 DUKE BRICK BLEND

2008-2017 - SIMPLIFIED 3 BRICK BLEND AFTER '08 - LESS VARIED DUE TO CHANGE IN PRODUCTION



10. Krzyzewski Center, 3-brick blend, Beck, 2008



11. K4 Residence Hall, 3-brick blend, William Rawn, 2011



12. Scott Family Athletic Performance, 3-brick blend, Beck, 2016



13. Blue Devil Tower - Wallace Wade, 3-brick blend, Beck, 2016

5.2 DUKE BRICK BLEND

2018 DUKE BRICK BLEND GUIDELINE

ACADEMIC DUKE BRICK BLEND

To simplify our process and guidelines for use of the Duke Brick Blend, with assistance from Tri-State Brick, the Cloud Ceramics plant in Kansas and William Rawn Architects (currently working on the Hollows Dorm project) an updated three brick blend has been developed. Cloud Ceramics is now able to provide more variety in the Cimarron brick color and substitutes Driftwood for Brown Tweed to recreate a blend similar to the original three brick blend. **This new blend is to be used in areas on West Campus near the Abele Quad and on the Athletics Precinct in close proximity to the original 5-brick and 3-brick blends.** For convenience Cloud Ceramics will name this the “Academic Duke Brick Blend”. Its mix is as follows:

45% Cimarron
30% **Driftwood**
25% Black Diamond



Academic Duke Brick Blend

ATHLETIC DUKE BRICK BLEND

The Athletic Duke Brick Blend is to be used in and around Wallace Wade Stadium. This blend is to be labeled “Athletic Duke Brick Blend”. Its mix is as follows:

45% Cimarron
30% **Brown Tweed**
25% Black Diamond



Athletic Duke Brick Blend

In the context of the earlier (pre-2007) Athletic buildings, such as Schwartz-Butters, the Academic Duke Brick Blend should be used to relate to the earlier blends.

5.2 DUKE BRICK BLEND

2018 DUKE BRICK BLEND GUIDELINE

TWO BRICK BLEND

A 2-brick blend (black diamond and brown ironstone) was originally included as an option in the guidelines. This dark blend has been used to make building bases, horizontal accent bands and string courses in the exterior wall of buildings, like Bostock Library.

In the future, it is not expected that dark bases will be used to any extent, except for projects in close proximity to buildings with this feature already. However, a dark, 2-brick blend band or string course may be used to create horizontal emphasis, scale or visual interest if needed by building designers.

MORTAR COLOR

There are several mortar colors that have been used with the DBB, most apparently a tan or cream mortar, for example Schwartz-Butters Athletic Center and a gray mortar, for example French Science Center. With mortar, care should be taken to match adjacent or nearby mortar color. When there is no precedent nearby, the tan or cream mortar should be used to better unify, blend and “visually warm” the buildings. See attached example photos.

MORTAR COLOR - TAN OR CREAM



Schwartz-Butters Athletic Center - 1999



K4 Residence Hall - 2011



Scott Family Athletic Performance Center - 2016

MORTAR COLOR - GRAY



Fitzpatrick Center CIEMAS - 2004



French Family Science Center - 2006

5.3 REQUIREMENTS FOR DUKE STONE

REQUIREMENTS FOR DUKE STONE

Outlined below is the standard for Duke Stone. The decision to accept or reject a wall sample will be based on the following criterion: the stone's shape, its size (dimensional proportions), jointing, as well as the mixing of the stone sizes and color in the sample wall.*

STONE SHAPE: Each stone shall be rectilinear in shape. The stone's top and bottom edges must be parallel. The right and left edges of the stone are not required to be at right angles to its base and top, but end angles greater than 25 degrees should not be used. To achieve a more uniformed surface, "hand-worked" stone faces are allowed (and sometimes encouraged). The exposed ends of a cornerstone may be "hand-worked" to get a proper right angle face. Special corner conditions (i.e. those corners that are not a right angle) will require a "hand-worked" face to achieve the correct angle.

STONE SIZE: Each stone size is governed by height to width proportions that may be either: 1 to 4, 1 to 5, or 1 to 6 (height to base). Also the vertical rise (or height) of the any stone should not be more than 6 inches. Therefore, a stone's width (its base) is dependent upon its height. When the stone is laid as a veneer wall, the stone should have a depth of 10" or greater.

JOINTS & POINTING: All joint edges shall be parallel. This requirement is especially important when jointing stones that have non-perpendicular ends (i.e. the end of a stone that is not at a right angle to its base). The traditional "struck joint" (as used on the original West Campus buildings) will have joints not smaller than 1" nor wider than 1 ½". The "racked joint" (as seen in the Sarah P. Duke Gardens entry gates) will have joints not be smaller than ½" nor wider than 1".

SIZE MIX: The differing stone sizes should be equally mixed as a patchwork throughout the wall face. However, the largest and best-shaped stones should be saved for the outside corners.

COLOR MIX: It has been said, "... the stone had seven primary colors and seventeen different shades of color." Therefore, the colors (mostly referred to as either gray, blue, or brown) should be equally mixed as a patchwork of color throughout the face of the wall.

CAUTION: Great care must be given to keeping the stone's face clean of any... repeat... any mortar, or mortar dust, left on the stone will bond to the face and never come clean. Examples of this problem can be found on the original stone work as well as new work. Attempts to remove or clean the face are fruitless.

* Office of Project Management, Duke University, C. Ray Walker, AIA, Staff Architect, Revised April 2003.

5.4 OTHER

HISTORIC DRAWINGS & PHOTOS

Miscellaneous historic images to aid in guiding future work or understanding key references on campus.



Duke Chapel, Abele rendering



East Campus Quad, Abele rendering



West Campus Union, Abele rendering



Abele Quad, Abele rendering



Perkins Library, Abele rendering



Julian Abele



Abele Quad looking at Davison



Flowers



Craven quad

5.4 OTHER

UNIVERSITY ILLUSTRATIVE PLANS

See the Office of the University Architect at Duke University's website for additional information.



Duke University Illustrative Master Plan 2000



Duke University Illustrative Master Plan Update, The 2024 Plan

5.4 OTHER

PHOTO GRID

Miscellaneous features to aid in guiding future work or understanding key references on campus.



Duke Stone improper on the left and proper on the right



Material detail, Schwartz-Butters Athletic Center



New Abele Quad pedestrian light pole



Structural expression, traditional parapet



Door stain color - Chapel doors only



Door stain color - Abele Quad standard door



Interior public space, slate with wood, Traditional



Reuse of Gargoyle detail - WCU



Transparency - WCU glass

5.4 OHTER

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