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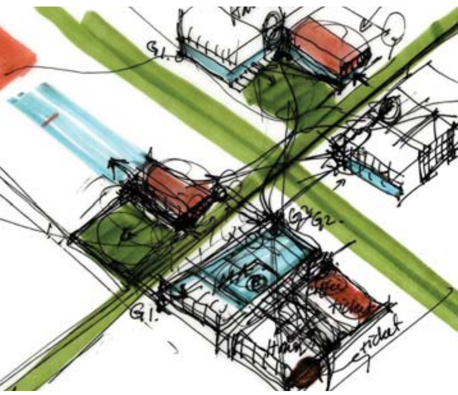

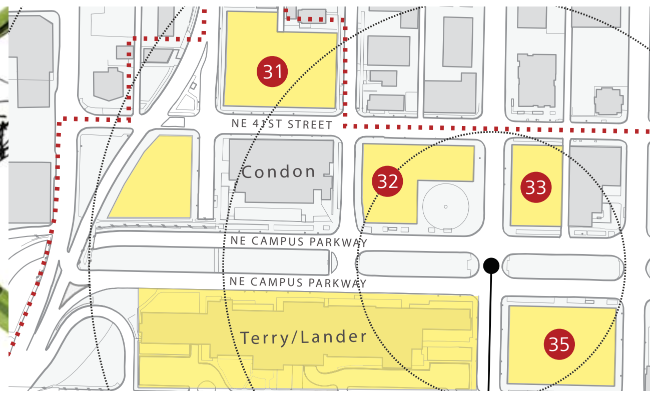

PREDESIGN DESIGN REPORT ::

STUDENT HOUSING PHASE I
UNIVERSITY OF WASHINGTON
SEATTLE, WASHINGTON

30 MARCH 2009



INTRODUCTION

TABLE OF CONTENTS

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EXECUTIVE SUMMARY

INTRODUCTION

PURPOSE AND SCOPE OF THE PREDESIGN STUDY

Student Housing Phase I represents the first step in the implementation of the University of Washington 2008 Comprehensive Housing Master Plan. This plan represents a fundamental shift in University housing policy and establishes the goal to "provide quality housing for its freshmen enrollment while creating a 4-year live-on campus culture."

The 1,750 Phase I beds planned for sites 31W, 32W, 33W and 35W in the UW West Campus will primarily serve to ease crowded living conditions in existing residence halls. Future phases will add approximately 850 apartment beds at sites 29W and 30W, and will renovate all existing residence halls.

In addition to residential units, a wide variety of support functions are planned for Phase I that will serve to enhance residential life and contribute to a vibrant neighborhood beyond. Careful placement of these functions at the base of new and renovated projects will set the tone for future development and help establish the West Campus as a Student Village, ultimately serving as the home for nearly 4,500 student residents.

The purpose of this Predesign Study is as follows:

:: Clearly Define the needs and issues required to be addressed by the project

:: Explore alternative solutions

:: Recommend a preferred solution

:: Confirm the project scope and budget

:: Establish a project work plan and agreement for the design of these facilities

The design team performed the following tasks in pursuit of these objectives:

:: Analyze programmatic needs and requirements for planned HFS functions

:: Analyze the project site(s) from both macro (urban planning) and micro (individual site conditions) perspectives.

:: Develop functional and technical programs for the planned uses, including future planned support functions at Terry Lander.

:: Analyze systems and strategies supporting the projects sustainability goals.

:: Develop a project concept including recommended programmatic distribution, building organization and bed count, building massing, and site sections.

:: Develop a recommended framework for enhancements to the urban fabric

:: Develop a project schedule, budget and work plan.


NE CAMPUS PARKWAY
BROOKLYN AVENUE NE

PROJECT GOALS

In addition to supporting University of Washington goals identified in the Campus Master Plan and the Comprehensive Housing Master Plan, Student Housing Phase I strives to accomplish the following broad goals:

1. Create environments that maximize safety and security for residents both in and adjacent to the residential buildings.
2. Create program and space that will provide our residents with a significantly higher quality of life and greatly enhanced living/learning experiences.
3. Create buildings with extremely low energy requirements. The project will meet the AIA 2030 Challenge and achieve a minimum LEED Gold rating. For buildings in 2011/2012 the energy use should be lowered by 60% below baseline average.
4. Create an urban center within the UW campus that can positively inspire/influence the U-District, can create place with a direct connection to the City and provide new direction to the evolving UW Campus Plan.
5. Exercise fiscal responsibility. Develop strategies that perform multiple functions, maximizing performance and value.

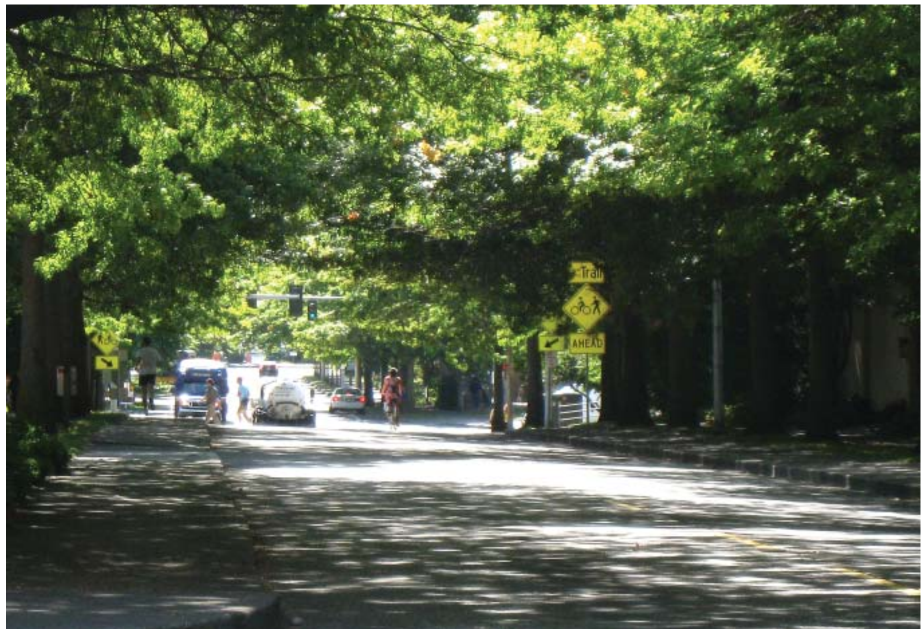
PROJECT SCOPE

The project consists of design and construction of four new residence halls located on sites 31W, 32W, 33W and 35W of the University of Washington West Campus, as designated in the UW Campus Master Plan (CMP).

The project will include approximately 1,750 new residential beds divided among single and double occupancy rooms with private baths. Each building will also include a variety of support spaces that will serve both its residents and the larger University residential community. These include: student lounge space, study space, HFS classrooms, a 200-seat auditorium, café, health and fitness center and administrative offices. The programmatic layout and design of each building and site will contribute to the broader purpose of creating a safe, vibrant, student-centered community within the West Campus. Offsite improvements, though limited to areas adjacent to the project sites, will support the long range vision for important streets and urban spaces identified in the CMP and analyzed in this report.

Buildings will utilize 'five-over-two' construction type commonly used for multi-family residential construction in the City of Seattle: Five stories of Type V wood framed construction (R1-R5) over two stories of Type I concrete construction (G1-G2), portions of which will be below grade. Buildings will comply with the height limits established for this construction type (75') and by the Major Institutional Overlay zoning requirements (65-105'). Total planned building area for the four sites is approximately 580,800 gross square feet.

The estimated Total Project Cost is $158 million, which includes an estimated cost of construction of $103 million. Construction and operation of the facilities will be supported by residential rents.



MAJOR PROJECT MILESTONES

The project will occur in two distinct phases, each with its own schedule. Phase IA will include Sites 31W and 33W and target occupancy in July 2011. Phase IB will include Sites 32W and 35W and target occupancy in July 2012. It is anticipated that two builders will complete the construction work. Following is a summary of major project milestones:

PREDESIGN:	Oct 2008 – Jan 2009
ENTITLEMENTS, PHASE IA & 1B:	
Alley Vacation	Feb 2009 – Sep 2009
SEPA Review	Mar 2009 – Oct 2009
MUP + Minor Plan Changes	Jul 2009 – Feb 2010
PHASE IA:	
Design & Bidding	Feb 2009 – Feb 2010
Construction	Mar 2010 – July 2011
Closeout & Occupancy	Jul 2011 – Sep 2011
PHASE IB:	
Design & Bidding	Apr2009 – Nov 2010
Construction	Jan 2011 to Jul 2012
Closeout & Occupancy	Jul 2012 – Sept 2012

PROJECT ASSUMPTIONS

In addition to scope, budget and schedule assumptions listed above, the following assumptions serve as the basis for this report:

:: The project will provide a minimum of 1700 new residential beds. A minimum of 122 beds will be in single-occupancy rooms

:: The project targets returning students: sophomore or above

:: Typical unit types will be single and double occupancy rooms with private baths.

:: The majority of beds will be located on floors R1-R5, however residential units should be located on level G2 where feasible to maximize bed count

:: Feasibility is determined by adjacency to grade (for security reasons); no G2 residential units are placed where grade is expected to be less than 8 feet below floor level.

:: Typical support functions should be evenly dispersed among residence halls

:: Terry Lander will continue to serve as the primary food service facility for the West Campus.

:: New residence halls will not have a manned service desk; a 'super desk' serving all West Campus residence halls will be located in Terry-Lander.

:: HFS will utilize the new residence halls to support summer conference programs

:: The University owns the existing Cavalier Apartment building at site 35W.

:: Each site will be cleared of existing structures as part of construction duration

:: Approximately 100 of the existing 143 commuter parking stalls at Site 31W will be replaced on-site by structured parking.

:: The specimen American Elm tree at site 32W will be preserved

:: The University will likely pursue vacation of existing alleys at Sites 31W, 32W and 35W. The alley at Site 33W was previously vacated.

:: The project will utilize the General Contractor/Construction Manager (GC/CM) method of construction procurement

CONCEPT SUMMARY

WEST CAMPUS HOUSING SITE PLAN

The initial phase of the West Campus Residence Hall project supports housing for approximately 1,750 students within four parcels (31W, 32W, 33W and 35W). Height and massing are limited by both zoning and construction type to yield buildings of 6 to 7 stories. Access to daylight for residential units demands that portions of the site remain open, creating light courts and articulation to the facades. Ground levels G1 and G2 are maximized while providing open pedestrian ways aligning with the alley structure of the adjacent urban context and creating diagonal movement through the blocks.

The following principles were significant drivers for the conceptual planning and site development for this project; it is hoped that these principles will also serve as drivers for future development of the West Campus.

PEDESTRIAN ENVIRONMENT

Providing a safe and healthy environment for pedestrians is a priority for the West Campus. A series of transit strategies which consider the pedestrian first will support an environment that is traffic calming. To the extent possible, streets are narrowed to minimum standards to slow traffic speed. Bulb-outs are located at all street crossings to minimize crossing distances. Street trees and planting buffers for storm water treatment will create an environment for the pedestrian that is sheltered from vehicles and aesthetically pleasing.

BICYCLE ENVIRONMENT

The west campus will consider the bicyclist second in priority in transit decisions. A new bike lane is proposed northbound on Brooklyn Avenue NE and a sharrow lane will be provided southbound (downhill) adjacent to sites 32W, 33W and 35W. NE 40th Street will continue to provide a dedicated bike lane, providing a direct connection from the Burke Gilman Trail into the main campus. Additional bike and sharrow lanes will be considered in the development of the campus. In addition, convenient bike parking will be located within each building.

PUBLIC TRANSPORTATION

Buses dominate the vehicle environment in the current West campus and provide a vital transportation mode for commuters and residents. Bus maneuvering, power and layover requirements will drive many urban design solutions. Improved and building-integrated bus shelters will be provided at the two major bus stops along NE Campus Parkway adjacent to sites 32W and 35W.

VEHICULAR CIRCULATION AND PARKING

Slowing traffic throughout this district will provide a safer environment for pedestrians. To accomplish this, streets will be narrowed to minimum standards and street parking will be maintained along the perimeter of each site. Designated load/unload areas will be demarcated for each site. Off-street ADA parking will be provided within each site.

OPEN SPACE

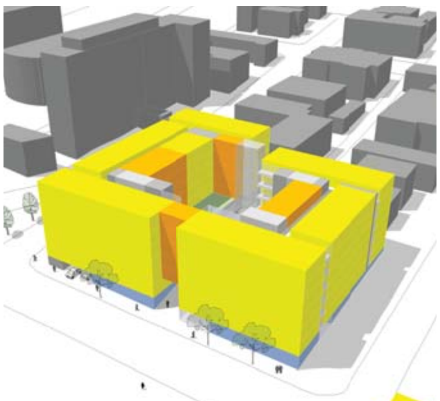
Open space within an urban environment is extremely valuable and its quality sets the tone for the campus. Improvements to NE Campus Parkway and the elm tree garden at site 32W will provide a strong identity and character for the West Campus.

NE Campus Parkway may be re-designed as a gateway to the University and as a functional environmental element. Travel lanes will be reduced and the medians flanking the intersection of NE Campus Parkway and Brooklyn Avenue NE will be improved to support the increased pedestrian crossing of this intersection, providing a focal point to the development and transforming this space into an amenity.

Brooklyn Avenue NE will be upgraded to “Green Street” standards, increasing its planting buffer and providing street trees. NE 40th & 41st Street may also be supplemented with street trees and planting beds which will provide a greener and cooler urban environment. University Avenue NE along site 35W may be narrowed and may be “greened” to support the goals of the Green Factor.

SOLAR ORIENTATION

An effort has been made to orient a majority of the residential bedrooms to either the north or south to increase thermal comfort. In all sites, however, a percentage of the beds will face either east or west. Sun studies and shading will be evaluated during design.

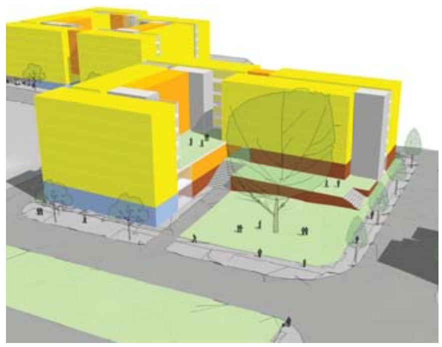


SITE 31W

Site 31W is located to the north of Condon Hall and will support 524 beds, HFS classrooms, HFS offices, support services and commuter parking.

The building design of site 31W orients all residential units outward and draws community functions inward to a shared "open center" defined by common spaces and a pedestrian dominated alley. The site is designed to connect to the main campus and other west campus amenities by placing its main entry in the southeast corner of the site. This entry will support all components of the building program and easily connect its occupants into the pedestrian flow along 41st Street NE.

The site will maintain an alley easement running north-south bisecting the site at the G2 level, dropping down to NE 41st Avenue The alley will be designed primarily as a pedestrian environment but will incorporate vehicle standards for width and height clearances.



SITE 32W

Site 32W is prominently located along NE Campus Parkway at the intersection of Brooklyn Avenue NE. The site will support 407 beds, a café, the wellness center, HFS classrooms, the drama studio, support services and an additional activating space.

The site will provide a significant open space for the west campus and will support the existing American Elm tree on the southeast corner of the site. The elm tree and the garden that surrounds it provide a focal point for the organization of the residence hall and ground the activating spaces which flank it.

Solar orientation allows the building wing to the north of the garden to be dappled in sunlight and provides a prime location for the café and terrace. Under this and to the west of the garden, the wellness center further complements the activated space.

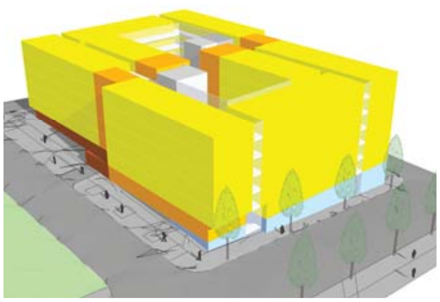
Open pedestrian walkways and terraces at level G1 and G2 provide pedestrian access though the block and allow the residence hall to serve as a gateway to other sites in the West Campus.

SITE 33W

Site 33W is prominently located along NE Campus Parkway at the intersection of Brooklyn Avenue NE. The site will support 237 beds, the resource center, HFS classrooms and offices.

The smallest building site in phase I, the design efficiently supports ideal residential community sizes of approximately 45-50 students on each floor, supporting student life and community identity.

The shared commons functions for the residents are entered directly from the main entry at G1. These common areas look out to the west and benefit from the improved Brooklyn Green Street and the tree garden beyond. A terrace at the R1 level also orients to the west connecting both interior and exterior commons spaces to a shared focal point.

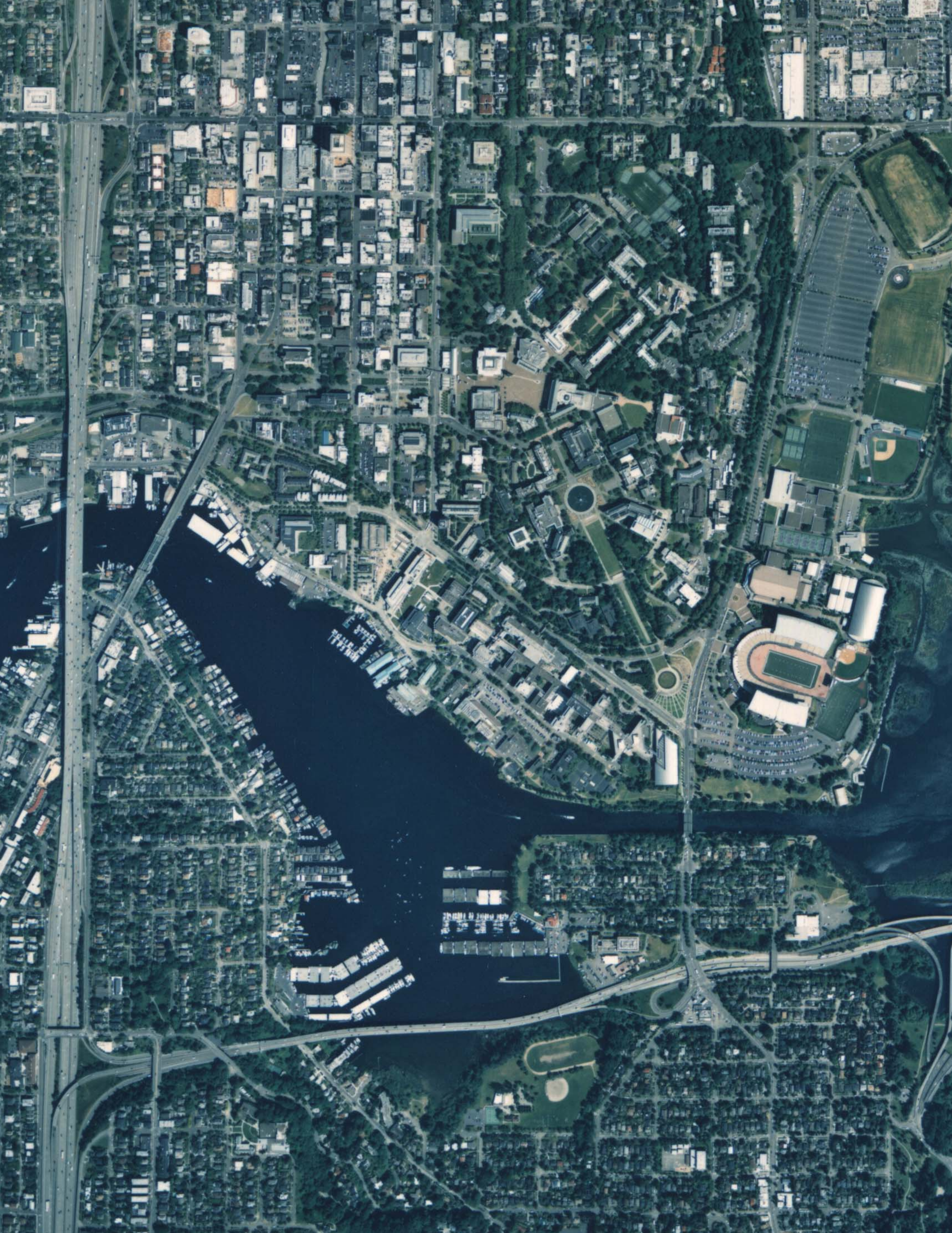


SITE 35W

Site 35W is prominently located along NE Campus Parkway at the intersection of Brooklyn Avenue NE. The site will support 580 beds, a shared use theater, HFS classrooms, administrative office space and the UW Arts Ticket Office. A small Quick Service Restaurant (QSR) will also be provided to support both the theater and the bus stop.

The ground levels of site 35W have a unique opportunity to support pedestrian flows of students through open passageways; connecting the west entry of the main campus at NE 40th Street to the new residence halls north and west of the site. These open walkway cut-throughs connect public and private functions of the site at the ground levels of G1 and G2.

Designed to focus common spaces, the building orients most residential units outward and draws community functions inward to a shared “open center” defined by common spaces and terraces.



PROJECT SUMMARY

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PREVIOUS PAGE | UW CAMPUS AERIAL

PROJECT DESCRIPTION

PROJECT TITLE
Student Housing Phase I

AGENCY
University of Washington
Housing and Food Services

UW PROJECT NUMBER
202707

PROJECT LOCATION
University of Washington West Campus

UW Campus Master Plan site 31W, 32, 33W, and 35 per the UW Campus Master Plan (CMP)

PROJECT SCOPE
New construction of four student residence halls containing approximately 1,750 new residential beds and supporting uses within approximately 580,800 gross square feet of building area.

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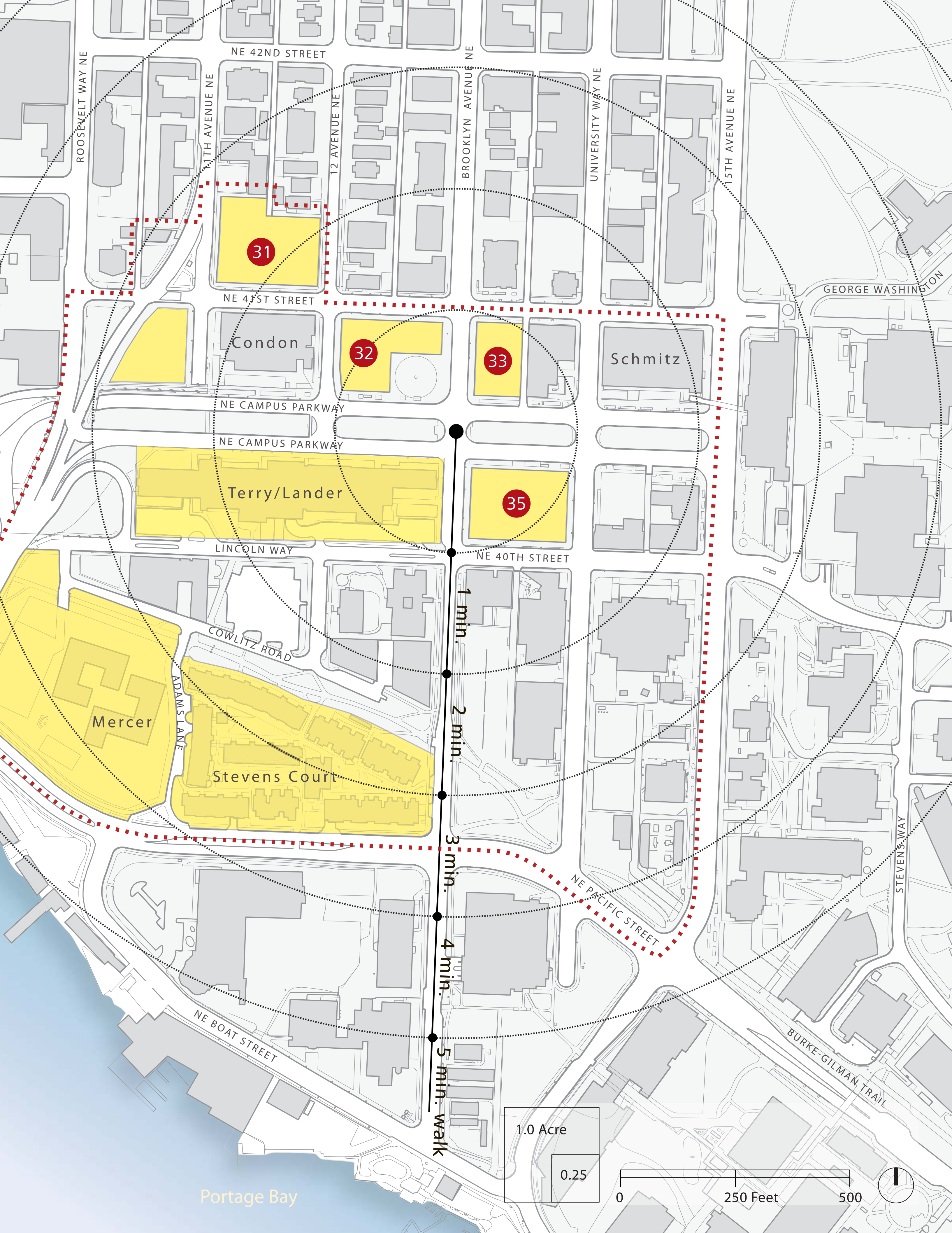
>
SITE DIAGRAM | UW WEST CAMPUS

LEGEND

- Walking Distances (.25 miles = 5 minutes)
- Residential Halls (Existing and Planned)
- Current Residential Projects
- West Campus Boundary



NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
GEORGE WASHINGTON
NE 41ST STREET
31
32
33
35
Condon
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
Terry/Lander
LINCOLN WAY
NE 40TH STREET
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
1 min.
2 min.
3 min.
4 min.
5 min. walk
NE PACIFIC STREET
STEVENS WAY
BURKE-GILMAN TRAIL
NE BOAT STREET
Portage Bay
1.0 Acre
0.25
0
250 Feet
500

PROJECT GOALS

INTENDED USES AND CAPACITY

Student Housing Phase I represents the first step in the implementation of the University of Washington 2008 Comprehensive Housing Master Plan. This plan represents a significant shift in University housing policy and establishes the goal to "provide quality housing for its freshmen enrollment while creating a four-year live-on campus culture."

The 1,700+ Phase I beds planned for sites 31W, 32W, 33W and 35W will primarily serve to ease crowded living conditions in existing residence halls. Future phases will add approximately 850 apartment beds at sites 29W and 30W, and will renovate all existing residence halls.

In addition to residential units, a wide variety of support functions are planned for Phase I that will serve to enhance residential life and contribute to a vibrant neighborhood beyond. Each residence hall will house basic support functions: lounges, laundry, group study space, etc. Other support functions will serve the broader residential community: café, Wellness/Fitness Center, HFS classrooms, and a 200 seat auditorium/theater. A renovated Terry Lander (future phase) will continue to provide dining and primary student services to student residents, and will include a small urban market, cementing its place as the hub of the West Campus.

Careful placement of these public and support functions at the base of new and renovated projects will set the tone for future development and help establish the West Campus as a Student Village, ultimately serving as the home for nearly 4,500 student residents.

UW REQUIREMENTS

In addition to supporting University of Washington goals identified in the Campus Master Plan and the Comprehensive Housing Master Plan, Student Housing Phase I strives to accomplish the following broad goals:

1. Create environments that maximize safety and security for residents both in and adjacent to the residential buildings.

:: Provide a safe space for students to explore opportunities for growth and learning.

:: Strive for physical and technological solutions to create safe buildings.

:: While maintaining a sense of academic openness and exchange of ideas for members of the university community and particularly for the residential student, create solutions which will inhibit intrusion by non community members.

:: Provide for an increasing level of security as one moves toward the living unit which continually narrows community population size.

:: Provide defensible space and create visibly safe environments–lighting, approaches, site lines, Crime Prevention Through Environmental Design (CPTED) principles.

2. Create program and space that will provide residents with a significantly higher quality of life and greatly enhanced living/learning experiences.

:: Provide comfortable density–design should incorporate the densest possible population solution and low assignable to gross ratio with the maximum amount of real or perceived space. The student room must be sized and designed to be competitive with College and University Market leaders and deliver value.

RIGHT
View from NE Campus Parkway to main campus

:: Create spaces that are conducive for group learning, collaboration and serendipitous encounters.

:: Create circulation leading to chance social and educational happenings which bring people into the stream of involvement.

:: Create spaces that facilitate educational, social and civic experience.

:: Strive for a global feel rooted in University of Washington culture.

:: Provide reflective, cocooning, contemplative, retreat spaces in living unit, floor spaces and building spaces.

:: Allow for flexibility of room uses within a defined range.

:: Provide individuals with a maximum control over their environment (temperature, space, fresh air, access to public space, etc.).

:: The living environment should provide the student with opportunities to balance mind, body and spirit.

:: Technology for building controls and educational and social pursuits is paramount for this generation of students. A successful project will weave virtual and real experiences into daily living.

:: The living environment should be welcoming for all residents. A high priority will be placed on the inclusion of and access for diverse populations, including the physically challenged.

3. Create buildings with extremely low energy requirements. The project will meet the AIA 2030 Challenge and achieve a minimum LEED Gold rating. For buildings in 2011/2012 the energy use should be lowered by 60% below baseline average.

:: Low energy consumption and reduction of other resources is a primary project paradigm.

:: Leverage the design group's experience; implement tried and true, cost effective low energy concepts and strategies into the project.

:: Exceed the status quo by initiating new standards and strategies that will provide energy reduction, short or long term payback and reduce environmental hazards.

:: Create a sustainable community; meet student demand for sustainability, promote good stewardship and environmental sensibility.

4. Create an urban center within the University of Washington campus that can positively inspire/influence the University District, can create place with a direct connection to the City and provide new direction to the evolving UW Campus Plan.

5. Exercise fiscal responsibility. The project will be self-sustaining, supported by rents and fees. Develop strategies and systems that perform multiple functions, maximizing performance and value.

LEFT
NE Campus Parkway Vista

WEST CAMPUS PLACEMAKING

Phase I represents a major step forward in the development of the UW West Campus. Three of the four project sites will front NE Campus Parkway, one of three significant vistas identified in the Campus Master Plan. Once envisioned as a formal approach to campus, it currently serves primarily as a transit hub with little pedestrian activity, falling well short of its functional and aesthetic potential.

NE Campus Parkway lies at the north end of the West Campus and abuts the University District to the north. University Way NE, lying to the east of sites 33W and 35W, serves as the major commercial artery for the University District. Brooklyn Avenue NE, one block to the west, has a more residential character, but one no less significant. Brooklyn is a key pedestrian artery, stretching from Ravenna Park at the north end of the U-District, then connecting the University (formerly Safeco) Tower at NE 45th Street with the West Campus and NE Campus Parkway. It then continues further south, becoming the only street in the district to extend to Portage Bay at its southern terminus.

Thus the intersection of Brooklyn and Campus Parkway, touching Terry Lander, three of the new residence halls and the American Elm tree at site 32W delivers enormous potential (and responsibility) to this project. Careful planning (and execution) can create a vibrant urban hub at this intersection and lay the groundwork for Campus Parkway and the West Campus to ultimately realize the potential envisioned in the University of Washington CMP.

PROJECT BACKGROUND

Existing Facilities Affected

Following is a summary of existing facilities located on each proposed site. All properties are currently owned by UW unless noted otherwise.

Site 31W contains a commuter parking lot; its west, north and east property lines serve as the boundary for the West Campus. Setbacks are established on these edges by the CMP for properties bordering residential zones. The site is bisected in the north-south direction by an alley that is identified as a candidate for vacation in the CMP. Underground utilities exist in this alley that would require relocation if vacation is pursued. The site currently contains approximately 143 parking stalls operated by UW Parking Services. A portion of these stalls will be replaced in the development of this site; UW Housing and Food Services (HFS) will pay a fee to UW Parking Services for each stall that is not replaced.

Site 32W fronts NE Campus Parkway and is home to the American Elm tree. This tree is designated by the CMP for preservation. The western half of the site houses five single family residences, converted to offices by the University. Several are currently unoccupied in anticipation of this project. The Brooklyn Building, similarly unoccupied masonry apartment building, sits on the northeast corner of the site. All structures will be demolished by UW prior to the start of the project. The southeast corner, including the area around the elm tree, is unimproved, serving as a de facto parking lot. An alley bisects the lot to the north-south and is identified as a candidate for vacation in the CMP. The CMP also establishes setbacks along the northern property line of Site 32W, adjacent to a non-UW residential zone.

The buildable portion of **Site 33W** includes the western half of the city block occupied by the newly renovated Playhouse Theater to the northeast and the UW Employment Office to the southeast. A University-owned service drive bisects this block and borders

RIGHT
Terry Lander Eleven 01 Cafe

the project site to the east; it was previously vacated. The Playhouse Theater utilizes the alley for loading/unloading activities; this function must be maintained. A required egress door serving the UW Employment Office also fronts the alley. The western (buildable) half of the site contains a parking lot that served as the staging area for the Playhouse Theater project.

The Cavalier Apartments, a privately owned concrete and masonry building, occupies the northwest corner of **Site 35W**. The University has purchased the Cavalier. This study assumes that the Cavalier will be demolished, however further study of this building is underway to confirm the viability of this approach. The UW Arts Ticket Office occupies the building on the southeast corner of this lot. This building is planned for demolition; the Arts Ticket Office will be relocated at street level within one of the new residence halls. The remainder of Site 35W includes UW-owned surface parking. This site is also bisected in the north-south direction by an alley identified as a candidate for vacation in the Campus Master Plan.

Terry and Lander, existing residence halls, are located on Campus Parkway, east of Site 35W. Phase I will have the short-term effect of a much needed reduction of residents, eliminating the need for triple occupancy rooms. Ground floor levels of Terry Lander will serve increasingly important functions, housing the primary food service facility for the West Campus as well as a planned 'super desk', the primary student resident service desk. Some programs currently housed in Terry-Lander (HFS administrative offices, for example) will relocate to the new residence halls at the completion of Phase I, clearing the way for future renovation activities. Terry-Lander will be renovated following the completion of Phase I.

Campus Parkway, including the median strip, is located in City of Seattle right-of-way. A UW utility vault/tunnel currently runs in the median strip and contains the following utilities and services: campus steam, power, communications, fire alarm and cable TV. It is anticipated that Phase I projects will need to access some or all of these services causing temporary/intermittent traffic disruption during construction. Further, it is anticipated that curbs, gutters and sidewalks at each site will be replaced/reconfigured as part of Phase I.

Related Work Leading To Project

The 2003 University of Washington CMP established a majority of the guidelines and criteria for development of the new West Campus Residence Halls. The UW campus is governed by the City of Seattle Major Institutional Overlay (MIO) zone which supersedes underlying zoning. Any desired revision to the CMP requirements may require an amendment to the UW Major Institutional Master Plan (refer to Section 3, Code Analysis).

The West Campus lies within the University Community Urban Center (UCUC). During the mid 1990's, a series of community planning efforts with UW students, faculty and staff and resulted in the University Community Urban Center Plan. The CMP includes a section that clearly identifies how it's provisions address the goals of the UCUC Plan, as well as an Adoption Matrix that includes strategies supporting these goals that can be carried-out as development proceeds.

In 2008, UW HFS completed the UW Comprehensive Housing Master Plan (CHMP). This plan represents the foundation for Phase I and the next fifteen years of HFS expansion and redevelopment. Site 31W was not included in the CHMP; its addition to phase I was necessary to achieve desired bed count by confirmation the Elm at Site 32W should be saved. Like any good master plan, the CHMP functions as a living document.

RIGHT
West Campus

RECOMMENDED PROJECT PROPOSAL

PROJECT SCOPE

The project consists of design and construction of four new residence halls located on sites 31W, 32W, 33W and 35W of the University of Washington West Campus, as designated in the CMP.

The project will include approximately 1,750 new residential beds divided among single and double occupancy rooms with private baths. Each building will also include a variety of support spaces that will serve varying sets and subsets of the campus community, as listed below; refer to Section 3 Program Analysis for additional detail.

Community Subset	Representative Uses
Residential Floor	Floor Lounge, Group Study
Residence Hall	Building Lounge, Group Kitchen, Laundry, Mail
Residential Community	Live/Learn areas, Resource Room, Music Practice, Health & Fitness Center, HFS Administrative Offices
Campus Community	Café, Auditorium, UW Arts Ticket Office, Commuter Parking

The programmatic layout and design of each building and site will contribute to the broader purpose of creating a safe, vibrant, student-centered community within the West Campus. Off-site improvements, though limited to areas adjacent to the project sites, will support the long-range vision for important streets and urban spaces identified in the CMP and analyzed in this report.

Buildings will utilize 'five-over-two' construction type commonly used for residential construction in the City of Seattle: Five stories of Type VA wood framed construction over two stories of Type I cast-in-place concrete construction, portions of which will be below grade. Buildings will comply with the height limits established for this construction type (75') and by the MIO zoning requirements (65-105'). Total planned building area for the four sites is approximately 580,800 gross square feet.

The estimated Total Project Cost is $158 million which includes an estimated cost of construction of $103 million. The estimated useful life of the capital improvements is 50 years.

MAJOR PROJECT MILESTONES

The project will occur in two distinct phases, each with its own schedule and builder. Phase IA will include Sites 32W and 33W and target occupancy in July 2011. Phase IB will include Sites 31W and 35W and target occupancy in July 2012. Following is a summary of major project milestones:

PREDESIGN	October 2008 – January 2009
Entitlements Phase IA & 1B	
Alley Vacation	February 2009 – September 2009
SEPA[1] Review	March 2009 – October 2009
MUP[2]	July 2009 – February 2010
Phase IA	
Design	February 2009 – December 2009
Building Permit	October 2010 – March 2010
Bidding	January 2010– February 2010
Construction	March 2010 – July 2011
Closeout and Occupancy	July 2011 – September 2011
Phase IB	
Design	April 2009 – June 2010
Building Permit	April 2010 – September 2010
Bidding	October 2010 – November 2010
Construction	January 2011 – July 2012
Closeout and Occupancy	July 2012 – September 2012

[1] State Environmental Policy Act
[2] Master Use Permit

PROJECT MANAGEMENT

MANAGEMENT ORGANIZATION

The UW Capital Projects Office (CPO) will manage the design and construction of this project. The Associate Vice President for Capital Projects is responsible for overall organization management. CPO provides programming, pre-design, cost estimating, design and construction services for building alterations, additions, new construction and grounds improvements for the Seattle and Tacoma campuses and remote field research stations. Projects range in size from a few thousand dollars to over $100 million and have numbered over 250 in each of the last five years.

CPO Project Managers organize and administer the work of outside design consultants and public works contractors. They follow projects all the way through construction and work closely with clients, project architects, designers and consultants. In addition, they work with CPO construction coordinators and contractors to ensure projects are on time and within budget. The Capital Projects Office's professional staff includes architects, engineers, cost estimators, project accounting staff, interior designers, an architectural advisor, a landscape architect, contract specialist and an environmental planner. All of these resources are available to university units needing assistance.

The cost for the University's management of the design and construction is included in the C-100 form (not included in this report).

CONTRACT/DELIVERY METHOD

The University of Washington proposes to use the General Contractor/Construction Manager (GC/CM) method, as authorized by the State Legislature in Title 39 RCW, to accomplish this project in the most cost-effective manner. It is anticipated that GC/CM contracts will be organized to include 31W/32W in one package and 33W/35W in another.

UW CONSULTANTS

Development Management
The Seneca Real Estate Group/
Spectrum Development Solutions

Environmental Consultant
The Blumen Group

Land Surveyor
Bush, Roed, Hitchings, Inc.

DESIGN CONSULTANTS & SUBCONSULTANTS

Architect
Mahlum

Planning Consultant
Robert Sabbatini

Civil Engineer
SvR Design Company

Landscape Architects
Gustafson Guthrie Nichol, Ltd.

Structural Engineer
Coughlin Porter Lundeen

Mechanical, Electrical, and Plumbing Engineers
PAE Consulting Engineers

Acoustical Consulting
SSA Acoustics

ANTICIPATED PERMITS AND AUTHORIZATIONS

The following permit and review processes are anticipated for the Phase I Housing project:

:: Alley Vacation: sites 31W, 32W and 35W.

:: Master Plan Departure: proposed deviations from the Campus Master Plan will require review and approval.

:: State Environmental Policy Act (SEPA) review: requires preparation and approval of a Supplemental Environmental Impact Statement (SEIS) for the project. UW will serve as the SEPA lead agency.

:: City of Seattle Master Use Permit (MUP) for each project.

:: Design Review:
UW Architectural Commission
University Landscape Advisory Commission
City/University Community Advisory Committee (CUCAC).

:: Grading and Demolition Permit: required to clear the site of existing structures prior to construction (outside of contract for construction).

:: Excavation, Shoring and Foundations Permit: anticipated early permit submittal for Phase IA to allow for 2011 occupancy.

:: Building Permits: potential participation in Seattle DPD Priority Green Permitting pilot program.

:: Mechanical, Electrical Permits.

:: Public Utilities: water, sewer and stormwater connections.

:: King County Health Department Review: Plumbing, Food Service/Café.

:: Street Use/R.O.W. permits: Seattle Department of Transportation (SDOT).

UW REVIEW PROCESS

In addition to UW Design Review listed above, technical review and approval of design and construction work are the responsibility of UW Engineering Services. This division of UW Facilities Services provides expertise on architectural, mechanical, structural, electrical, communications, utilities, asbestos, environmental, and commissioning issues. In addition the UW departments of Computing & Communications and Environmental Health & Safety provide additional technical reviews, and UW Housing and Food Services will perform reviews relating to operational standards.

Due to the specific needs of residential construction and budget considerations, the project will not follow the Facilities Design Information (FDI) Manual, but will rely on the IBC as a basis for design. Details of implementation of this approach and impact to the review process are under discussion at the time of this writing and will be finalized prior to the start of design.

LEFT
NE Campus Parkway looking east

MAJOR OR LONG-LEAD EQUIPMENT

No major or long-lead equipment is anticipated at this time. The University and the design team will work closely with the GC/CM as the design progresses to identify any such items and make necessary adjustments to the project schedule.

SUMMARY OF RISKS

Schedule Risk

The Phase IA project schedule, required to achieve 2011 occupancy, is extremely aggressive. Maintaining this schedule will require efficient and effective design team progress and timely Owner decision-making and review. Project milestones must be strictly adhered to. The Student Housing Phase I Steering Committee has acknowledged, however, that unforeseen conditions may require additional study or consideration to ensure that the proper decisions are made and that the schedule may be modified accordingly.

The Committee also acknowledges that the City of Seattle entitlements process must go smoothly to maintain project schedule. The project team will prepare timely and complete submittals. However the review and approval schedule from that point is controlled by the jurisdiction.

CAMPUS MASTER PLAN COORDINATION

The project is generally consistent with the 2003 CMP, with one exception: setbacks are required at properties abutting residential zones at the MIO boundary. This condition occurs at the north property line of Sites 32W and 33W, and the west, north and east property lines of Site 31W.

The project will apply for a change to the CMP to eliminate required setbacks at Sites 32W and 33W, and at the east and west boundaries of Site 31W. The north setback at 31 will be maintained as the property directly abuts the residential uses–no street or right-of-way separates the properties. This setback modification is warranted and desirable. Adjacent uses, such as the Playhouse Theater, do not maintain this setback, and doing so would weaken the urban nature of these portions of the neighborhood.

Acquisition of the Cavalier Apartments was not anticipated in the CMP, however incorporating this site into the project should not trigger a departure from the CMP.

CAMPUS AND URBAN PLANNING

URBAN DESIGN

The University of Washington's West Campus is at the threshold of another transformative period in its history. The first period took place in the early 1950s with the construction of NE Campus Parkway followed by a period of rapid university development in the early 1960s. Over the years, the University has purchased numerous properties in the West Campus, becoming, with few exceptions, the controlling property owner. The area's street grid reflects the urban character of Seattle, while its residents and users are clearly associated with the University.

There is a unique opportunity to develop the West Campus to reflect a dual image and sense of place— that of the University of Washington and the City of Seattle. This intent is stated in the following goals:

:: Create a vibrant residential mixed-use neighborhood that serves the needs of the University of Washington students, staff, faculty, and the residents and users of the University Community Urban Center.

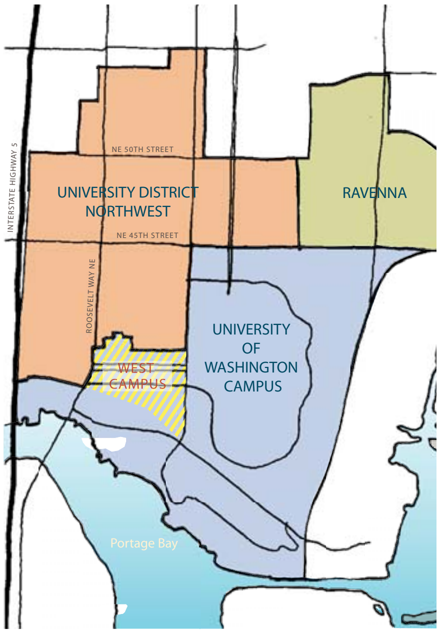
:: Evoke the culture and character of the University of Washington, providing students a memorable and life-shaping undergraduate experience.

:: Embrace and define the urban character of the West Campus, creating an inviting and welcoming, people-oriented urban community.

One key to achieving these goals is the creation of an active and safe urban setting. Buildings will embrace and animate the outdoor environment, offering fluidity of movement and visual transparency between ground floor uses and pedestrians. Landscape too can significantly change the West Campus's sense of place through a streetscape system that is a bio-filtering mechanism, is pedestrian friendly as a place to walk and linger and is memorable in its form and character. The greatest emblematic element in the West Campus is the NE Campus Parkway. Conceptualized in the 1920's, reflected in the 1948 campus master plan, and implemented in the early 1950's, it has yet to reach the stature of the quality of the University's three iconic outdoor spaces: the Rainier Vista, Memorial Way and The Quad. These spaces are memorable in the quality of the experience they create. They are of their time and physical context. NE Campus Parkway can achieve this too with the design of its landscape and the buildings that frame it. Its potential is palpable.

The design of the new residence halls and their landscapes will be the first step in achieving this vision. They will be informed by past planning and will set precedents for future development.

DISTRICT DIAGRAM
University Community Urban Center



RELATED POLICIES AND STUDIES

The planned university residence halls are part of the larger scheme of the University to develop supportive services in the West Campus and the City of Seattle's intent to foster an active and high-quality mixed-use pedestrian environment in the University Community Urban Center.

Current planning in the West Campus stems from two key planning documents: The University of Washington Master Plan, Seattle Campus completed in January 2003 (CMP) and the City of Seattle Comprehensive Plan, Towards a Sustainable Seattle (COMP Plan) completed in January 2005 with amendments thereafter. The Urban Village Element of Seattle's COMP Plan sets forth a strategy of increased densities in support of housing and employment to promote "concentrated, pedestrian-friendly mixed-use neighborhoods of varied intensities at appropriate locations throughout the city."

The University and adjacent properties including the West Campus comprise one of three villages that together make up the University Community Urban Center. The other two villages are Ravenna and the University District Northwest. The latter lies adjacent to the northern edge of the West Campus. (City of Seattle, Urban Village Element, 2005, pages 1.3 and 1.15) The City of Seattle guides both public and private investments to achieve this strategy. Increased transit access, such as the forthcoming light rail station just north of the West Campus is an example of these public investments.

The University and the City of Seattle have jointly and independently undertaken further studies in support of these two key documents, focusing on area-wide issues or specific programmatic needs. An example of the latter is university housing, the subject of this predesign document.

Implementation of the housing is a significant step in realizing the University and City's shared vision for the West Campus. The university's Housing and Food Services recognizes the need to plan and design housing for the West Campus in a manner that addresses their programmatic requirements and contributes to the larger planning goals of the University and the City, all, of course, within the limits of available financial resources. The following diagrams provide context for that vision. Refer to Section 3 - Code Analysis for additional information.

PLANNING CONTEXT

>
UW CAMPUS | WALKING DISTANCES AND FUTURE TRANSIT

LEGEND

- Major Institutional Overlay Zone
- Walking Distances (.25 mi = 5 minutes)
- Vistas
- Green Streets (Neighborhood Plan Recommendation)
- Burke-Gilman Trail
- Light Rail Station - Proposed
- Street Car Station - Proposed
- Commercial Zones
- West Campus
- West Campus Boundary

WEST CAMPUS

The CMP identifies the West Campus (1) as the area likely to absorb the majority of university development over the next few decades. (University of Washington, January 2003, page 13) The majority of the 46-acre area is bounded by NE 41st Street to the north, NE Pacific Street to the south, Roosevelt Way NE/University Bridge to the west, and 15th Avenue NE to the east. The university campus bounds the eastern side of 15th Avenue. A mixture of uses—residential, office, commercial—and university - comprise the area north of the West Campus.

The West Campus is part of the urban grid of the City of Seattle, unlike the university campus (2) that is composed of the meandering Stevens Way and pedestrian ways within expansive landscaped open space. North-south and east-west roads divide the West Campus into a series of blocks. Rectangular city blocks, approximately 200 by 260 feet, compose the northern area of the West Campus, while larger organic-shaped parcels to the south reflect the curvilinear route of the Burke Gilman Trail and NE Pacific Street.

Given its adjacencies, the West Campus will combine the urban scale and texture of its neighboring mixed-use district and the character of the University. Furthermore, the CMP encourages new development to create connections to both the University and the surrounding neighborhood, avoiding exclusionary, inward focus. (University of Washington, January 2003, page 13)

WALKING DISTANCES AND FUTURE TRANSIT

The university's Central Campus is close to West Campus. A three- to seven-minute walk from the Central Plaza brings one to the east and west boundaries of the West Campus. The University Tower (**3**), located on NE 45th Street and 12th Avenue NE is within a 10-minute walk of the Central Campus.(**4**) Future public transit improvements include a below-grade light-rail station (**5**) to be located on Brooklyn Avenue NE between NE 43rd and NE 45th Streets. A proposed streetcar line will run a north-south route through the area, with one stop (**6**) in the West Campus.

NE CAMPUS PARKWAY

NE Campus Parkway (**7**) forms the third major vista of the university, complementing the outwardly focused Rainier Vista and the inwardly focused view of The Quad. All three views originate in the Central Plaza, a.k.a. Red Square. The view of NE Campus Parkway is the least realized in terms of identity and quality of experience. Construction of the NE Campus Parkway in 1953 required the removal and reconfiguration of the city blocks it bisected. Its 50-foot-wide median is bounded on each side with 34-foot-wide pavement, comprised of two travel lanes and a parking/bus stop layover lane. Planting in the median varies from heavily forested to the west, near Roosevelt Way NE, to minimum on the east, near 15th NE. A variety of building types stand at different distances from the road edge. Buses, diesel and electric along with the electric overhead cable lines, dominate this central area of the West Campus. Little is provided for pedestrians.


ROOSEVELT WAY NE
11TH AVENUE NE
12TH AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
Memorial Way
10 min. walk
UW Tower
3
NE 43RD STREET
UW Bookstore
5
CAMPUS ZONE:
Liberal Arts
5 min.
4 min.
3 min.
2 min.
Liberal Arts Quad
NE 42ND STREET
NE 41ST STREET
6
Campus Parkway
7
4
2
1
NE 40TH STREET
9
UNIVERSITY BRIDGE
CAMPUS ZONE:
Science & Math
STEVENS WAY
BURKE-GILMAN TRAIL
8
Portage Bay Vista
CAMPUS ZONE:
Athletics
CAMPUS ZONE:
Medical
Rainier Vista
Portage Bay
5.0 Acres
1.0
0
500 Feet
1000

HISTORY

Lacking space to expand in Seattle in the late 1800's, the University of Washington acquired land to the north and in 1895 held classes in Denny Hall, its first building on the new campus. The adjoining neighborhood grew with the University and became a self-sufficient business and residential district. Over time, streets were renamed to reflect a the district's past neighborhood name—Brooklyn Avenue NE—and to reflect the area's commercial ties to the university—University Way NE. (Wikipedia, University District, Seattle, Washington)

In 1909, the Alaska-Yukon-Pacific World's Fair was held on the University of Washington campus. The exposition plan established several key elements apparent today in the university campus: the Rainier Vista (**8**, pg 5) and a western entry to the campus off NE 40th Street (**9**, pg 5) close to several streetcar lines. Over the years the University prepared several campus master plans and subarea plans.

OWNERSHIP - CURRENT

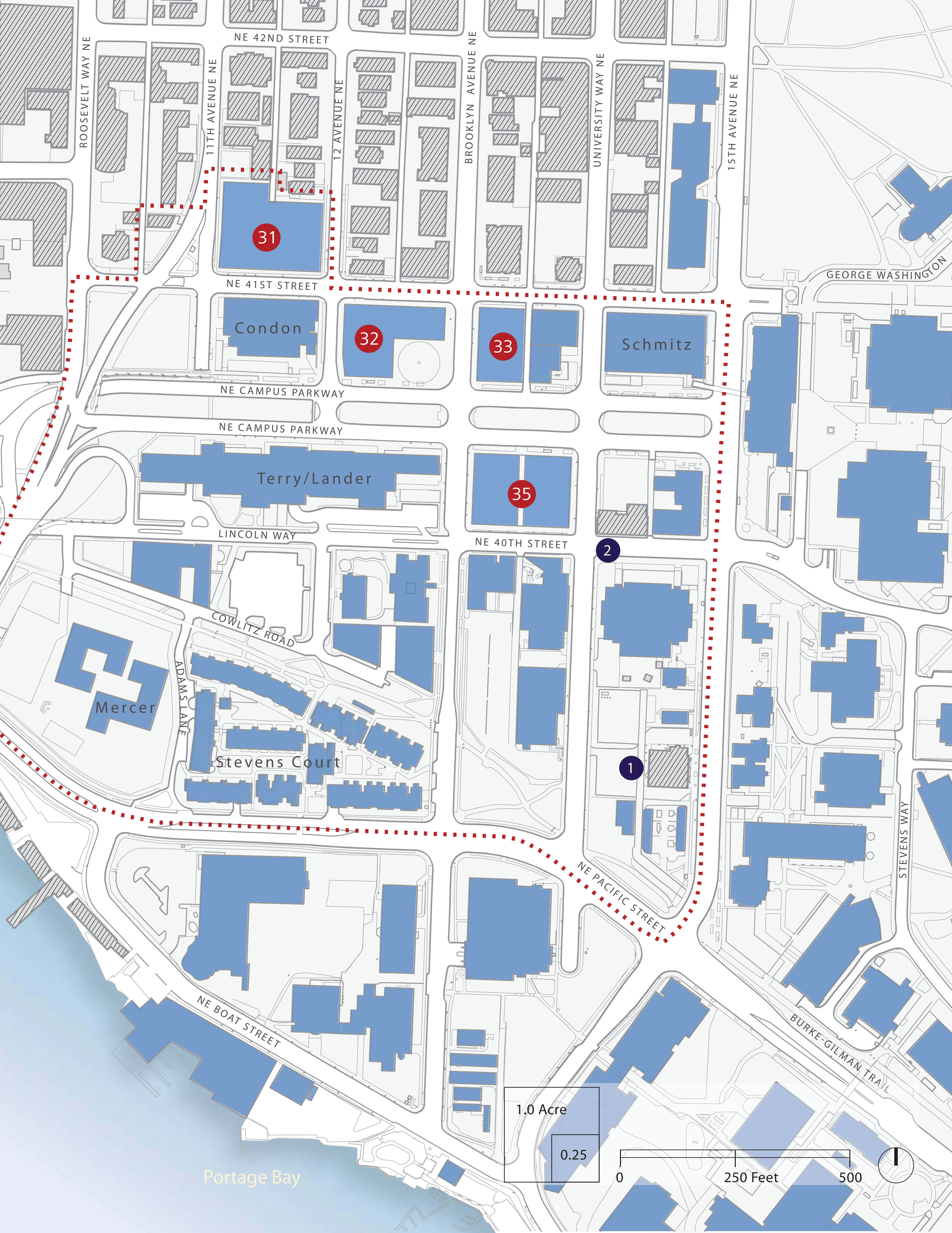
The University owns all but two parcels in the West Campus: The Latter Day Saints Church (**1**) and College Inn (**2**). The University is currently negotiating the purchase of the Cavalier Apartments. The majority of the streets, including NE Campus Parkway, are owned by the City of Seattle.

Because the University owns the majority of the land in the West Campus, it has the unique opportunity to transform the character and quality of the environment of the entire West Campus. Coordination with the City of Seattle and Metro Transit must be undertaken if the University wishes to achieve comprehensive improvement to the area. Overhead electric lines for buses and their support, for example, could possibly be coordinated into a more cohesive and simplified plan with less visual clutter.

>
OWNERSHIP | CURRENT

LEGEND

- University
- Private
- Current Residential Projects
- West Campus Boundary



NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
GEORGE WASHINGTON
31
NE 41ST STREET
Condon
32
33
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
Terry/Lander
35
LINCOLN WAY
NE 40TH STREET
2
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
1
NE PACIFIC STREET
STEVENS WAY
BURKE-GILMAN TRAIL
NE BOAT STREET
Portage Bay
1.0 Acre
0.25
0
250 Feet
500

FIGURE 1
Early photograph of UW West Campus Area

CAMPUS / URBAN PLANNING

HISTORICAL ANALYSIS

The history of the University of Washington's West Campus Area predates the relocation of the University from downtown Seattle to the present 'Lake Washington' Campus in 1895. Federal surveyors in 1855 noted the presence of a foot trail just north of Lake Union which connected early Native American settlements on Portage Bay (at the foot of what is now Brooklyn Ave) and Lake Washington. The area west of 15th Avenue Northeast was largely de-forested, cleared, graded, and platted by 1890 (Fig 1). It was named the Brooklyn neighborhood by the developer James Moore in an allusion to its separation from downtown Seattle by a body of water (similar to the relationship of Brooklyn, NY to Manhattan).

The UW campus moved to its present location in 1895, driven by limited classroom space and a growing student population. In the early years of the new campus, most students commuted by streetcar from housing in downtown Seattle and transferred at the University Station, an open shed at the corner of 42nd Street and University Way NE (Fig 2). The West campus area has therefore had an association with transportation infrastructure and an urban connection to downtown Seattle since the early days of the Lake Washington Campus.

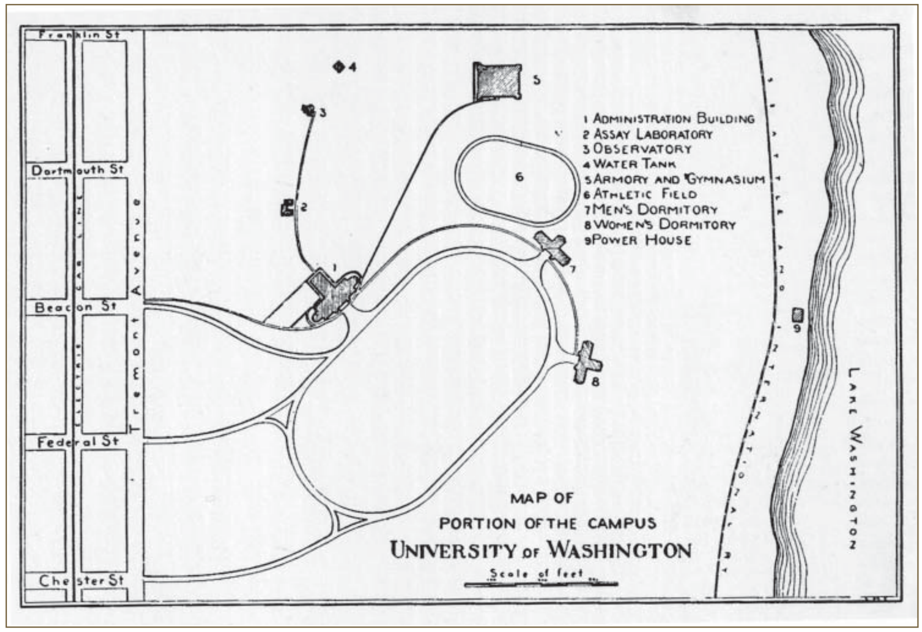
The development of the University campus east of 15th Avenue Northeast began with the construction of Denny Hall in 1894, and followed the oval form of the 1900 Fuller plan with the siting and construction of Parrington Hall in 1902 (Fig 3). Denny Hall was oriented purposefully towards key views of the regional setting: the Cascade and Olympic mountain ranges, and Lake Washington. Additionally, these early buildings espoused a regional philosophy towards materials:

"Before the erection of any buildings on the new grounds the Board of Regents adopted a wise policy by deciding that each structure should be made of materials found in the State of Washington. In this way, besides serving their various purposes, the buildings furnish magnificent exhibits of the wealth of Washington in first-class building material . ." (University Catalogue, 1902-1903).

The plan for the Alaska Yukon Pacific Exposition of 1909 also celebrated the regional setting of the university, and reorganized the campus around the major axis of the Rainier Vista (Fig 4). The West Campus Area and the University District as a whole was transformed by the Exposition. The major entrance to the exposition was located at NE 40th Street and 15th Avenue NE, serving a large volume of visitors from downtown Seattle via the streetcar (Fig 5). The College Inn at the corner of University Way NE and NE 40th Street was constructed to serve visitors to the exposition and remains today in its original location.

FIGURE 2
Photograph of University Streetcar Stop

FIGURE 3
1900 Fuller (oval) Plan



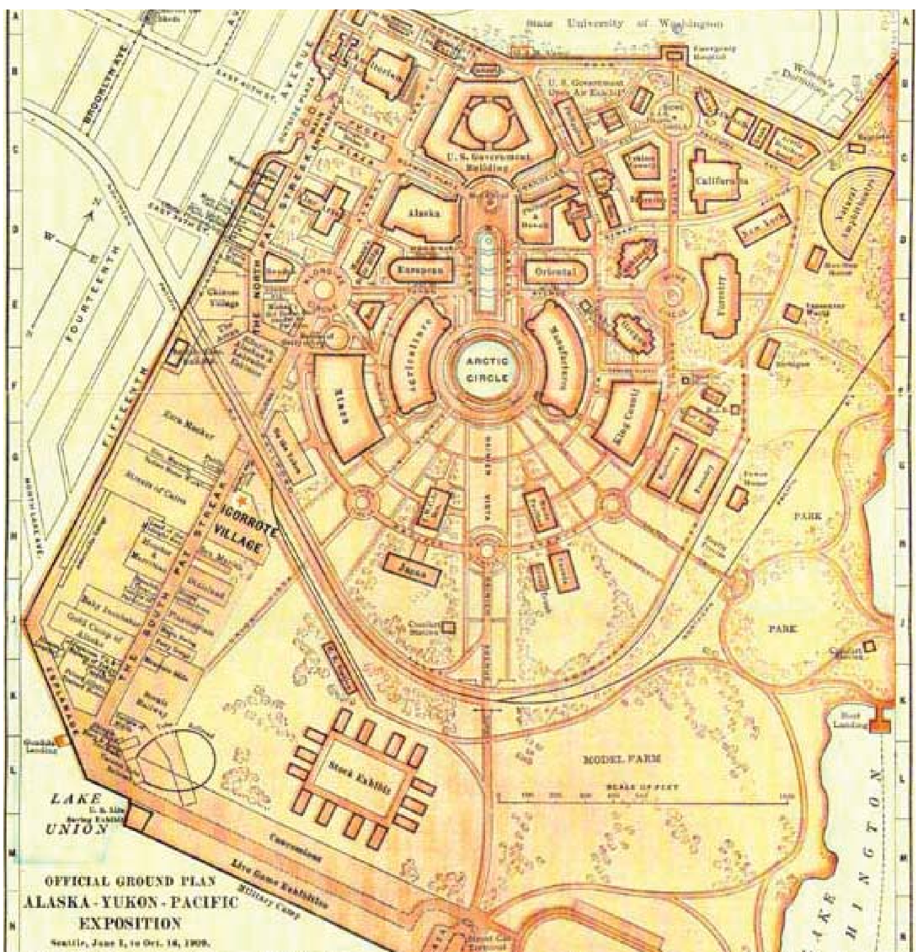


FIGURE 4
1909 Alaska Yukon Pacific (AYP) Exposition Plan

FIGURE 5
Photograph of the NE 40th Street entry to Alaska Yukon Pacific Exposition

FIGURE 6
NE Campus Parkway under construction in early 1950s

In the years following the Exposition, the University took a more active role in planning the West Campus area. In particular, the idea of an entry to campus from the west, at the north end of the University Bridge, was formally initiated in a 1924 proposal from UW president Henry Suzzallo: "The proposal that met with the most favor was that of a broad avenue running from Tenth to Fifteenth Avenues Northeast between Northeast Fortieth and Northeast Forty-first streets." The Cavalier Apartments were constructed in 1929 with an entry oriented to the North, possibly anticipating this proposed avenue. Suzzallo's proposal was included in the 1948 campus plan, along with the acquisition of large areas of land in the West Campus area (Fig 9). It was finally realized in the construction of Campus Parkway in 1953 (Fig 6).

Since its construction, NE Campus Parkway has served as a spine for the development of the West Campus. Terry, Lander, Schmitz, and Condon halls were all constructed along the Parkway from 1953-1973. Various landscape improvements along NE Campus Parkway since its construction have left little coherent legacy to the West Campus landscape. One exception to this is the large American Elm tree located at the Northwest corner of NE Campus Parkway and Brooklyn Avenue NE, noted as "extraordinary" in a recent arborist's report (Fig 7). A mixed stand of coniferous and deciduous trees was planted at the west end of NE Campus Parkway in 1961 for an International Forestry Exposition, but now compounds the overly shaded microclimate to the north of Terry Lander Hall (Fig 8). Lastly, a recent UW art department design/build effort added landscape improvements and public art to the easternmost median block on NE Campus Parkway. This improvement has not resulted in significant use of NE Campus Parkway as a pedestrian open space, or as a comprehensive iconic open space commensurate to others on the UW campus.

The West Campus Area historically served as a place of rich cultural interaction between the Campus and the City, and a vital transportation hub between the two. It continues to support high volumes of transportation connections, but its current landscape does little to support the pedestrian experience or connect it to the campus. The lack of consistent landscape treatment along NE Campus Parkway, and its prioritization of the automobile, has detracted from the historical vibrancy of the West Campus as a place of connection between the University and the city. The UW West Campus Housing Project holds the potential to reestablish this vibrancy of place. The reconsideration of NE Campus Parkway will be central to this process.

FIGURE 7
Photograph of American Elm Tree

FIGURE 8
Photograph of International Forestry Exposition, Present Day

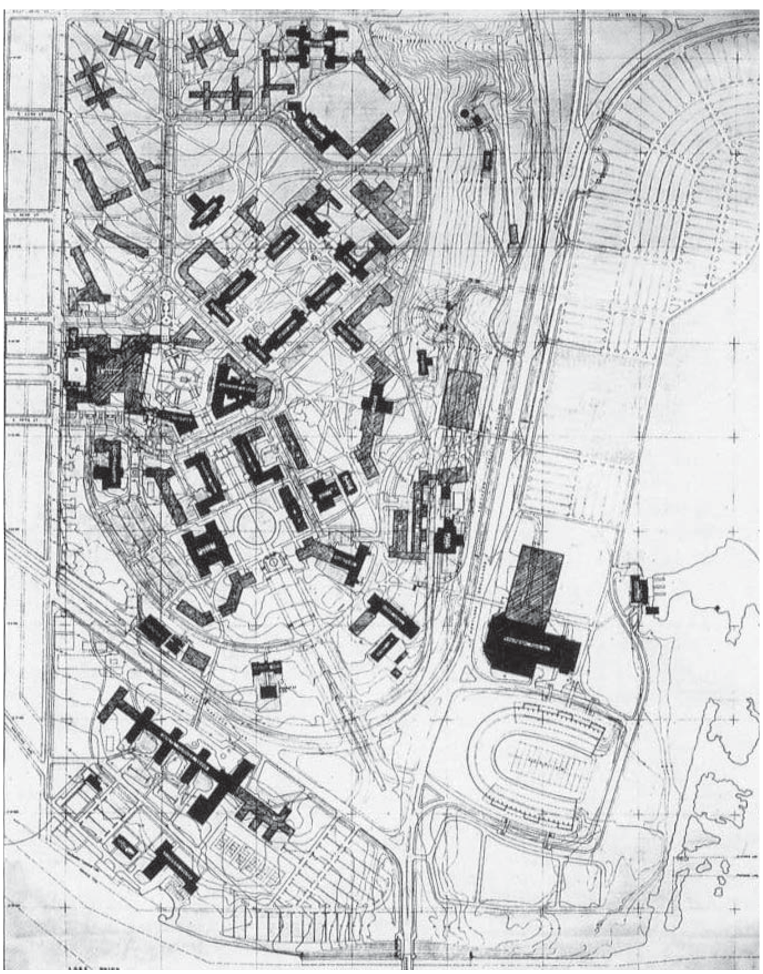


FIGURE 9
1948 University Plan

FIGURE 10
Photographs of sidewalk conditions in West Campus area

FIGURE 11
Photograph of crosswalk on Campus Parkway

LANDSCAPE FABRIC

The West Campus area presents a unique opportunity in its overlay of Campus and Urban landscapes. It hosts a number of University buildings and uses alongside the urban streets and culture of the University District and the larger city to which it is connected. The underlying structure, or fabric, of open spaces in the West Campus supports this unique overlay of Campus and Urban; with the bisection of the University District's Urban grid by Campus Parkway and the additional connections to Campus along NE 40th and 41st Streets. However, the existing configuration of landscape elements and spaces in the West Campus area lacks the consistency, capacity, and quality to support a vibrant new housing district and strengthen the connection between the Campus landscape of the University with the Urban landscape of the University District.

From a pedestrian perspective, this area is currently experienced as a series of sidewalk spaces of variable width and surface quality (Fig 10). These spaces are often undersized and their walking surfaces can be hazardous. Street crossings on NE Campus Parkway can also be hazardous for pedestrians on account of the unusual width of the parkway traffic lanes, and the large amounts of bus traffic through the area (Fig 11). There are few comfortable open spaces for pedestrian stopovers in West Campus. Existing bus stops provide a limited amount of seating and shelter relative to the high volumes of ridership they serve (Fig 12). Besides the grassy median on NE Campus Parkway–also an uninviting space for pedestrians–the open spaces of the West Campus area are predominately parking lots. Open spaces associated with University buildings in West Campus–including Condon, Terry-Lander, and Schmitz halls–are largely disengaged from activity on the streets and under-used (Fig 13).

The overlay of NE Campus Parkway–a major axis of the UW campus–with the urban grid of the University District presents a great opportunity to structure the landscape of the West Campus and strengthen its connections to the heart of the UW campus east of 15th Avenue NE. As has been stated in both the Campus Master Plan and the University District Neighborhood Plan, this could be accomplished much more successfully with a greater consistency in landscape treatment of sidewalks and planting, as well as a simplified configuration of infrastructural elements such as overhead bus lines (Fig 15).

FIGURE 12
Photograph of bus stop on Campus Parkway

FIGURE 13
Photograph of courtyard at Condon Hall

FIGURE 14
Diagram of roadway connections from Eastlake Avenue to Campus Parkway

> WEST CAMPUS DIAGRAM | URBAN CONNECTIONS

FIGURE 15
Photograph of view towards Red Square from Campus Parkway

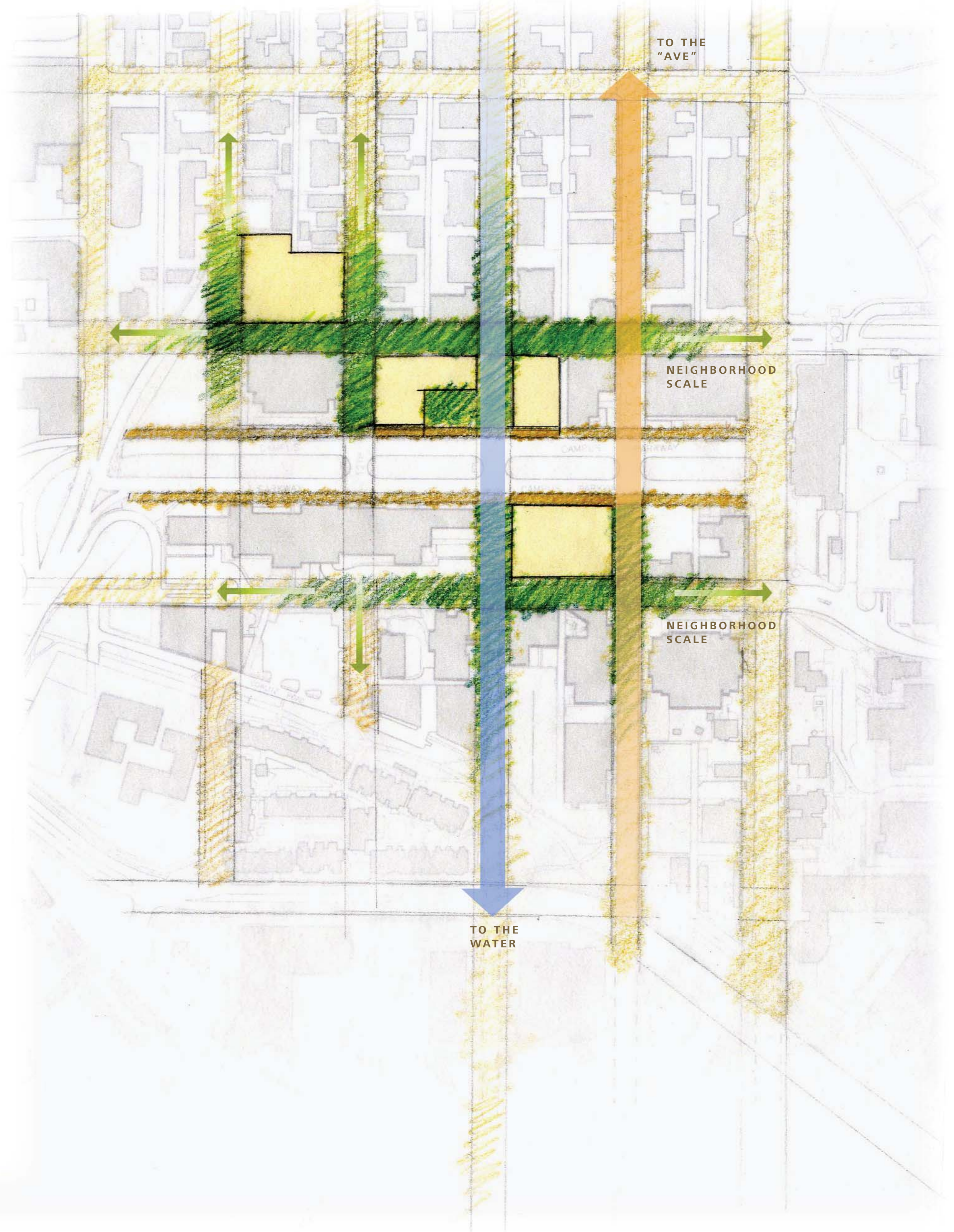
"Campus Parkway is currently an under-used resource and should be improved. There are two groups of design options, depending on whether or not the street is realigned to better service transit or other circulation. If the street is not to be reconfigured, then new street lights, [transit] poles, trees, landscaping, and other amenities-such as large-scale sculpture-should be added. "- Neighborhood Master Plan, 1998

The current arrangement of roadways and pedestrian spaces privileges the automobile experience of the West Campus area. The design of Campus Parkway in particular encourages drivers to maintain higher speeds with wider lanes and freeway-ramp type connections to Eastlake Ave (Fig 14). The configuration and materiality of roadways do little to alert motorists and bus drivers to the presence of pedestrians in the area and in turn slow traffic to safer speeds. A major goal of the development in the West Campus will be to reverse this prioritization of space and reconfigure the landscape of NE Campus Parkway–and the West Campus area in general–to enhance pedestrian connections to both the heart of the University Campus to the east, and the commercial core of the University district to the north.

The patchwork character of the landscape can make orientation a challenge in the West Campus Area, although there are several underlying opportunities for improvement. The inconsistency of building heights and open spaces on the edges of NE Campus Parkway, combined with the tangle of overhead electrical bus lines and the inconsistency of the tree canopy, obscure the alignment of NE Campus Parkway with the heart of the UW campus (Fig 15) and the Olympic Mountains to the West. Additionally there are views to Capitol Hill, Lake Union, and downtown Seattle from the north-south avenues in the West Campus area which help to orient visitors to the larger urban and regional context. The clarification of these views, based on existing street alignments and involving improvements to elements of landscape fabric including street plantings and transportation infrastructure, would improve orientation to the main UW Campus (NE Campus Parkway), the commercial core of the University District (University Way NE), and the Portage Bay waterfront (Brooklyn Avenue NE) (See diagram opposite).

Improvements to NE Campus Parkway itself are beyond the scope of the West Campus Housing Project and involve sufficient complexity to merit further study at the Master Plan level. However, the improvements within the scope of the West Campus Housing Project-including adjacent sidewalks and open space-should compliment a more consistent and pedestrian-integrated approach to NE Campus Parkway.

Generally, the landscape fabric of the West Campus holds great opportunity as a means of strengthening the interface between university and urban communities. The underlying axial connection of Campus Parkway to the heart of the UW Campus, as well as the urban connections provided by University Way NE and Brooklyn Avenue NE, are aspects of this area which can be enhanced by a more cohesive, legible, well-constructed, and pedestrian-oriented landscape fabric.


TO THE
"AVE"
NEIGHBORHOOD
SCALE
NEIGHBORHOOD
SCALE
TO THE
WATER

DEVELOPMENT – CURRENT AND PLANNED

In addition to the four parcels identified for approximately 1,750 beds to be constructed by 2012, the University identifies two other parcels for future student housing—Parcels 30W and 29/42. These, along with the existing housing stock, will provide a net total of approximately 4,500 student beds within the West Campus—the population of a small town when coupled with university staff associated with residence halls and other university facilities, and with the staff and users associated with the few privately-owned parcels in the area. The University will develop additional parcels for academic and mixed uses. The majority of these parcels are south of NE 40th Street. The "heart" of West Campus will be defined by the development that will occur at the intersection of NE Campus Parkway and Brooklyn Avenue NE. This location is within a four-minute walk of the boundaries of the West Campus and a five-minute walk to Red Square.

>
DEVELOPMENT | CURRENT AND PLANNED

LEGEND

Existing and Planned Projects

Current Residential Projects

West Campus Boundary

NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
GEORGE WASHINGTON
31
NE 41ST STREET
30W
Condon
32
33
7W
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
Terry/Lander
35
34W
23W
LINCOLN WAY
NE 40TH STREET
40W
39W
38W
37W
29/42W
COWLITZ ROAD
22W
36W
ADAMS LANE
Mercer
Stevens Court
41W
STEVENS WAY
NE PACIFIC STREET
NE BOAT STREET
BURKE GILMAN TRAIL
1.0 Acre
0.25
0
250 Feet
500
Portage Bay

GROUND-FLOOR USES - CURRENT

The ground-floor uses in the West Campus and the area to the north demonstrate the mixed-use nature of this area. A variety of residential types abut the western edge of University Way NE whose retail-dominated ground-floor uses terminate at NE 41st Street. The majority of neighborhood-serving uses are located along University Way NE. Within the West Campus, the majority of ground-floor uses cater to specific university user groups, e.g. student residents. Some offer services to the broader campus community but are not of a nature that fosters sustained ground-floor activities.

One of the goals of the University is to generate ground-floor active uses in the residential parcels. How the University defines these programs, their locations, and their accessibility will be key to achieving this goal.

>
GROUND-FLOOR USES | CURRENT

LEGEND

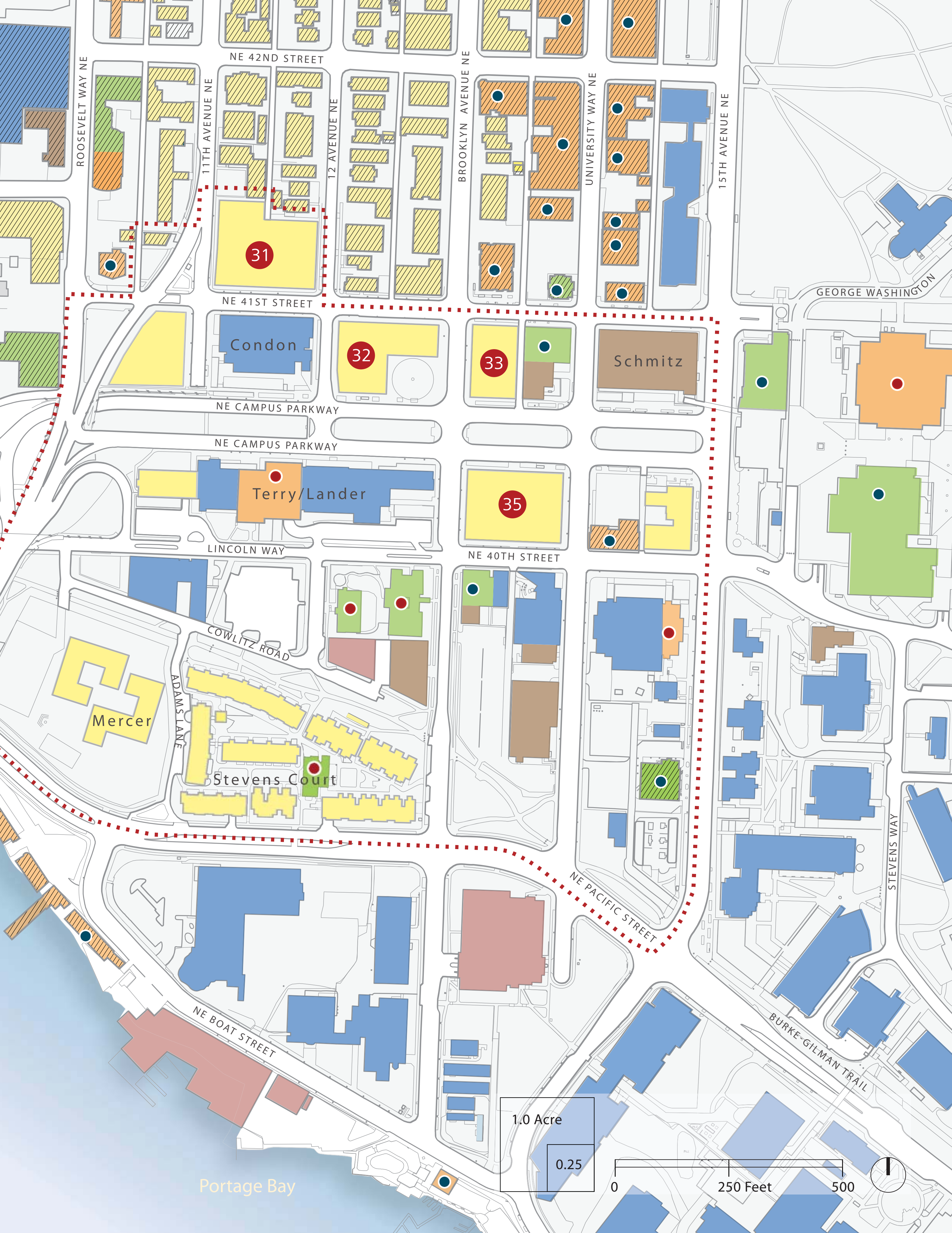
- Retail
- Private Ownership
- Academic/Research
- Administrative/Office
- Support Services
- Other
- Residential - Current and Planned
- Current Student Residential Projects
- West Campus Boundary

Student Residential and Campus Community Oriented Uses

1101 Cafe
Stevens Court Community Center
Ethnic & Cultural Center
Gould Hall Cafe
By George Cafeteria
Child Care Center

Public Oriented Uses

Bicycle shop
Boat shop
Corner market
Ethnic & Cultural Center Theater
Henry Art Gallery
Meany Theater
Playhouse Theater
Religious spaces
Variety of restaurants


NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
GEORGE WASHINGTON
NE 41ST STREET
31
Condon
32
33
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
Terry/Lander
35
LINCOLN WAY
NE 40TH STREET
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
NE PACIFIC STREET
STEVENS WAY
BURKE-GILMAN TRAIL
NE BOAT STREET
1.0 Acre
0.25
0
250 Feet
500
Portage Bay

OPEN SPACE – CURRENT AND PLANNED

The open space in the West Campus is fairly nondescript. It may be categorized as iconic, programmed, and interstitial. Iconic open space includes the NE Campus Parkway median (**1**) and the Central Plaza (**2**) on the Central Campus. Programmed open space is limited to the Burke-Gilman Trail (**3**) and a future park (**4**) that will be adjacent to NE 40th Street and east of the Applied Physics facility. The remaining open space is interstitial, specific to groupings of buildings, offering aesthetic appeal and passive uses. The West Campus also lacks any evidence of open space used to address sustainability measures. Such measures should be integrated into the overall character of the West Campus as development occurs.

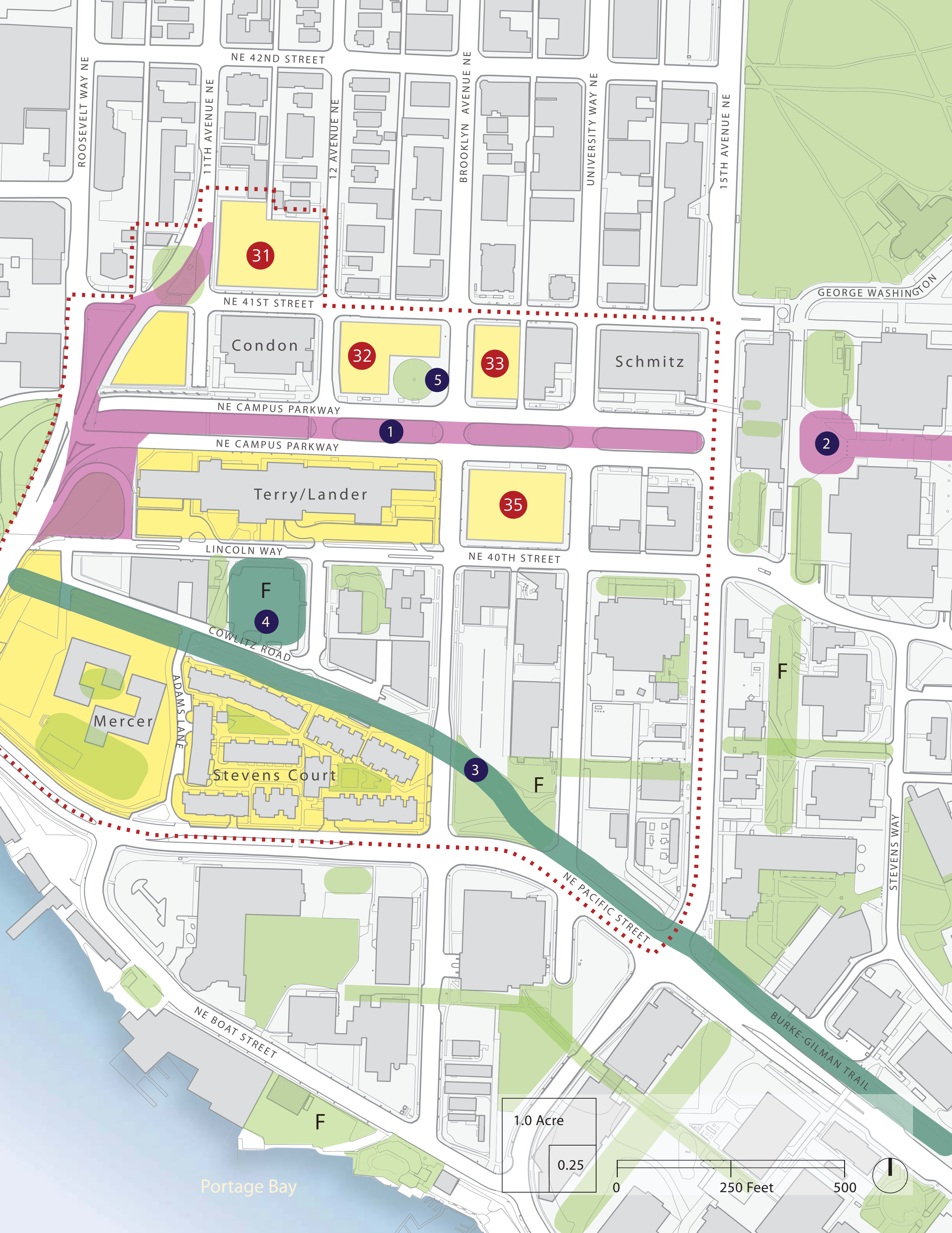
A mixture of landscape treatments characterizes the NE Campus Parkway. The heavily forested west end of the parkway transitions to manicured lawn with a few trees to a hardscape-art treatment nearest 15th Avenue. Although the CMP identifies the NE Campus Parkway as one of the major axis of the campus, it lacks the memorable quality worthy of the University's stature. The sidewalks that border NE Campus Parkway and the other streets in the study area lack a unifying character. There is potential to elevate the quality of the parkway and the open space associated with vehicular access at the parkway's west end, including the areas bordering or defined by the on and off ramps.

The elm tree (**5**) located on Parcel 32W will remain. It is one of the finer examples of American elm in the City of Seattle (Tree Solutions Inc, 30 June 2008).

>
OPEN SPACE | CURRENT AND PLANNED

LEGEND

- Iconic Open Space
- Programmed Open Space
- Interstitial Open Space
- F Planned Future Open Space Project
- Residential Halls - Existing and Planned
- Current Residential Projects
- West Campus Boundary


NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
GEORGE WASHINGTON
NE 41ST STREET
31
Condon
32
5
33
Schmitz
NE CAMPUS PARKWAY
1
2
NE CAMPUS PARKWAY
Terry/Lander
35
LINCOLN WAY
NE 40TH STREET
F
4
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
3
F
F
STEVENS WAY
NE PACIFIC STREET
BURKE-GILMAN TRAIL
NE BOAT STREET
F
Portage Bay
1.0 Acre
0.25
0
250 Feet
500

VEHICULAR CIRCULATION AND PARKING

The road system in the West Campus provides both east-west and north-south access. Only 15th Avenue NE and Brooklyn Avenue NE provide continuous north-south access through the West Campus. Terry Lander's superblock bisects 12th Avenue. Average Weekly Daily Trips (AWDT) in the West Campus vary between 15,100 (Roosevelt Way NE at NE 41st Street) and 2,140 (NE 41st Street at Roosevelt Way NE).

NE CAMPUS PARKWAY

Preliminary review indicates that NE Campus Parkway primarily serves transit. Its use by private vehicles is low. The AWDTs for NE Campus Parkway are 9,350 (at Brooklyn Ave) and 6,300 (at 15th Ave). Given the low AWDT, one travel lane could be eliminated to allow increased space for the parkway median and/or the sidewalk areas that bound the outside edges of the roadways. Examples of other two-lane streets in this area that have more traffic than NE Campus Parkway are:

:: NE Pacific Street at Boat Street (14,300 AWDT, which operates well)

:: East 40th Street near Wallingford Ave (13,400 AWDT w/o a turn lane)

:: NE Ravenna Boulevard under I-5 (17,200 AWDT)

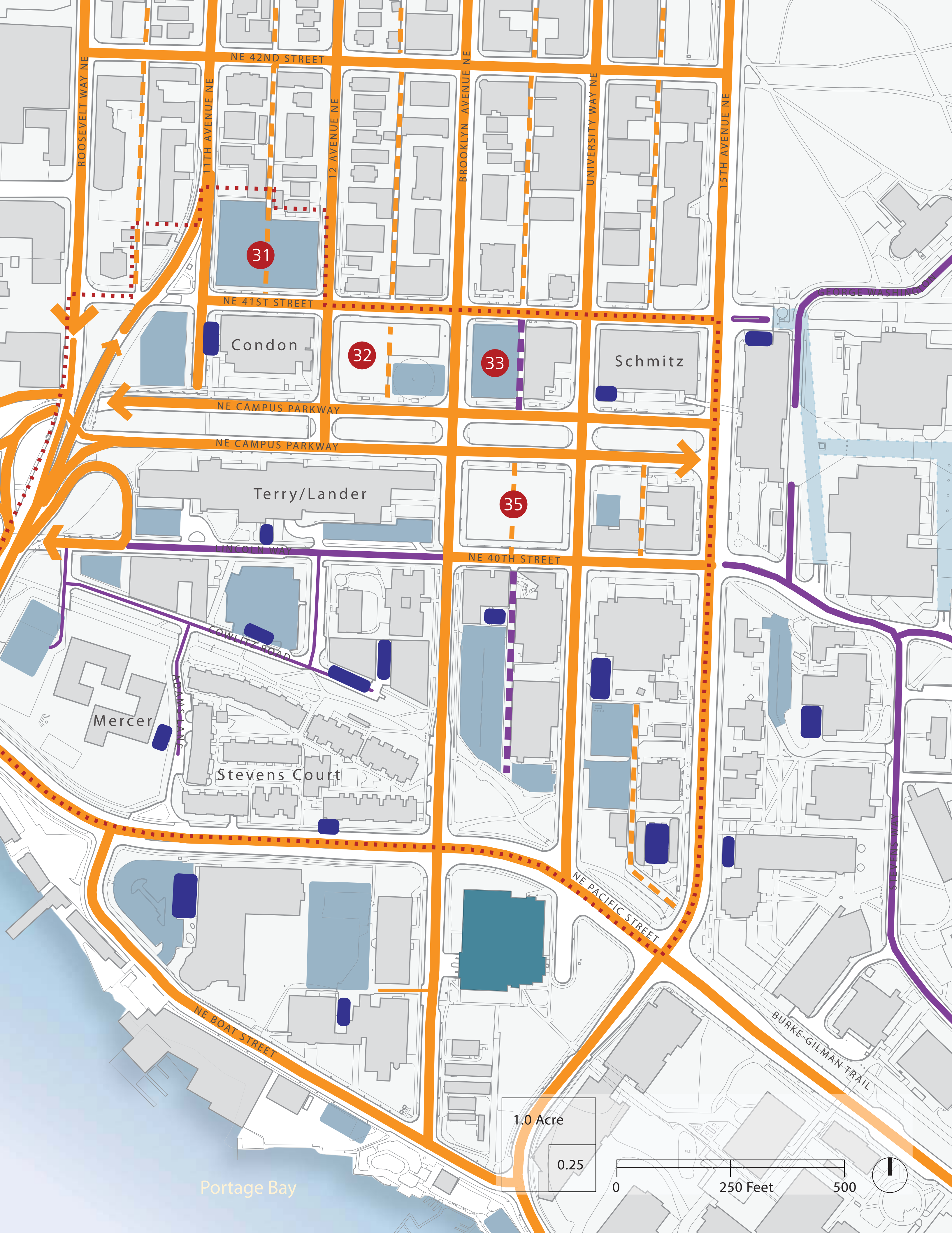
:: NE Greenlake Drive at Latona Ave NE (15,300 AWDT)

:: NE 45th Street through the heart of Wallingford (24,200 AWDT with a turn lane, considered to have the highest volume of any three-lane arterial in Seattle) (Heffron Transportation Inc., 16 Dec 08)

> VEHICULAR CIRCULATION AND PARKING | CURRENT

LEGEND

- Public Roads
- Public Alleys
- University Roads
- University Alleys
- Service Access
- Parking - Surface
- Parking - Structured
- Parking - Below Grade
- Current Residental Projects
- West Campus Boundary


NE 42ND STREET
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11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
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NE 41ST STREET
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Condon
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NE CAMPUS PARKWAY
Terry/Lander
35
LINCOLN WAY
NE 40TH STREET
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
STEVENS WAY
NE PACIFIC STREET
BURKE-GILMAN TRAIL
NE BOAT STREET
1.0 Acre
0.25
0
250 Feet
500
Portage Bay

Arterial Classification by Location – University of Washingon's West Campus Area

STREET	CLASSIFICATION	LOCATION
11th Avenue NE	Principal	NE Ravenna Boulevard to Eastlake Ave E
15th Avenue NE	Principal	NE Pacific Street to NE 50th Street
NE 40th Street	Minor	Eastlake Avenue E off-ramp
	Collector	Brooklyn Avenue NE to 15th Ave NE
NE 41st Street	Principal	Roosevelt Way NE to 11th Avenue NE
Brooklyn Avenue NE	Collector	NE Ravenna Boulevard to NE Pacific Street
Campus Parkway	Minor	Roosevelt Way NE to 15th Avenue NE
NE Pacific Street	Principal	Montlake Boulevard NE to I-5)
	Minor	East of I-5
Roosevelt Way NE	Principal	Eastlake Avenue E to NE Northgate Way
University Way NE	Collector	NE Ravenna Boulevard to NE Pacific Street

SOURCE: Seattle Department of Transportation, December 2008 and Heffron Transportation, Inc. 16Dec08

ARTERIAL STREETS

The terms "Principal, Minor, and Collector" all refer to arterial types. The City of Seattle Land Use Code places some restrictions based on a street's classification. For example, the land use codes directs access location to the lowest type of arterial if a site borders more than one street (with the highest preference for access to alleys and then non-arterial streets). There are requirements for sidewalk width and other street frontage improvements that also relate to the street classification. Those requirements can vary by area and zone.

PARKING

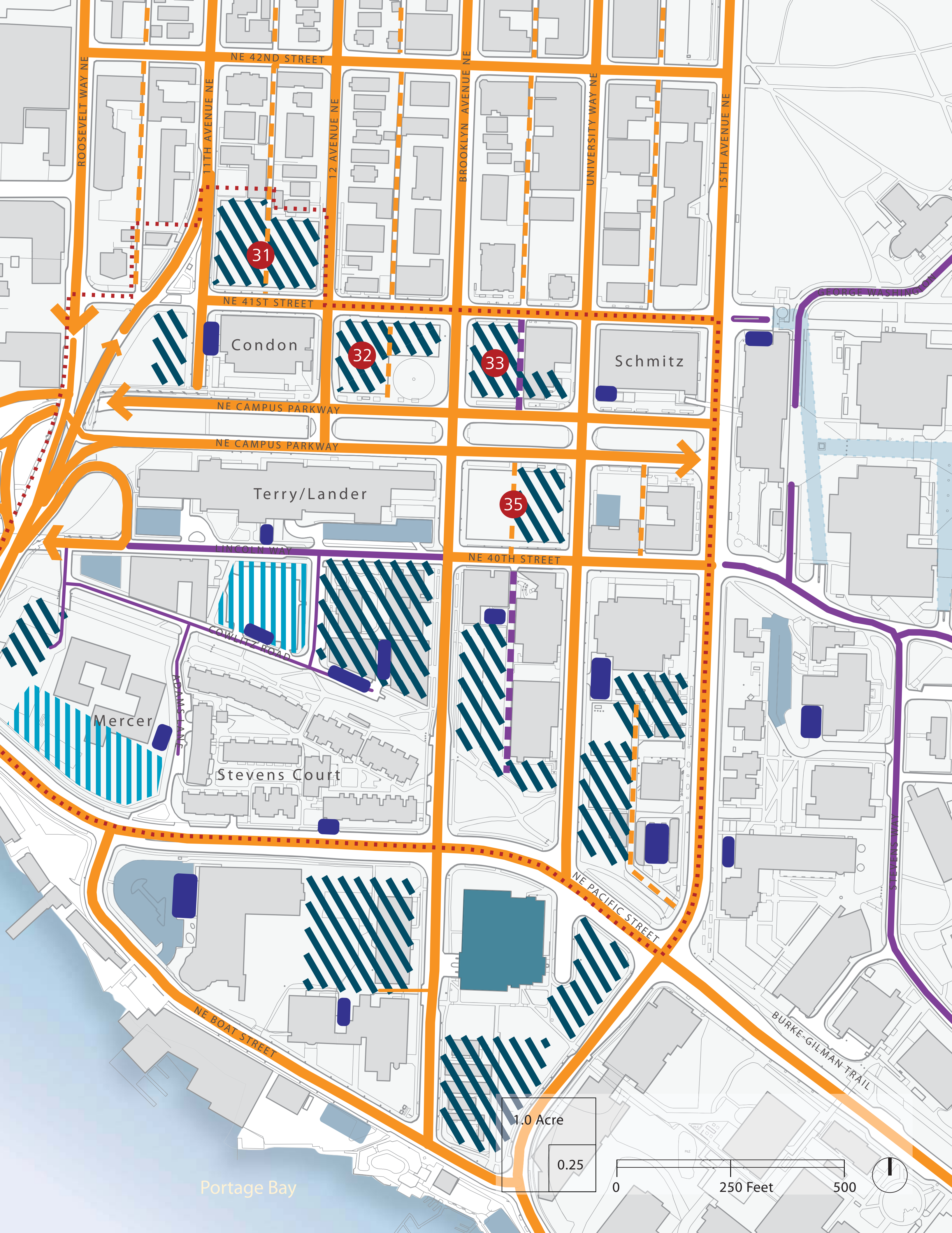
The West Campus is currently served by numerous surface parking lots, many of which will be developed for university uses. Parcels 31W, 32W, and 33W all have surface parking. The CMP identifies future parking in structures or set below grade. Structured parking includes both free-standing facilities and those incorporated into new buildings that will house a variety of uses. The overall quantity of commuter parking is fixed. The replacement quantity and locations will be determined by UW Transportation Services. The intent is to minimize the parking in the West Campus due to its proximity to the campus, retail, and transit (University of Washington, Jan 20, page 79).

>

VEHICULAR CIRCULATION AND PARKING | PLANNED AND CURRENT TO REMAIN

LEGEND

- Public Roads
- Public Alleys
- University Roads
- University Alleys
- Service Access
- Parking - Structure Planned
- Parking - Below Grade Planned
- Parking - Surface to Remain
- Parking - Structured to Remain
- Parking - Below Grade to Remain


NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
GEORGE WASHINGTON
NE 41ST STREET
31
32
33
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Condon
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
Terry/Lander
LINCOLN WAY
NE 40TH STREET
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
NE PACIFIC STREET
STEVENS WAY
NE BOAT STREET
BURKE-GILMAN TRAIL
1.0 Acre
0.25
0
250 Feet
500
Portage Bay

Transit Classification by Location – University of Washington's West Campus Area

STREET	CLASSIFICATION	LOCATION
11th Avenue NE	Major	South of NE 65th Street
15th Avenue NE	Prinicpal	NE Pacific Street to NE 45th Street
NE 40th Street	Minor	Unversity Avenue NE to 15th Avenue NE and w/o Eastlake Ave E
	Local	Brooklyn Avenu NE to Univesity Avenue NE and 15th Avenue NE to George Washington
NE 41st Street	Minor	11th Avenue NE to Brooklyn Avenue NE
Brooklyn Avenue NE	Major	NE Campus Parkway to NE 45th Street
	Local	NE Campus Parkway to NE Boat Street
Campus Parkway	Major	Roosevelt Way NE to 15th Avenue NE
NE Pacific Street	Principal	East of I-5
	Minor	I-5 to 15th Avenue NE
Roosevelt Way NE	Major	South of NE 65th Street
University Way NE	Major	NE Ravenna Boulevard to NE Campus Parkway
	Minor	NE Campus Parkway to NE 40th Street
	Local	NE 40th Street to NE Pacific Street
SOURCE:	Seattle Department of Transportation, December 2008 and Heffron Transportation, Inc. 16Dec08	

>
TRANSIT | CURRENT AND PLANNED

LEGEND

- Bus Layover
- Bus Route
- Bus Stop
- T Transfer Station
- HS Health Science Bus Stop
- Street Car Route, Suggested by City of Seattle
- Street Car Stop, Suggested by City of Seattle
- Residential Halls - Existing and Planned
- Current Residential Projects
- West Campus Boundary

TRANSIT – CURRENT AND PLANNED

URBAN VILLAGES

Urban Villages are part of the City of Seattle's Comprehensive Plan. The vision is to concentrate growth in a series of compact and walkable neighborhoods. The rebuilt University Way NE is part of the urban village improvements strategies. As stated in the Transportation Strategic Plan (TSP): "During the TSP process, several recurring themes emerged. These themes, detailed below, are: improve safety; preserve and maintain transportation infrastructure; support the urban village land use strategy, and; provide mobility and access through transportation choices." (Seattle Department of Transportation, 2005, page 9.)

EXISTING TRANSIT

Being part of the University Community Urban Center, the West Campus contains a multimodal hub currently served by buses—diesel and electric. The latter uses overhead electrical lines that line NE Campus Parkway.

The streets in the West Campus are classified for transit use. Principal Transit Streets serve through-transit service, connecting urban centers and urban villages. 12th Ave NE borders the eastern edge of Parcel 31W, which would suggest minimizing access to the parcel from this street. Collector Transit Streets provide direct access to destinations through distribution of transit from Minor and Principal Transit Streets.

BUS STOPS AND LAYOVERS

The majority of bus stops are located along NE Campus Parkway and 15th Avenue NE. Bus layovers consist of dedicated curbside parking for buses and access to university restrooms. They are subject to an agreement between King County and the University of Washington. Made in 1999, the agreement is in effect for 25 years. Currently bus stops and layovers are adjacent to Condon Hall, Parcels 32W, 33W, and 35W. A university change to the locations of current layovers is possible, subject to funding by the University. Their location adjacent to Parcel 32 could be problematic as the parked buses will block views to and from the ground-floor uses that are intended to activate the street environment. Also, the existing layovers along Brooklyn Avenue NE will need to be relocated if Brooklyn Avenue NE is narrowed.

FUTURE TRANSIT

The City of Seattle plans to introduce two new modes of transit in or near the West Campus. A new light rail stop will be located on 12th Avenue NE between NE 43rd and NE 45th Streets, just north of the West Campus. In addition, the streetcar line may extend from the south through the West Campus, with several stops; one possibly in West Campus (Seattle Department of Transportation, May 2008, page 6). The specific of the streetcar line and the location of the street car stops are not definite at this time. They will require study by the City of Seattle and the University. The introduction of light rail and the streetcar will not significantly affect ridership for the buses (Mahlum Architects and UW Meeting, 10 December 2003).

NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
GEORGE WASHINGTON
NE 41ST STREET
31
32
33
HS
Condon
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
Terry/Lander
35
HS
T
25 67 73
30 68 74
31 70 75
49 71 372
65 72
LINCOLN WAY
NE 40TH STREET
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
HS
NE PACIFIC STREET
STEVENS WAY
BURKE-GILMAN TRAIL
NE BOAT STREET
HS
1.0 Acre
0.25
0
250 Feet
500
Portage Bay

PEDESTRIAN CIRCULATION – CURRENT AND PLANNED

Pedestrian walking distances in the West Campus are short. The West Campus can be traversed in a five-minute walk. The intersection of NE Campus Parkway and Brooklyn Avenue NE is within a five-minute walk of the Central Campus. The City of Seattle's goal is to develop a safe and a consistent approach to pedestrian circulation by providing clear and accessible pathways and crossings, especially for people with disabilities and senior citizens. (Seattle Department of Transportation, 2005, page 81) The CMP identifies NE 40th Street and the north side of NE Campus Parkway as major pedestrian pathways.

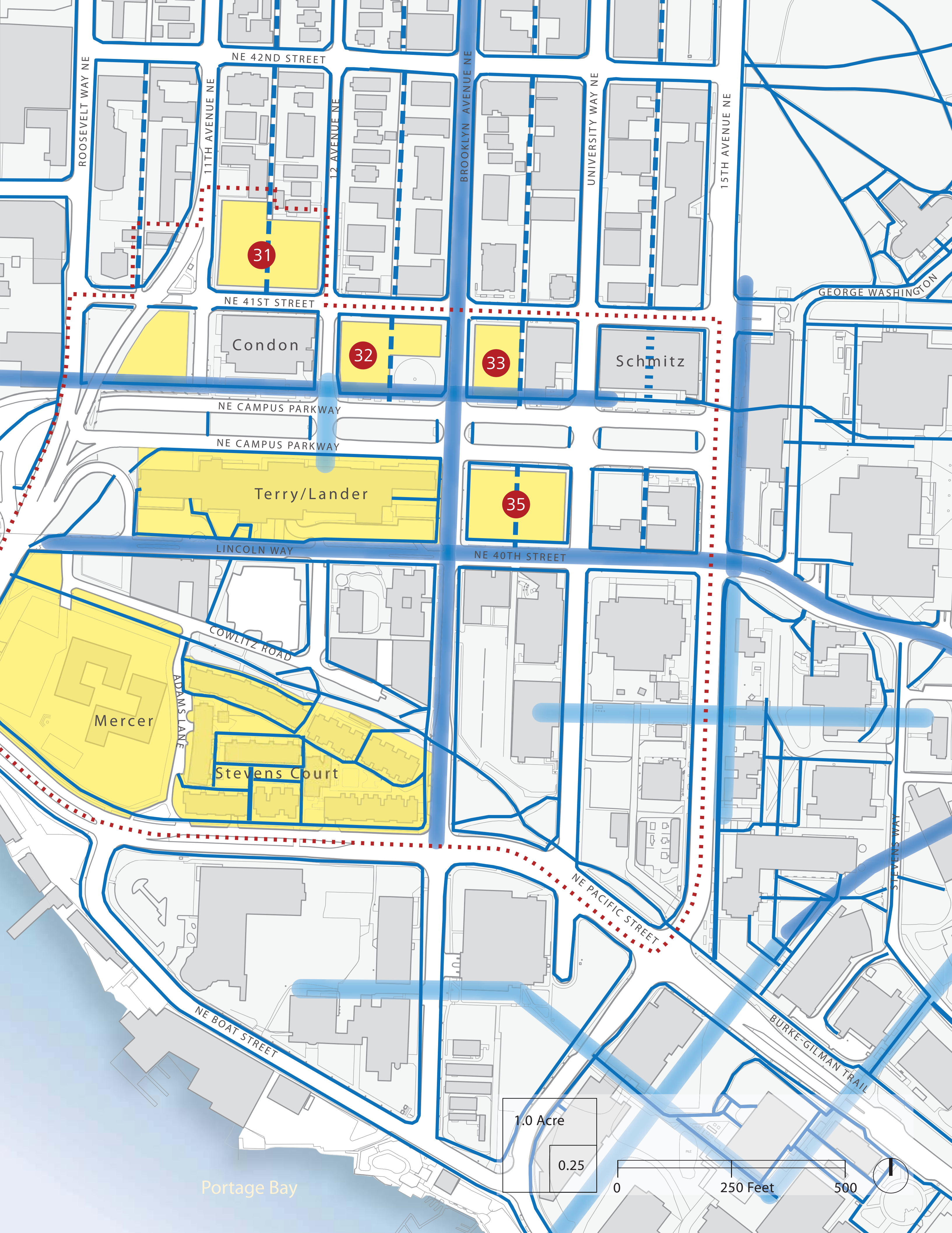
Pedestrian improvements are needed, given the large number of existing pedestrians and the increases that will occur from the new residences and future development in and adjacent to the West Campus. The CMP calls for enhanced pedestrian connections along the north side of NE Campus Parkway, NE 40th Street, and 15th Avenue NE. New pedestrian connections include 12th Avenue NE as it crosses NE Campus Parkway. The proposed improvements respond to current and foreseen development patterns.

As the West Campus undergoes future development, pedestrian circulation demands will increase and the movements will increase in complexity—students will walk where they wish to walk. This underscores the importance of improving all pedestrian connections in the area.

>
PEDESTRIAN CIRCULATION | CURRENT AND PLANNED

LEGEND

- Enhanced - Planned
- New - Planned
- Sidewalks and Paths - Existing
- Alleys - Existing
- Through Building - Existing
- Current Residential Projects
- Residential Halls - Existing and Plann
- West Campus Boundary



NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
31
NE 41ST STREET
GEORGE WASHINGTON
Condon
32
33
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
Terry/Lander
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LINCOLN WAY
NE 40TH STREET
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
NE PACIFIC STREET
STEVENS WAY
NE BOAT STREET
BURKE-GILMAN TRAIL
1.0 Acre
0.25
0
250 Feet
500
Portage Bay

BICYCLE CIRCULATION

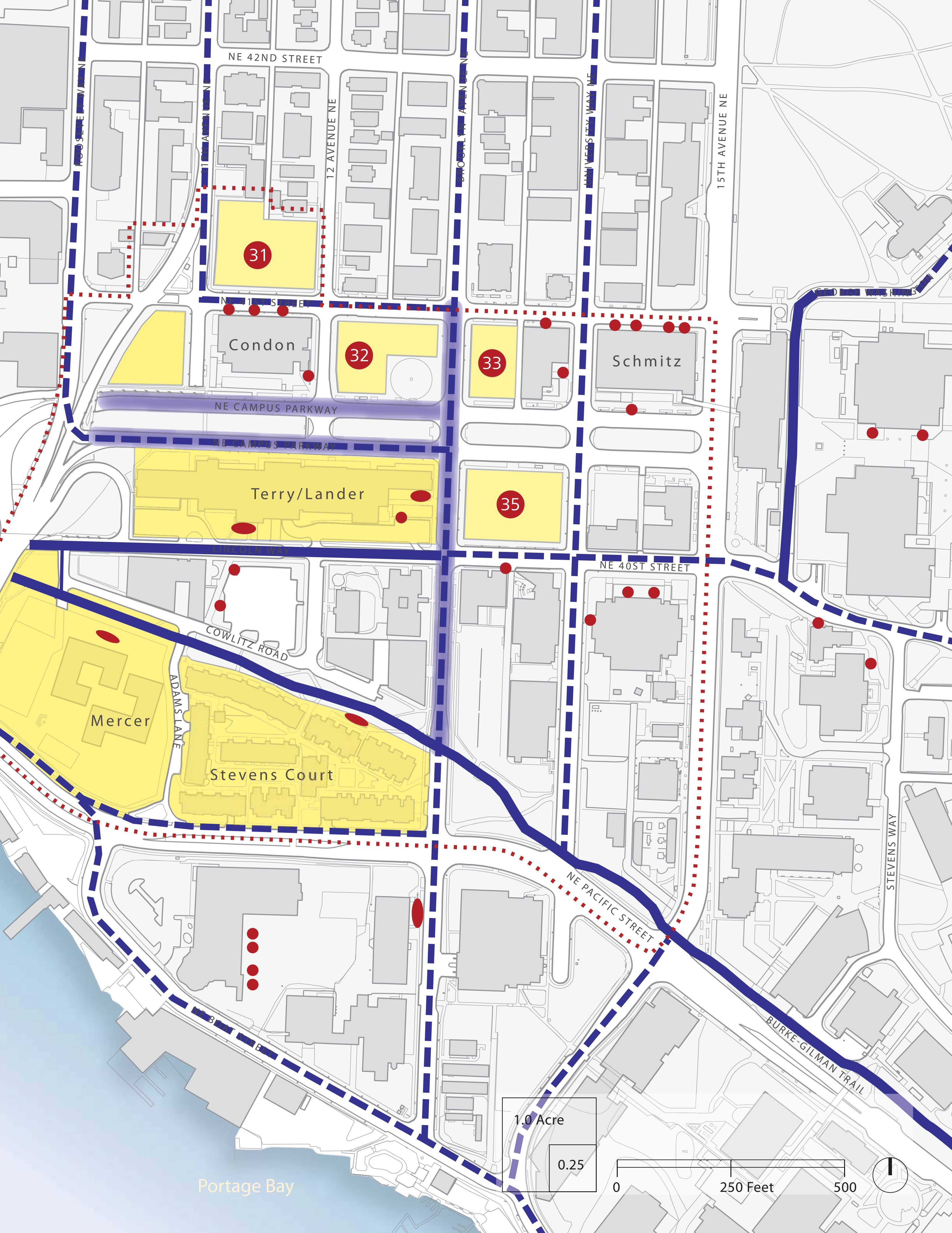
Bicyclists circulate throughout the West Campus both on-road and off-road. The Burke-Gilman trail is a prime example of an off-road bicycle route. Some of the on-road routes have designated lanes, such as the one along NE 40th Street. The NE 40th Street corridor is important because it connects to the NE 40th Street entrance to the campus. Others roads share one lane with vehicles.

The CMP suggests improvements for bicyclists along the entirety of NE Campus Parkway and along Brooklyn Avenue NE from the Burke-Gilman Trail to NE 41st Street (University of Washington, January 2003, page 67). In addition, the placement of bicycle parking adjacent to these routes will emphasize the routes for bicycle travel.

>
BICYCLE CIRCULATION | CURRENT AND POSSIBLE IMPROVEMENTS

LEGEND

- On-Road
- Off-Road
- Bicycle Racks
- Areas of Possible Improvements
- Residential Halls - Existing and Planned
- Current Residential Projects
- West Campus Boundary



NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
31
NE 41ST STREET
GEORGE WASHINGTON
Condon
32
33
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
Terry/Lander
35
LINCOLN WAY
NE 40ST STREET
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
NE PACIFIC STREET
STEVENS WAY
BURKE-GILMAN TRAIL
NE BOAT STREET
1.0 Acre
0.25
0
250 Feet
500
Portage Bay

ENVIRONMENTAL CONDITIONS

FIGURE 15 | Seattle average temperatures

Seattle Average Temperature (F)

MONTH \ HOUR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
January	39	38	38	38	38	38	38	38	39	40	41	43	44	44	44	43	42	41	41	40	39	39	39	38
February	42	42	42	41	41	41	41	41	42	44	45	47	48	48	48	48	47	46	45	44	44	43	43	43
March	42	41	41	41	40	40	40	41	43	45	47	48	50	50	51	50	49	48	46	45	45	44	43	43
April	46	45	44	44	44	44	45	47	48	50	52	53	54	55	55	55	54	53	51	50	49	48	47	46
May	50	49	49	49	48	49	51	53	55	57	59	60	62	63	63	63	62	61	58	56	54	54	52	51
June	55	54	53	53	52	53	55	57	59	60	62	64	65	67	67	67	66	65	63	60	58	57	56	56
July	58	57	57	56	56	57	59	60	62	64	67	69	70	72	72	73	72	70	68	65	63	62	60	59
August	60	59	58	57	57	58	59	61	63	64	67	69	71	72	73	73	72	70	68	66	64	62	61	60
September	55	54	53	53	52	52	54	56	58	61	64	66	68	69	69	69	68	64	61	60	59	57	56	55
October	50	50	49	49	49	49	49	50	51	52	54	56	58	58	59	58	56	54	53	52	52	52	51	50
November	44	43	43	43	43	43	43	43	44	46	47	48	48	48	48	47	46	45	45	44	44	44	43	44
December	40	39	39	39	39	39	38	38	39	40	41	42	43	44	43	43	42	42	42	41	41	41	41	40

Temperature

- 73
- 64
- 55
- 46
- 38

CLIMATIC DATA

Seattle climate is strongly affected by cold Pacific Ocean waters; summers are mild without excessive humidity, winters are cool and also tempered by the Pacific Ocean. The climate is well suited for natural cooling in the summer using air-side economizers and natural ventilation. While peak temperatures can range into the 90's, average summer temperatures are less than 75°F. In the winter, the required heating energy can be significantly reduced by including a high performance envelope and heat recovery system in a new building.

Figure 15 represents the daily average temperatures in Seattle on a monthly and hourly basis. The figure illustrates that the maximum average summer temperature is 73°F in the afternoons in July and August. Average summer night temperatures drop to 56-57°F.

>
WEST CAMPUS | SUN AND WIND

LEGEND

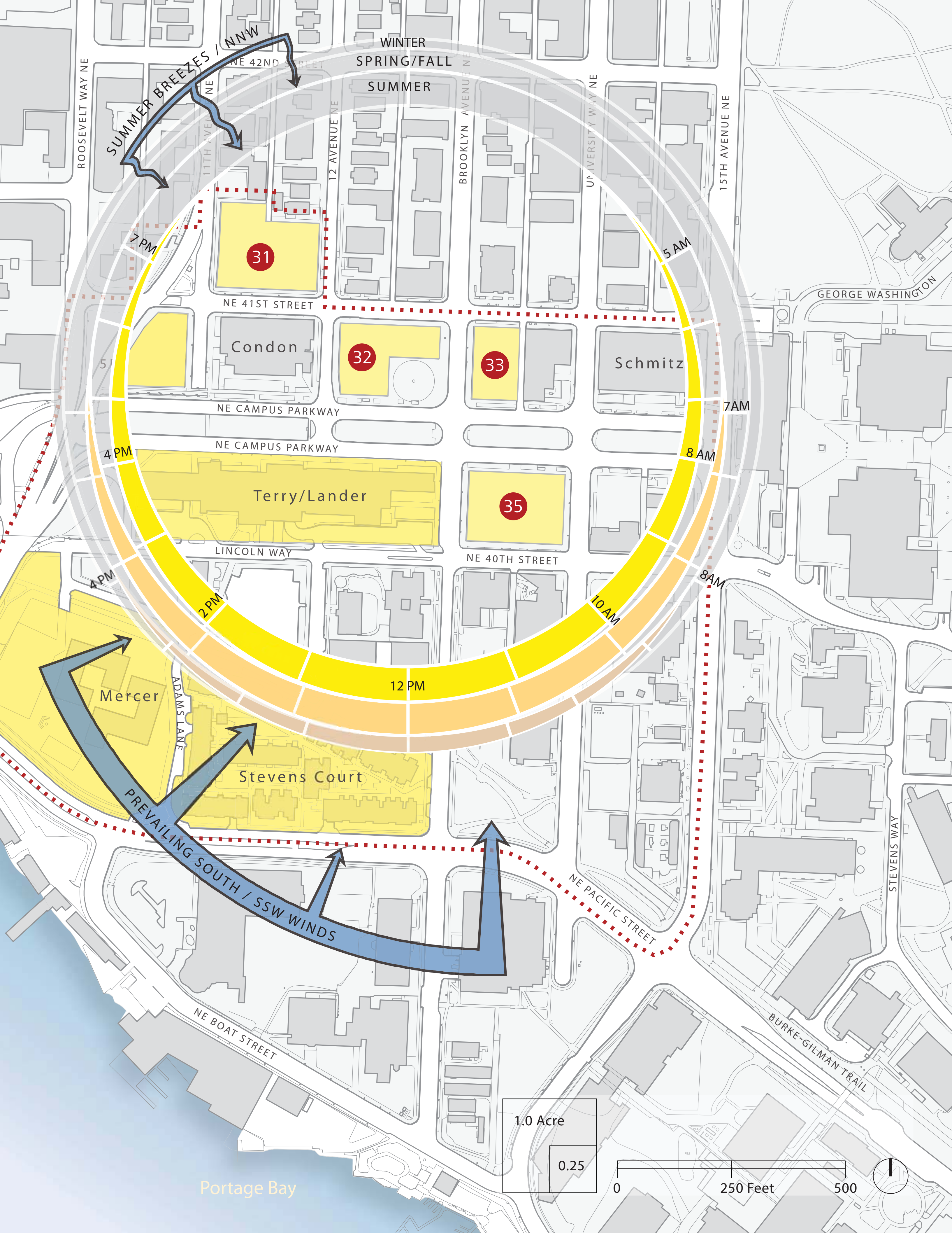
Residential Halls - Existing and Planned

Current Residential Projects

West Campus Boundary

Climatic Data:

Winter Azimuth	53°
Winter Altitude	19°
Summer Azimuth	125°
Summer Altitude	66°
Annual Rainfall	38"



WINTER
SPRING/FALL
SUMMER
SUMMER BREEZES / NNW
NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
GEORGE WASHINGTON
7 PM
5 AM
31
NE 41ST STREET
Condon
32
33
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
7AM
4 PM
8 AM
Terry/Lander
35
LINCOLN WAY
NE 40TH STREET
4 PM
8AM
2 PM
10 AM
12 PM
Mercer
ADAMS LANE
Stevens Court
PREVAILING SOUTH / SSW WINDS
NE PACIFIC STREET
STEVENS WAY
BURKE-GILMAN TRAIL
NE BOAT STREET
1.0 Acre
0.25
0
250 Feet
500
Portage Bay

FIGURE 16 | Seattle Summer Bin Data

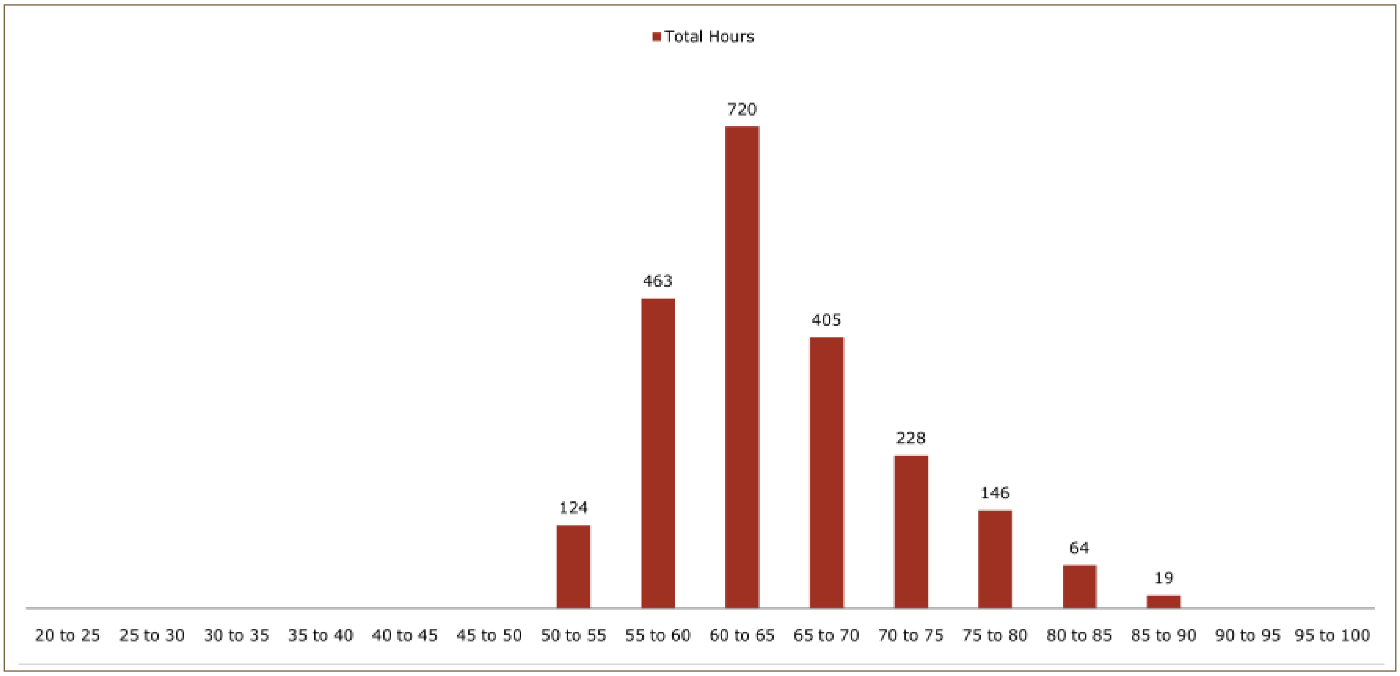
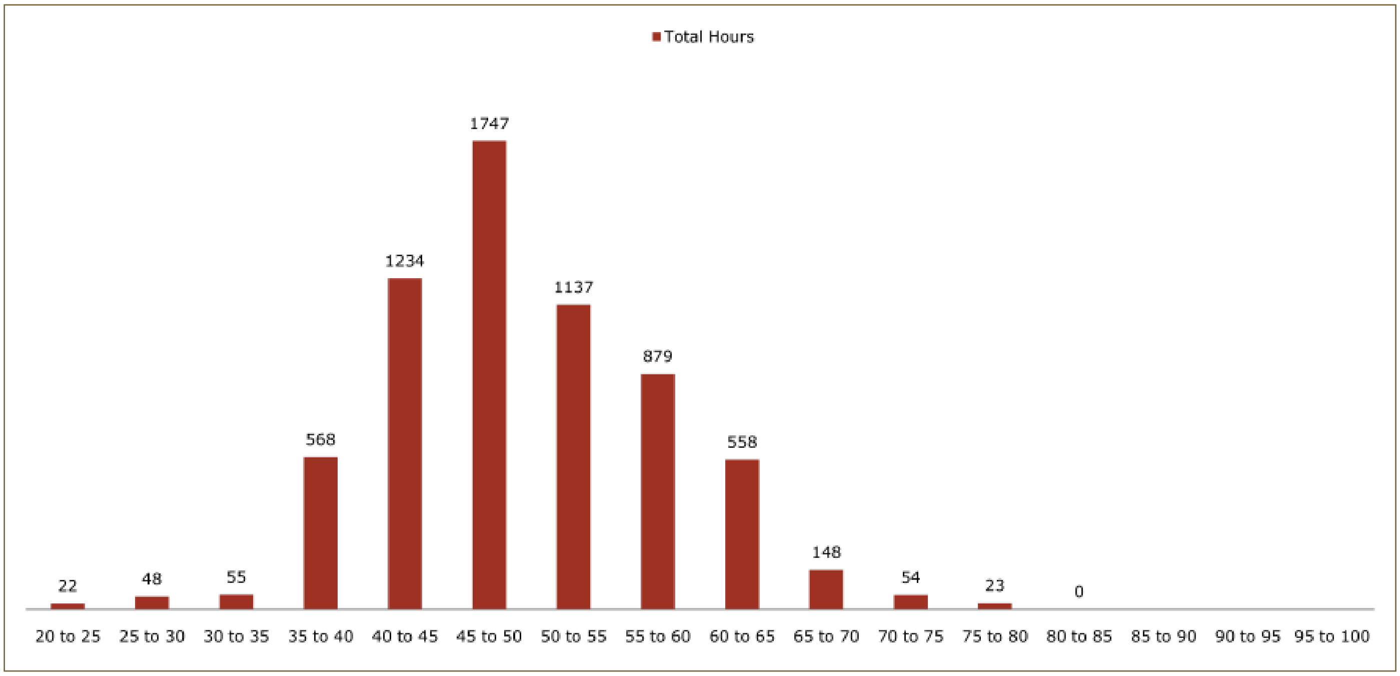


FIGURE 17 | Seattle Non-summer bin data



Figures 16 and 17 represent the total number of hours at 5-degree temperature intervals, based on TMY3 temperature data. Hours above 75°F are critical for natural ventilation because overheating of the space may occur in this temperature range.

CODE ANALYSIS

> ZONING AND UNIVERSITY COMMUNITY DESIGN GUIDELINES

LEGEND

- MIO (Major Institutional Overlay)
  NC (Neighborhood Commercial)
  MR (Residential, Multifamily, Midrise)
  RC (Residential)
  C (Commercial)
- Mixed Use Corridor
- Green Streets - Neighborhood Plan
- Public Private Parks and Playgrounds
- Seattle Green Factor
- Potential Impact Area
- Gateway
- Current Residential Projects
- West Campus Boundary

- MIO-105-MR
- MIO-65-NC3-65
- MIO-65-C1-65
- MIO-50-C!-40
- MIO-105-C1-65
- NC3P-65
- NC3-65
- MR-RC
- MR
- C1-65
- CMP = 65’ Height

LAND USE CODES

Development on the UW Campus is governed by development standards set forth in an agreement with the City of Seattle through a Major Institution Master Plan (MIMP) titled the University of Washington Master Plan Seattle Campus 2003 (CMP). The Seattle zoning map reflects this agreement with the designation of a Major Institution Overlay (MIO) zone. All Phase I project sites are within the campus boundary and as such follow development standards for the built environment. Development is analyzed for its impact on the district and campus overall. Other standards are site specific. Standards and policies calculated on a campus-wide basis include but are not limited to:

Density, Development capacity, Parking quantity and dimensions, Lot coverage Open space and landscape, Views, Circulation, and Transportation.

ZONING

The project sites have an underlying zone of Mid-Rise residential (MR) and are adjacent to MR or Neighborhood Commercial (NC) zones with height limits of either 65’ or 105’.

STRUCTURE SETBACKS

Structures are required to be setback from the property line when the property is located along the campus boundary and adjacent to residential property. Setbacks may be averaged horizontally or vertically. Setback depths are determined by the adjacent use and building height and are noted on the site plans on the following pages. Underground structures may be located within the setback areas. Covered and uncovered pedestrian bridges, walkways, and similar facilities are permitted. From initial observations, overhead electrical service lines will be removed during construction. The electrical distribution system (Seattle City Light) appears to be undergrounded; thus, no building setbacks are anticipated arising from the presence of overhead electrical service lines.

MAXIMUM BUILDING HEIGHT LIMIT

Sites 31W and the east portion of Site 35W have a height limit maximum of 65’. Sites 32W, 33W and the west portion of Site 35W have a height limit of 105’. Structure height is measured from finished or existing grade, whichever is lower. On sloped sites when more than 50% of the roof area of a floor is below the height limit, the remainder of that floor may be built above the height limit, not to exceed 15 feet. Exceptions for certain utility equipment and structures for circulation apply.

DESIGNATED USES

Project sites 31W, 32W and 33W were identified as potential housing sites and anticipated buildings with eight floors each. Potential development on Site 35W was identified as academic, mixed use and transportation. Phase I projects are mixed use including housing, academic and transportation.

MODIFICATIONS TO MASTER PLAN

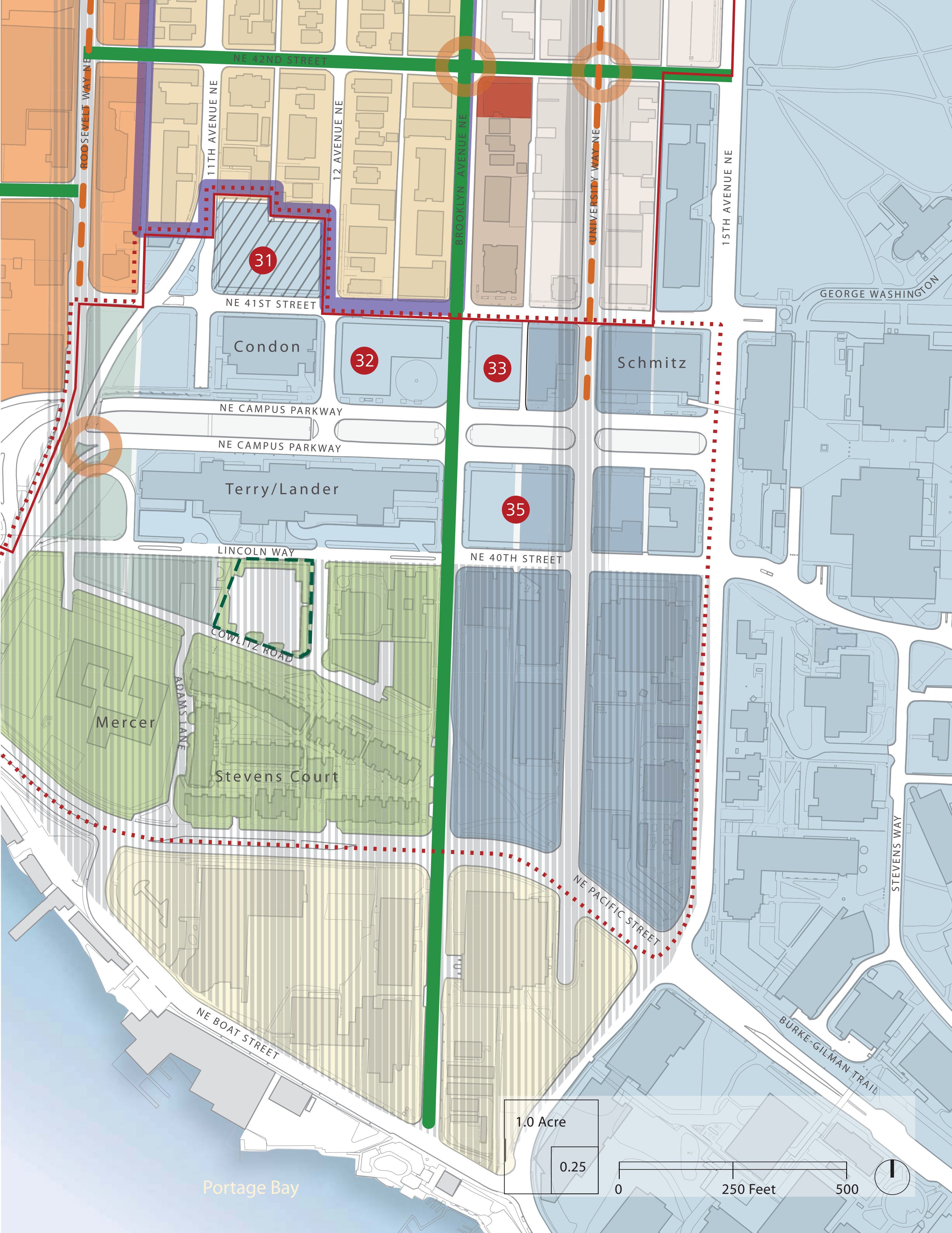
Proposed changes to the CMP include pursuit of alleviation of setbacks at Sites 31W, 32W and 33W, inclusion of Cavalier Apartments in the campus boundary and addition to beds allowed.

ALLEY VACATIONS

Noted in the CMP are potential alley vacations for Sites 31W, 32W and 35W. The vacations are identified not to significantly increase development capacity, but rather to create a better campus design. All blocks with the exception of Site 31W are University owned.

BUILDING CODES

Construction will be per City of Seattle codes, requirements, and policies (see Appendix G).


NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
GEORGE WASHINGTON
31
NE 41ST STREET
Condon
32
33
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
Terry/Lander
35
LINCOLN WAY
NE 40TH STREET
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
NE PACIFIC STREET
STEVENS WAY
BURKE-GILMAN TRAIL
NE BOAT STREET
Portage Bay
1.0 Acre
0.25
0
250 Feet
500

DEVELOPMENT STANDARDS

Existing Site 31 Plan

SITE 31W

EXISTING SITE PLAN

The site currently has surface parking and to the north are single and multi-family residences.

SITE DEVELOPMENT CAPACITY

While the underlying zone is Mid-Rise residential with a maximum height of 105', the University negotiated a maximum building height of 65'. Because the north, west and the north portion of the west facade borders the campus boundary, setbacks are required. Per the CMP, a side setback equivalent to the underlying zone is required when the site is adjacent to residential structures. The north setback is currently estimated at 16'. The setback at the west and northern east facade are 15' when the building height is 65'.

PROPOSED SITE PLAN

ALLEY VACATION

A full vacation of the alley is requested with the following conditions:

:: Access would be maintained for properties adjoining the alley.

:: The alley would be maintained by the UW and existing utilities would be relocated within a private service drive.

:: Alley access at the property would be rerouted with a 90 degree angle turn to either 12th Ave or 11th Ave and constructed to City of Seattle standards (not illustrated). The right-angle access drive would be maintained by the UW. Alternatively, the UW would provide an easement at the current location of the alley for thru-access, however this is not the preferred vacation alternative (illustrated here).

Vacation of the alley at Site 31W is important because it would allow for construction of efficient, underground parking stalls and would eliminate unsightly surface parking. The vacation would result in high-quality, midrise multifamily housing for students (50 to 60 additional beds if the alley is vacated, fewer vehicular trips to campus and existing housing stock now occupied by students could be available as workforce housing). The proposed vacation meets UCUC Directives #1 (Create & Enhance Stable Neighborhoods) & #4 (Provide Diverse & Affordable Housing).

PROPOSED SETBACK CHANGES

To match the current density and building footprints of neighboring structures, relief from the 15' setback at the east and west facades is requested.

PUBLIC BENEFITS:

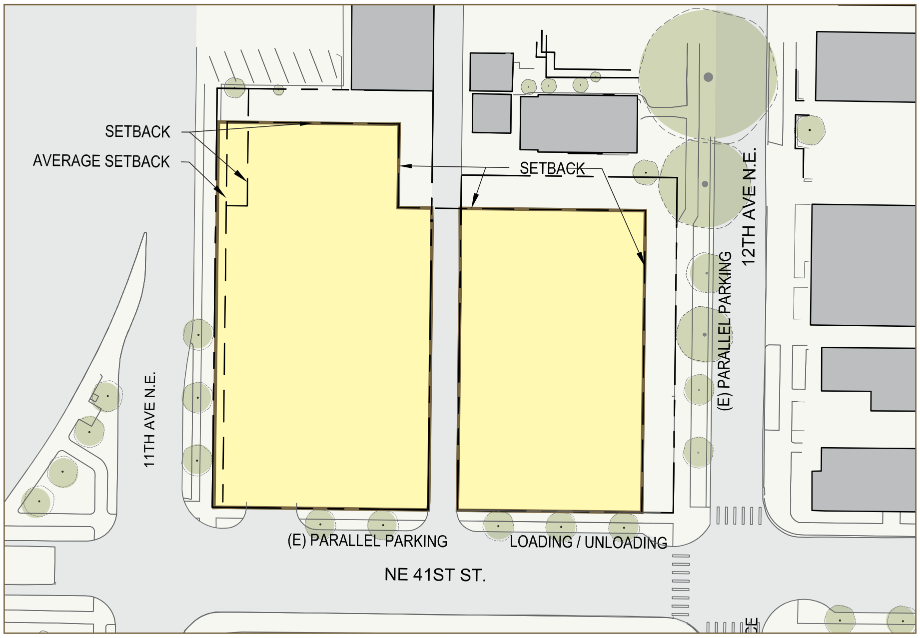
Create two neighborhood gateway green spaces by adding a neighborhood sign identifying the University District Neighborhood and by making and maintaining landscape improvements at the following:

:: Triangular parcel owned by the UW, located on the southwest corner of the intersection of NE 41st Street and 11th Avenue NE;

:: Triangular parcel owned by the City and generally located on the northwest corner of the intersection of NE 41st Street and 11th Avenue NE;

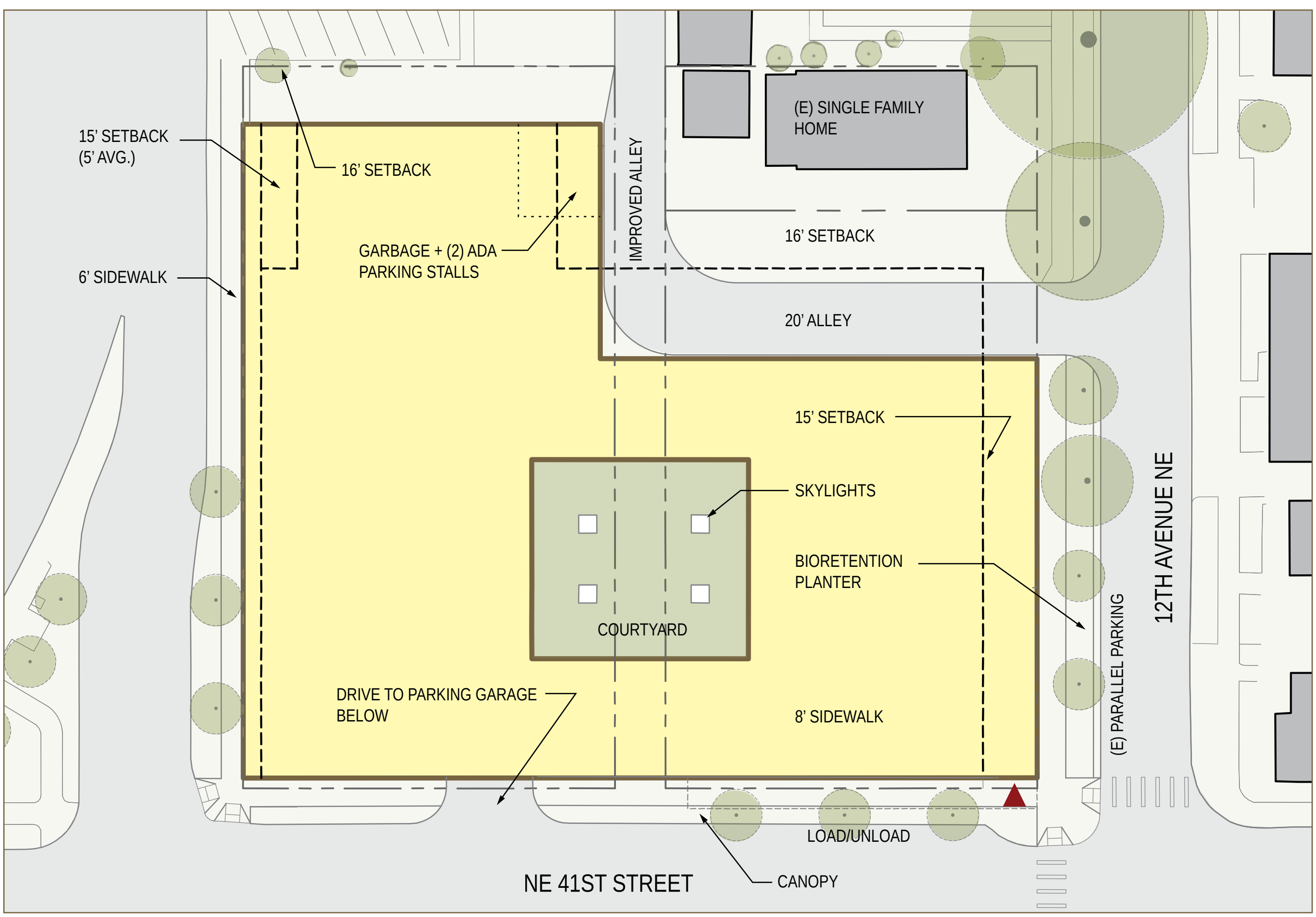
:: Enhance pedestrian experience along NE 41st Street and 12th Avenue NE by providing awnings, widened sidewalks and landscape improvements at project site;

:: Improve the University's four-block redevelopment at intersection of Brooklyn Avenue NE and NE Campus Parkway.

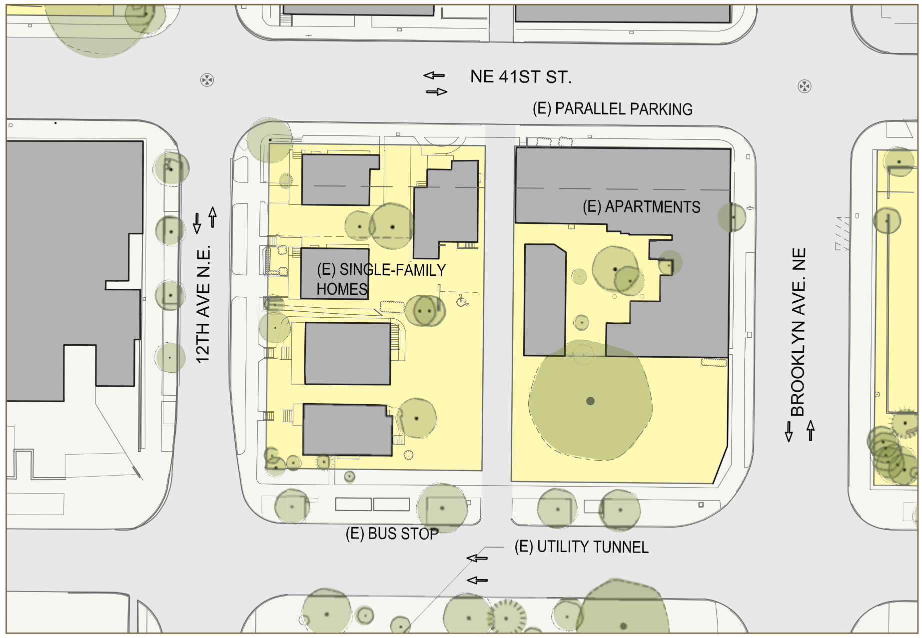


LEFT
Site 31 Development Capacity

BELOW
Proposed Site 31 Plan



Existing Site 32 Plan



SITE 32W

EXISTING SITE PLAN

The block currently has five single-family homes on the west parcel and an apartment building, parking and historic elm tree on the east parcel.

SITE DEVELOPMENT CAPACITY

Preserving the elm tree limits the east parcel's building capacity given the required setbacks. Per the CMP, a 20' setback is required at the campus boundary along 41st Street NE when the building height is 105'. The site slopes down from north to south allowing access at grade at two levels.

PROPOSED SITE PLAN

ALLEY VACATION

A full vacation of the alley at Site 32W is requested for the following reasons:

The proposed vacation would allow for integrated redevelopment of the property that maximizes the number of beds provided without affecting the existing, extraordinary site amenities. Vacating the alley results in additional beds by allowing for construction of an "L"-shaped building on the north and west sides of the block.

PROPOSED SETBACK CHANGES

Given the maximum proposed structure height of 75' and desire to match the existing streetscape and building setbacks of neighboring structures, relief from the 20' setback at the north facade is requested.

PUBLIC BENEFITS

Increase the amount of public open space around the elm that is located in the southeast corner of the block by incorporating vacated land area.

Improve landscape improvements to the open space associated with the elm to create an active community gathering space.

Reduce overall height of the proposed development from the 105' limit to 75', which would result in a housing development scale that is more friendly to the neighborhood and more affordable to students.

Enhance the pedestrian experience along NE 41st Street and 12th Avenue NE by providing awnings and landscape improvements at the project site.

Public improvements within a four-block area that includes the intersections of NE 41st Street and NE Campus Parkway at Brooklyn Avenue NE and 12th Street NE. The improvements include:

:: Improve pedestrian crossings and proposed 6' pedestrian bulbs;

:: Enhance street lighting, awnings, benches and widened sidewalk improvements;

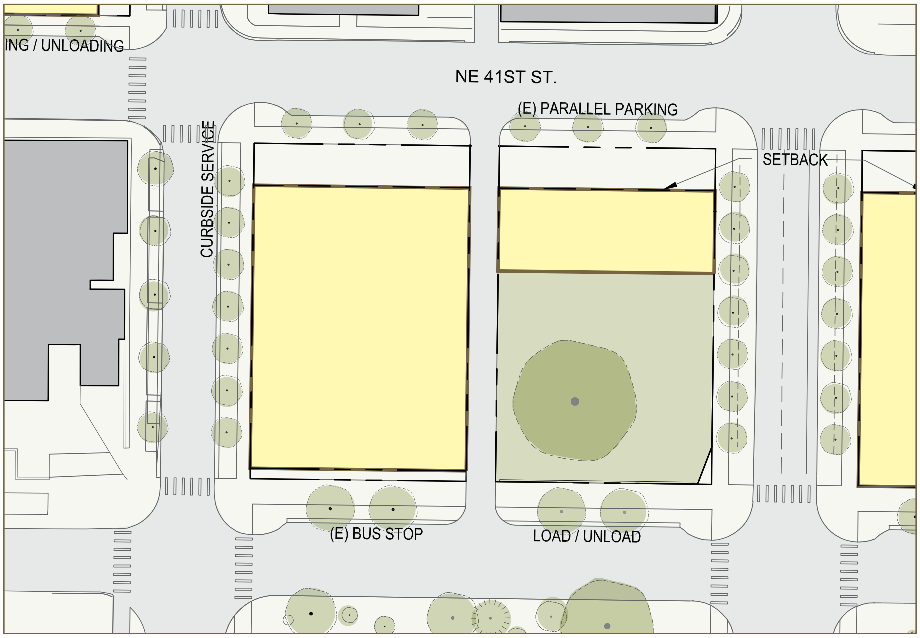
:: Add street trees;

:: Apply Green Street principles at affected streets;

:: Enlarge bus waiting area and awning shelter–pedestrians waiting at the mid-block bus stop will no longer be in conflict with vehicles utilizing the alley;

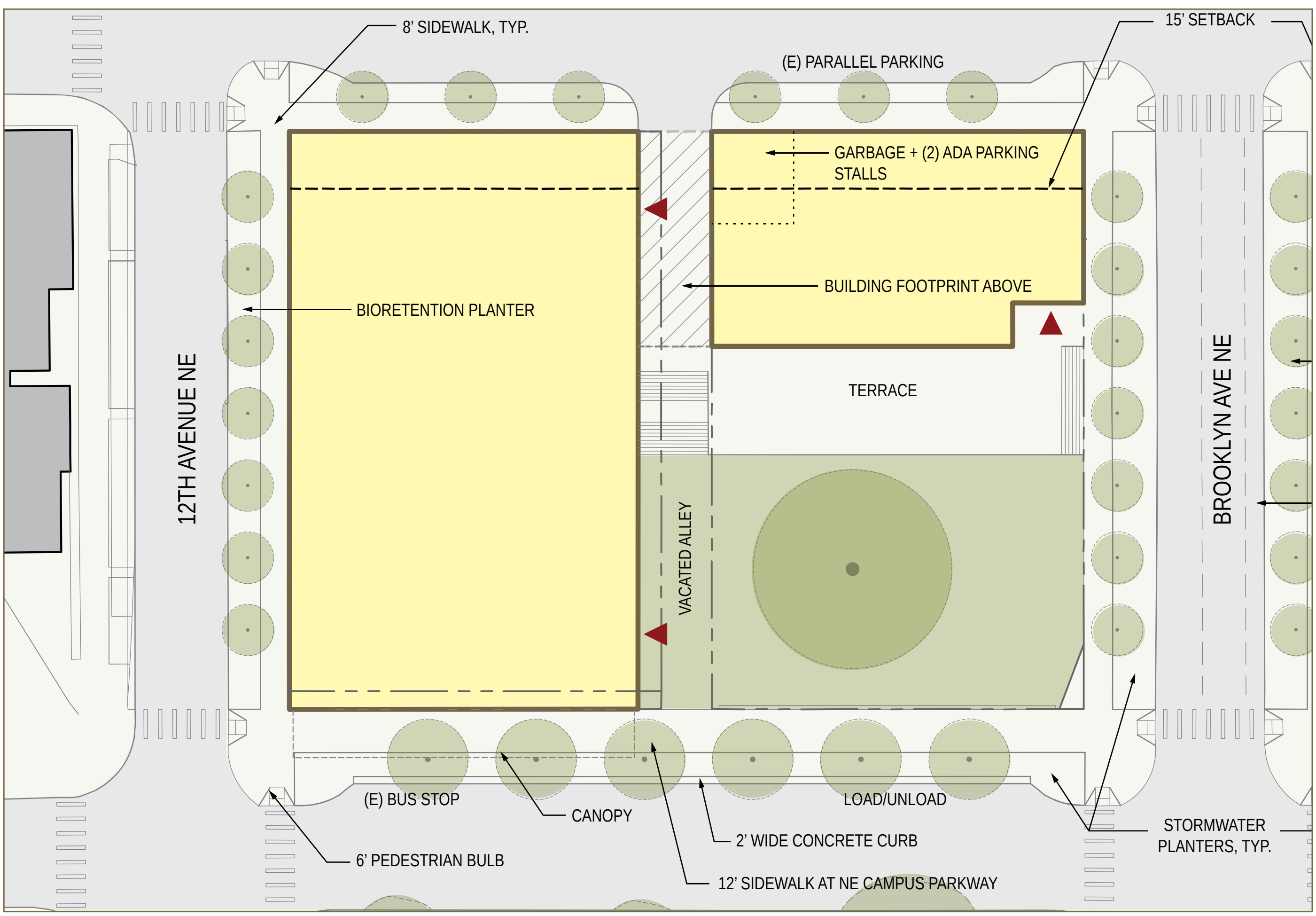
:: Improve landscape at the two blocks of the median at NE Campus Parkway.

This improvement is identified as part of UCUC Directive #6–Areas Proposed for Special Design Treatment or Improvements.

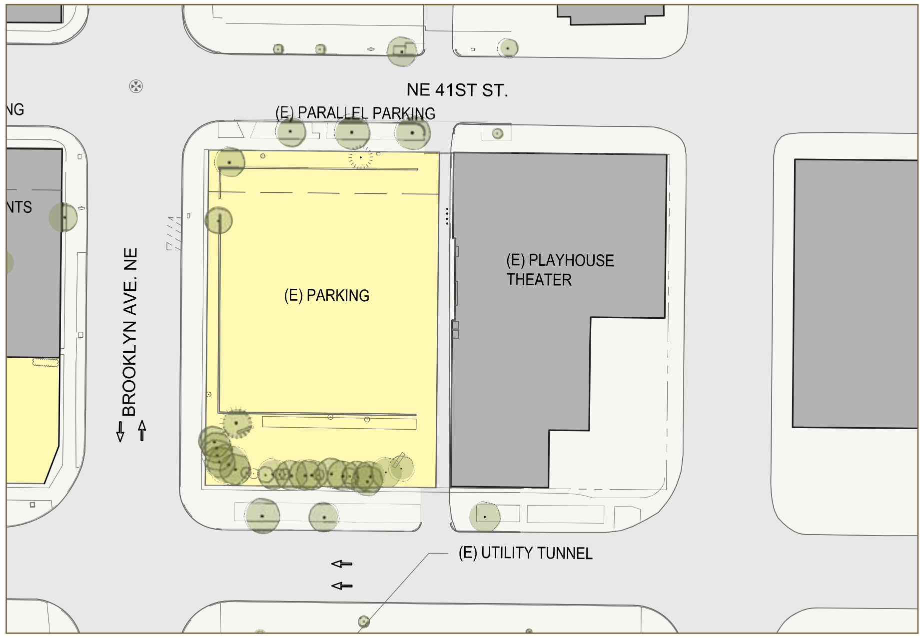


LEFT
Site 32 Development Capacity

BELOW
Proposed Site 32 Plan



Existing Site 33 Plan



SITE 33W

EXISTING SITE PLAN

The University Playhouse occupies the east portion of the block. The majority of the west portion is a gravel parking lot.

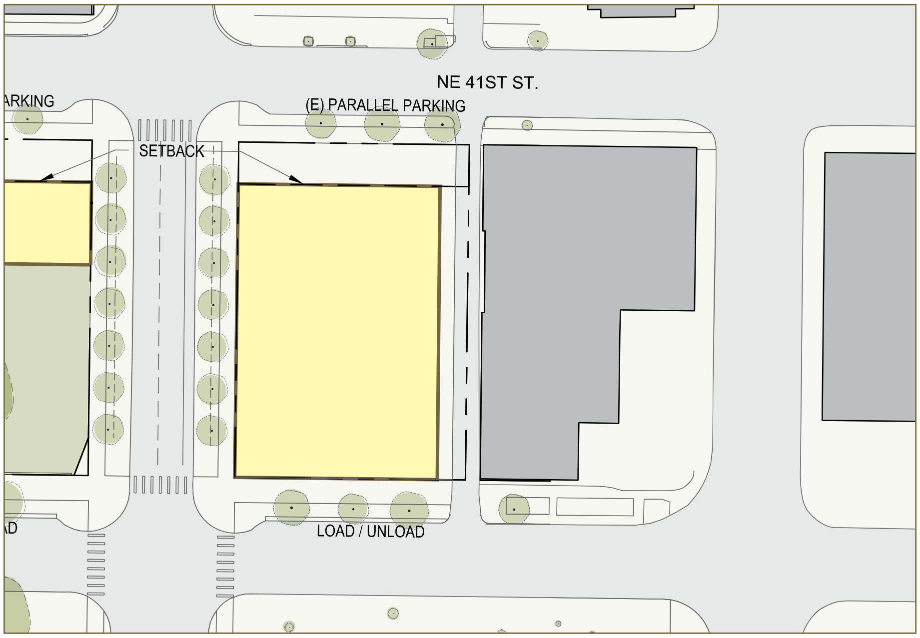
SITE DEVELOPMENT CAPACITY

Per the CMP, a 20' setback is required at the campus boundary to the north of Site 33W when the building height is 105'. The site slopes down from north to south allowing access at grade from two different levels. The drive aisle between the Playhouse and the project site will be maintained for access to the Playhouse loading dock.

PROPOSED SITE PLAN

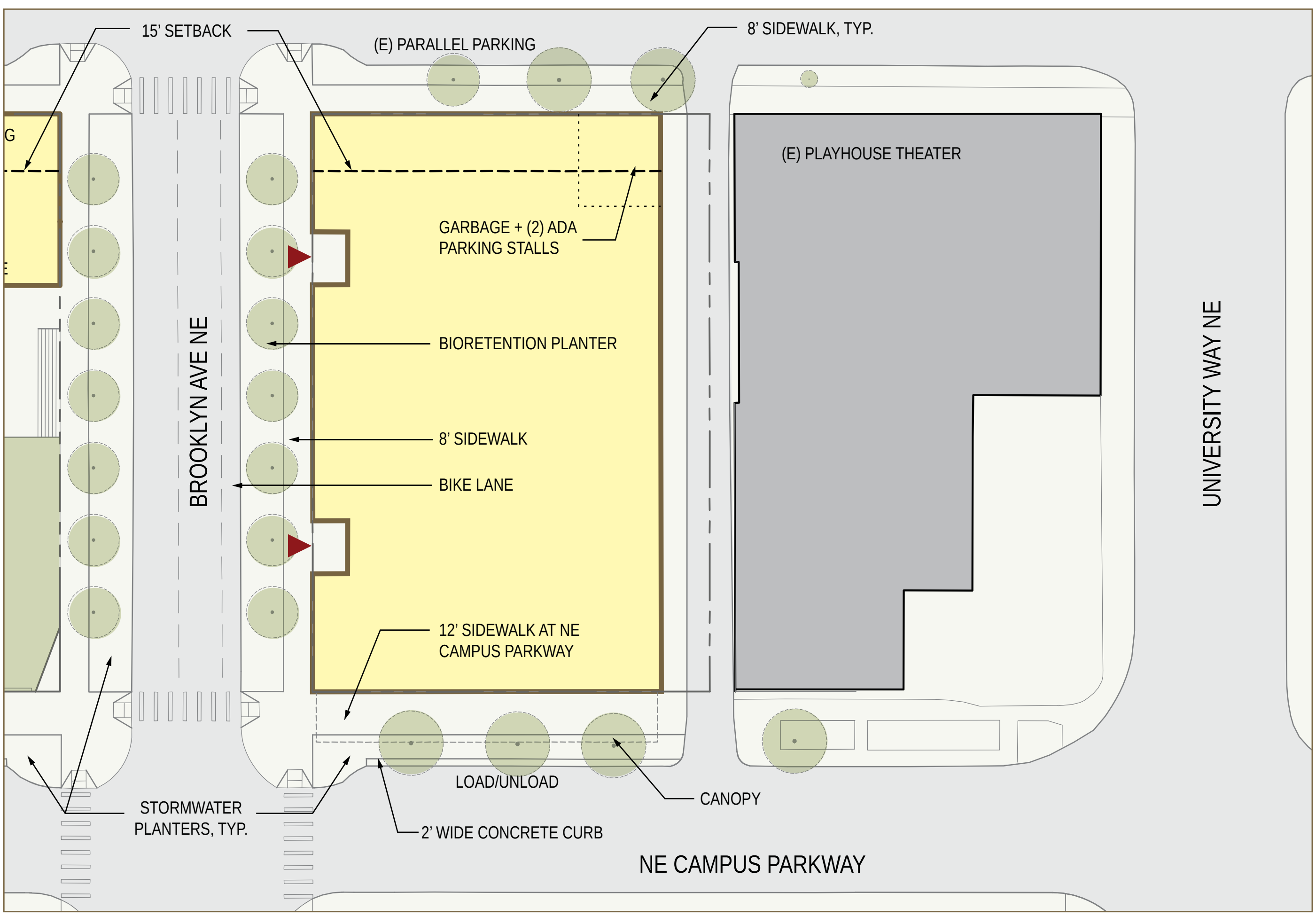
PROPOSED SETBACK CHANGES

To match the existing facade of the Playhouse and the structures across the street, relief from the 20' setback at the north facade is requested so a uniform streetscape is established.

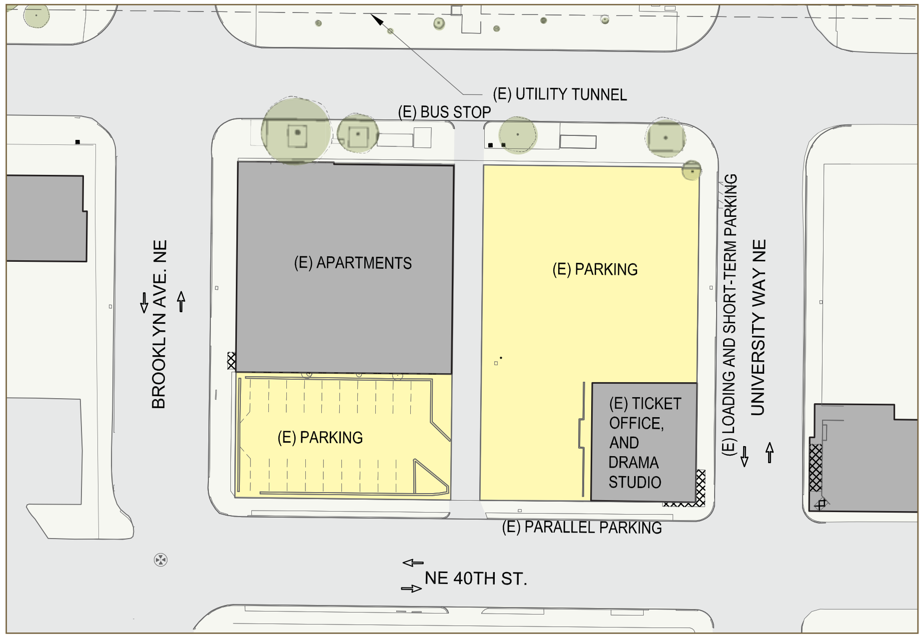


LEFT
Site 33 Development Capacity

BELOW
Proposed Site 33 Plan



Existing Site 35 Plan



SITE 35W

EXISTING SITE PLAN

The Cavalier Apartments at the northwest portion of the block were recently acquired by the University. Parking is to the south and east portion of the block.

SITE DEVELOPMENT CAPACITY

The west portion of the block has a maximum building height of 105’ and the east portion 65’. The site slopes down from north to south and from east to west.

PROPOSED SITE 35 PLAN

ALLEY VACATION

A full vacation of the alley at Site 35W is requested because it allows for integrated redevelopment that maximizes the number of beds provided while continuing to maintain pedestrian access through the block.

PUBLIC BENEFITS

Reduce overall height of the east portion of the site to 75’, creating a better scale for the neighborhood and makes housing more affordable to students.

Make concentrated public improvements at the University’s four-block redevelopment of the intersection at Brooklyn & Campus Parkway bounded by NE 40th and 41st Streets, and 12th Avenue NE and University Way NE (identified as part of UCUC Directive #6–Areas Proposed for Special Design Treatment or Improvements), as follows:

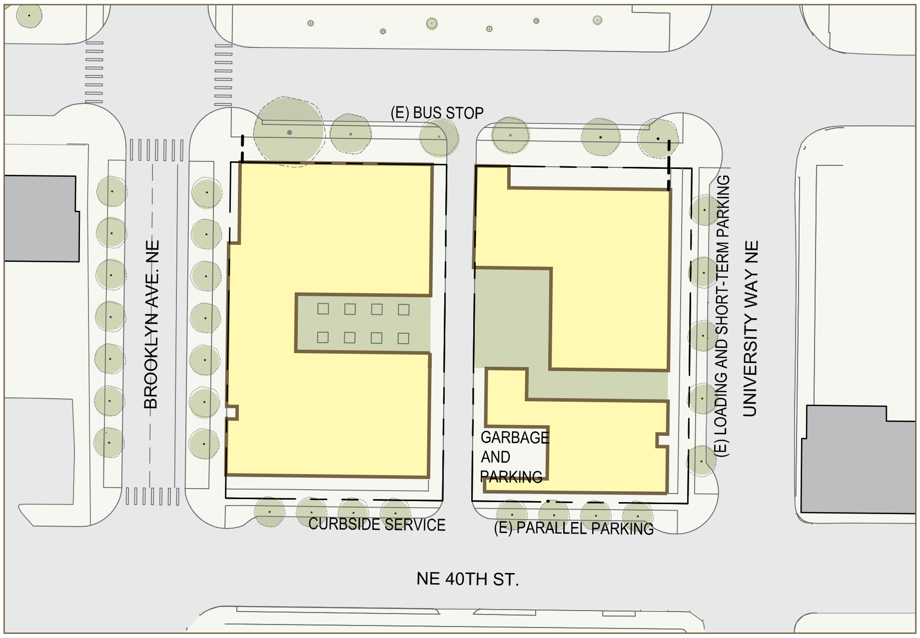
:: Improve pedestrian crossings and add pedestrian bulbs;

:: Enhance street lighting, awnings, benches and other sidewalk improvements;

:: Add street trees and application of Green Street principals throughout this areas;

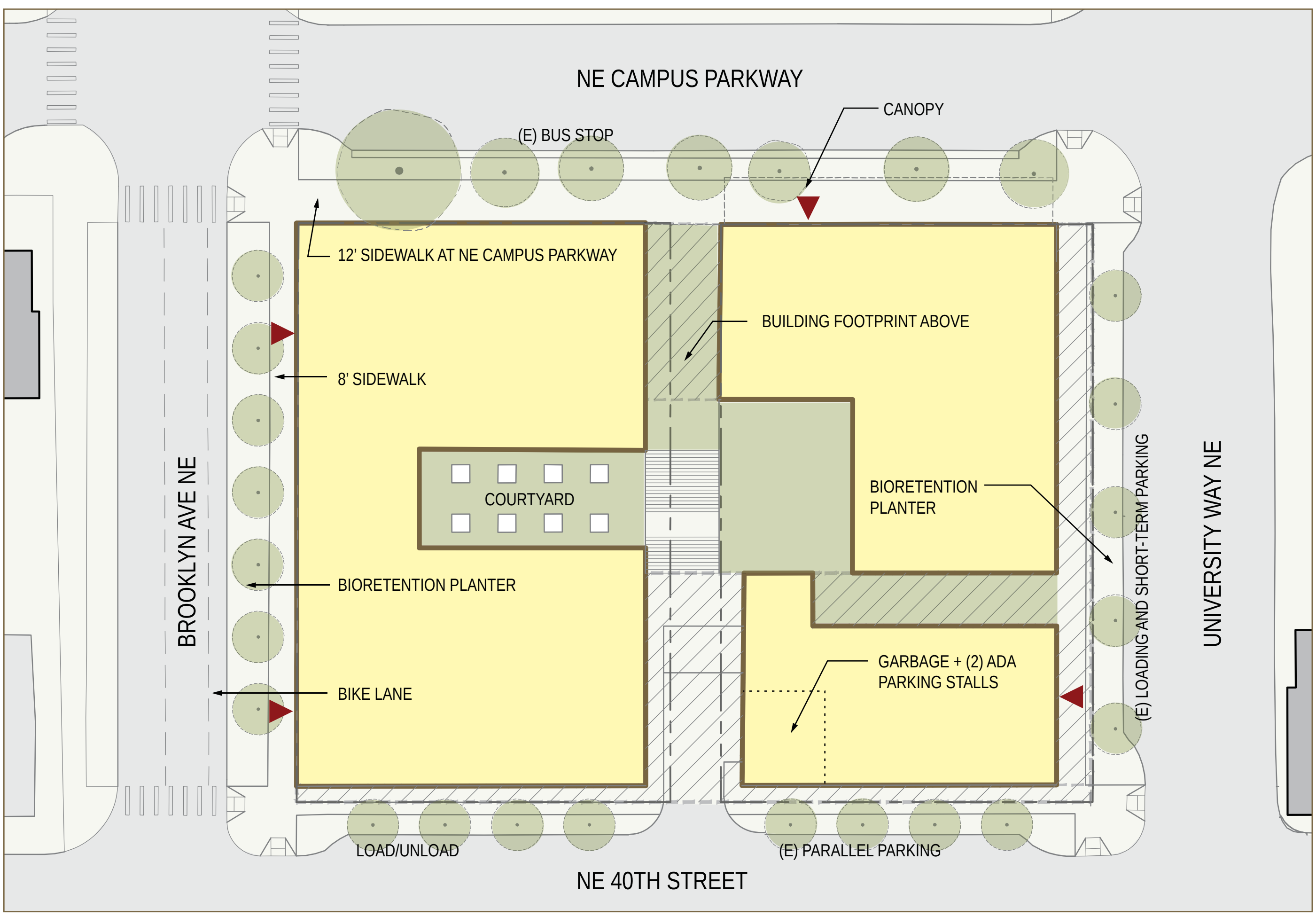
:: Enlarge bus waiting area and provide awning shelter–pedestrians waiting at the mid-block bus stop will no longer be in conflict with vehicles utilizing the alley;

:: Landscape improvements to the two block-long medians along Campus Parkway.



LEFT
Site 35 Development Capacity

BELOW
Proposed Site 35 Plan



UTILITIES AND INFRASTRUCTURE

FIGURE 18

UTILITY TUNNEL (UTILIDOR)

The UW Campus is served by a network of tunnels and trenches which house high pressure steam, condensate return, central cooling water, compressed air, electrical power, emergency power and communication utilities. The NE Campus Parkway branch of UW's utility tunnel system (the Utilidor) runs East-West under the NE Campus Parkway median between Central Campus and NE 40th Street. It then turns south and extends underneath Terry Lander Hall. The Utilities Master Plan recommends that all sites adjacent to the Utilidor that will include new buildings should include the construction of Utilidor extensions in their programming and budget. Sites 31W (via Condon Hall), 32W, 33W, and 35W are included in this recommendation in the Utilities Master Plan.

The Utilities Master Plan identifies several capacity issues that may arise regarding the Utilidor if and when additional piping for high pressure steam, condensate return, the central cooling water system and the compressed air system is needed to accommodate future growth.

POWER

Existing 13.8kV distribution dual-service feeders are routed along NE Campus Parkway via an existing underground utility tunnel. These service feeders serve most existing buildings located in west campus.

EMERGENCY POWER

Existing campus emergency distribution is available in the form of a 2.4kV circuit in the underground utility tunnel at NE Campus Parkway. This circuit currently serves existing buildings at the west campus, including the Terry-Lander building. UW Facilities Services has indicated that this circuit has capacity if project emergency loads are limited to life safety. Further design analysis will need to be completed during the design phase of the project.

The existing University of Washington Seattle campus infrastructure masterplan indicates that a new 4.16kV feeder will replace the existing 2.4kV emergency distribution feeder. The timeline for transition is undetermined.

CAMPUS STEAM

High pressure steam mains (125psi) are piped through the tunnel under the NE Campus Parkway median; this steam could be extended from the tunnel to provide building heat and domestic water generation. Initial studies indicate that use of steam may not be well-suited to this project; refer to Section 4 Program Analysis for additional detail.

GAS

Gas services are available at the street for each site. Natural gas distribution within the UW campus is served by a Puget Sound Energy (PSE) distribution main line that parallels the Burke Gilman Trail, south of the project sites. Existing gas main lines adjacent to the project sites are indicated on Figure 18. Once building loadings are determined, the existing gas line capacities will need to be reviewed with PSE to determine if any improvements will be required.

EXISTING CONDITIONS

11th Avenue NE and NE 41st Street looking North

North frontage of NE 41st Street looking west

FRONTAGE

EXISTING CONDITIONS

STREETS

All streets fronting the project sites are surfaced with asphalt wearing course, except NE Campus Parkway, University Way NE and portions of Brooklyn Avenue NE, which are surfaced with concrete panels. Most paving surfaces within the project area are showing signs of deterioration, including potholes and cracking. Curb heights have been decreased in some areas to less than the standard 6-inches due to repeated asphalt overlays.

NE 41st Street is considered a local street, although it is of similar width to adjacent arterials. The asphalt surfacing on NE 41st Street between Brooklyn Avenue NE and University Way NE along the north frontage of Site 33W has been improved recently and is in good condition. The remaining surface of NE 41st Street is uneven with considerable cracking and other signs of deterioration.

SDOT has verbally indicated current street widths and Right-of-Ways (ROWs) in the project area are sufficient and that the Project will not need to dedicate any frontage to the ROW. However, the final decision is subject to SDOT's formal review.

Brooklyn Avenue NE is designated as a Green Street in the neighborhood plan (not yet adopted by the City). However, to date, there have been no street improvements undertaken to implement this designation. Additionally, both the City and UW have long identified Brooklyn Avenue NE as a key street for bicycling and traffic calming.

SIDEWALKS

While the sidewalks in the Project area are fairly developed on street frontages, they tend to be old and do not meet current Seattle Department of Transportation (SDOT) standards. Sidewalk surfaces have been significantly disrupted by uprooting of mature street trees. The uneven sidewalks are an inconvenience to pedestrians and a major barrier for the disabled, who constitute 10% of the University District's existing resident population. Obstructions such as sign posts, parking kiosks, hydrants, vaults, etc. are located within many of the sidewalks in the area, further hindering pedestrian traffic.

ADA ISSUES

While most of the curb ramps within the project area conformed to then-current standards when they were constructed, they do not meet current SDOT ADA standards with respect to width, grade, landing area, cross slope, and detectable warning. As a result, they will need to be replaced when new construction occurs.

There are also a number of paths, including the concrete walkway crossing the NE Campus Parkway landscaped median in front of Terry Lander Hall, that are not accessible. Sidewalks on the south side of Condon Hall have extreme cross slopes which also make them inaccessible routes. Walkway widths from Eastlake Avenue NE to Condon Hall above NE Campus Parkway are too narrow and uneven to be used by persons in wheelchairs or using assisted walking devices.

ANTICIPATED FRONTAGE IMPROVEMENTS

Given the frontages' existing condition, we anticipate that improvements will be required to repair the following conditions:

:: bring all curb ramps up to current ADA code;

:: repair sidewalks and roads that are in poor condition;

:: repair sidewalk and road impacts from utility trenching and installation. The width of the required street overlay will vary with the extent of the repairs required.

TABLE 1
SDOT Right of Way improvements manual

*NOTE: ONLY STREETS RELEVANT TO THE PROJECT ARE LISTED									
STREET NAME	FROM	TO	MONTH / YEAR REVISED	CLASS	EXIST. RIGHT OF WAY	REQ'D RIGHT OF WAY	EXIST. CURB	EXIST. ROADWAY WIDTH	REQ'D ROADWAY WIDTH
11 AV NE	EASTLAKE AV N	NE 45 ST	NOV-91	1	60	66	2	39	?
12 AV NE	12 AV NE	NE 73 ST	NOV-91	1	60	66	2	40	?
NE 40 ST	BROOKLYN AV N	15 AV NE	NOV-91	3	60	60	2	42	42
NE 41 ST	ROOSEVELT WY	EASTLAKE AV NE	NOV-91	1	60	60	2	25	25
BROOKLYN AV NE	NE PACIFIC ST	NE 40 ST	NOV-91	3	70	70	2	40	40
BROOKLYN AV NE	NE 40 ST	NE 45 ST	NOV-91	3	60	60	2	45	45
NE CAMPUS WY	NE 40 ST UPR	15 AV NE	NOV-91	2	160	160	2	64	64
NE PACIFIC ST	NE NORTHLAKE	BROOKLYN AV NE	NOV-91	2	80	80	2	40	40
NE PACIFIC ST	BROOKLYN AV N	15 AV NE	NOV-91	2	80	80	2	55	55
UNIVERSITY WY NW	NE PACIFIC ST	NE 50 ST	NOV-91	3	60	60	2	42	42

We also anticipate that water quality treatment will be required for street full pavement depth replacement activities (see pg 4-28).

With respect to all anticipated frontage improvements, a Street Improvement Design Guidance Meeting with SDOT will confirm actual requirements.

BICYCLE FACILITIES

During the 1970's, Brooklyn Avenue NE south of NE 40th Street was equipped with bicycle side path facilities – this is the reason Brooklyn Avenue NE narrows south of NE 40th Street toward the Burke-Gilman Trail crossing. While the side path still technically exists, neither UW nor SDOT has maintained it as a bicycle facility. According to SDOT staff, bicyclists have found the side path difficult to ride and perceive it as unsafe at points of access/egress.

The Study Area also contains a number of other bicycle facilities. University Way NE was recently marked with sharrows from NE Pacific Street to NE 50th Street. Bicycle lanes are planned for the University Way NE north of NE 50th Street. NE 40th Street has bicycle lanes from Brooklyn Avenue NE east to 15th Avenue NE.

The Roosevelt/Eastlake one way couplet is designated for sharrows in the Seattle Bicycle Master Plan (SBMP), but design challenges presented by existing peak hour parking restrictions have forced the City to defer implementation. The University Area Transportation Study recommends eliminating the peak hour parking restriction and converting one lane on each street into a bicycle lane.

FUTURE PUBLIC TRANSIT (SOUND TRANSIT AND STREETCAR)

The combination of residential unit development and expansion of high capacity transit services in the project area will create additional demand for pedestrian facilities. While streetcar development plans are by no means certain, the combination of streetcar service on lower Brooklyn Avenue NE and the programmed development of the LINK light rail station between NE 43rd Street and NE 45th Street will certainly result in higher volumes of pedestrians seeking access to and from transit to UW and University Way NE along Brooklyn Avenue NE and across NE 41st Street, NE 43rd Street and NE Campus Parkway.

SITE 31W ALLEY DEDICATION

The office of the City of Seattle Fire Marshal has indicated that terminating the alley in a dead end is not an issue for the Fire Department. However, SDOT has indicated on other projects that a hammerhead turnaround or cul-de-sac is required in this situation.

If a dead end is not acceptable, one possibility would be to include a "J" alley for through traffic coming from the north end of the block (including garbage trucks or service vehicles, etc.) with an exit on 11th Avenue NE or 12th Avenue NE. The flat portion of the "J" alley could be located in the setback, or could be proposed to be located in setback if needed. While SDOT has approved this type of alley condition on other projects, as set forth in Section 4.22 of the Street Improvement Manual (Table 1), SDOT reviews alley dead ends on a case by case basis.


ELEVEN
01
Cafe
Café
H
PAY HERE TO PARK

PROGRAM ANALYSIS

FUNCTIONAL PROGRAM - SPACE REQUIREMENTS

Housing and Food Services (HFS) is a self-sustaining auxiliary enterprise that employs over 700 full, part-time and student staff, and currently collects over $45 million in annual revenue. The Department's facilities include seven residence halls housing over 5,000 single students, 118 apartments housing 524 single students, 207 apartments for family housing, and 538 apartments for family housing provided through public-private partnerships. HFS also operates 21 food services outlets serving over 26,000 customers daily, a full-service catering department and a summer conference-housing program. HFS also operates a debit-card program for the University.

The mission of HFS is Working Together to Enhance Student Life

www.hfs.washington.edu

ARCHITECTURAL PROGRAM

PROCESS

The UW housing program began from an HFS edited program that stemmed from the 'Comprehensive Housing Master Plan completed by Hanbury Evans Wright Vlattas + Company in June 2008. This program was evaluated and revised, based on information gathered from discussions with the Steering Committee, tours of existing facilities, and in-depth meetings with some specialized program areas, such as the UW Arts Ticket Office and Drama Studio. In addition, program areas were compared with other similar facilities in the region.

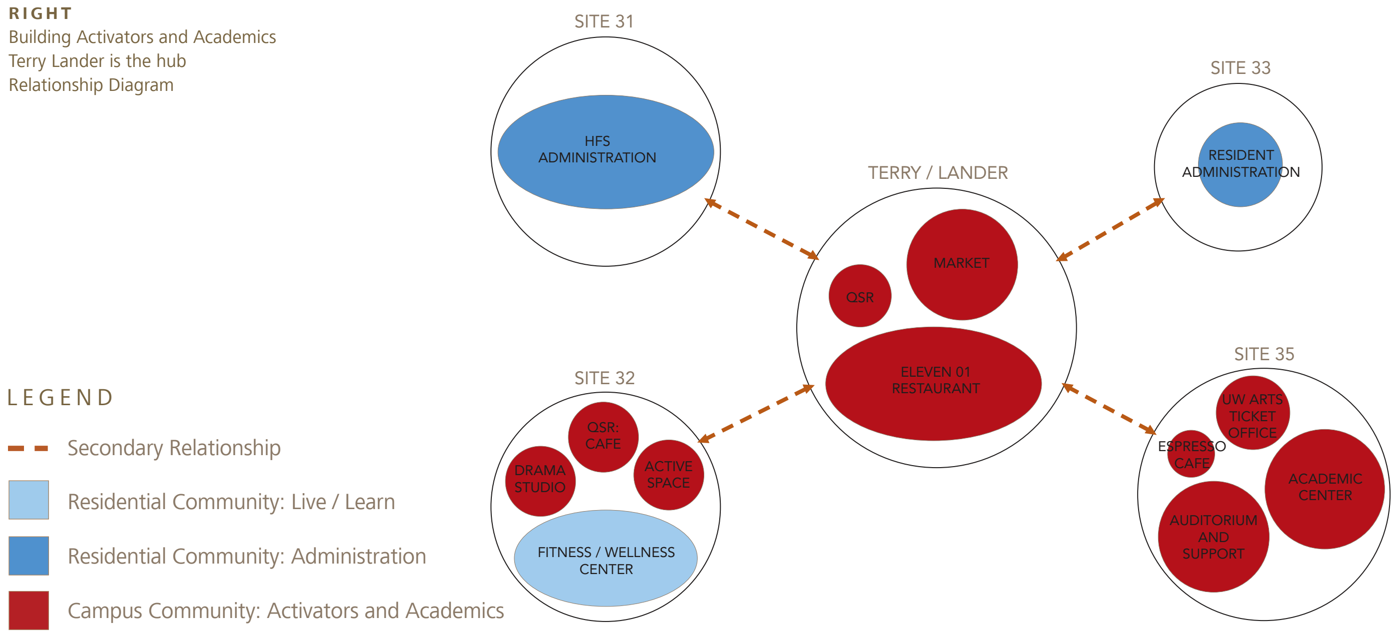
Once the basic program was established, detailed room requirements and plan tests were completed for each space, to verify that the allocated area is adequate for the intended functions.

ASSUMPTIONS

The UW housing program is based on a number of assumptions, including:

:: Maximize bed count, minimum of 1700 beds on the 4 sites
:: 122 single beds
:: All units (double and single) will have a private bath
:: Units designed to accommodate summer conference attendees
:: Some public area space on G1 and G2
:: Programming will include evaluating program in Terry Lander
:: Create the correct mix of program to activate the West Campus
:: Residential floor have a floor lounge, a 4-6 seat classroom and floor support
:: Each building has specific community area
:: Classrooms are distributed through all 4 sites.
:: Main food service will remain at Terry Lander
:: Regional desk - 'super desk' - located at Terry Lander will be a regional desk for all West Campus residents.
:: Keys, and large mail for all West Campus residence halls distributed at 'super desk
:: The Student Housing Phase 1 Buildings will not have a manned desk at the entry.
:: Resident Advisor (RA) ratio to equal 1 to 50 students maximum
:: Resident Advisor (RA) units are a double unit used as a single
:: One Resident Directors (RD) apartment per building on G1 - independent of students.
:: Parking at 31, must accommodate at least 80 spaces.
:: The Drama Program and Ticket Booth on site 35W need to be accommodated in G1 or G2.
:: Initial HFS program assumes alley vacates and full build out of G1 and G2.

RIGHT
Building Activators and Academics
Terry Lander is the hub
Relationship Diagram



PROGRAM ORGANIZATION

The program includes separate building programs for four new residential halls on campus (at Sites 31W, 32W, 33W and 35W), plus renovation and addition to the ground floors of the existing Terry and Lander Halls.

The first two floors of the new buildings are primarily non-residential (floors G1 and G2), the programs on these floors consists of residential building community, residential community and campus community, with five floors of housing and support above (floors R1-R5). All of the new residential halls include some areas that are exclusively for the use of the building's residents, some areas for the entire residential community, and some areas for the entire campus community. The campus community areas are used as "activators" for each building.

The program for the existing Terry and Lander Halls includes future renovation of the two lower floors, G1 and G2, as well as a small addition. There is currently parking for the building, but no new parking or additional exterior open space is planned at this site. The residential floors above will remain and be renovated. Currently some rooms are serving as triples; completion of Phase One will allow these rooms to revert to design capacity (double occupancy).

Campus community activators for Terry and Lander Halls include the existing Eleven 01 Restaurant, a quick service restaurant, and a new storefront market. These are intended to support and enrich the entire campus community. The commissary is also located at Terry/Lander, for use by campus staff.

The new program includes two resident director apartments and all of the typical community areas to support building residents, similar to the new residence halls. Areas include floor lounges, TV lounge, group kitchen, laundry, and other areas. Some spaces may differ in size from the new residence halls, due to existing building constraints.

Live/learn areas are also included in the program, providing support for the entire residential community. Live/learn amenities include varying sizes of classrooms, music practice rooms, video conference room, technology training, and a resource room.

Residential administration is also housed at Terry and Lander Halls, including resident director offices in an advisory suite and RHSA offices. The Regional Desk, known as the "Super Desk," will provide services to residents in Terry, Lander, Stevens, all new residence halls and conference guests. Mail and small package distribution will occur in each of the new residence hall lobby areas.

Program areas in each building are organized into the following categories:

:: Residences
Single and double units for students and resident advisors, as well as apartments for the resident directors and visiting staff or summer conference directors. There are several units: a single, a double, and accessible double unit and a single apartment.

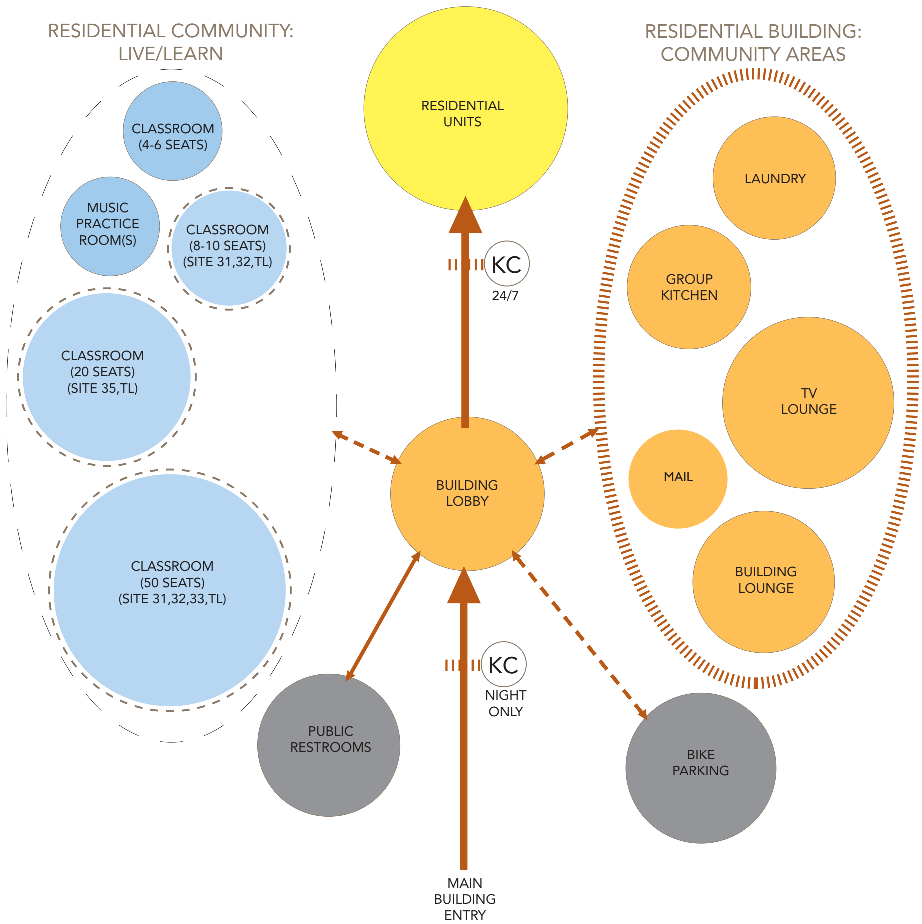
:: Residential Building: Community Areas
Shared areas exclusively for the use of building residents, including both recreational areas, such as floor lounges and TV lounge, and resident support areas, such as mailboxes and laundry.

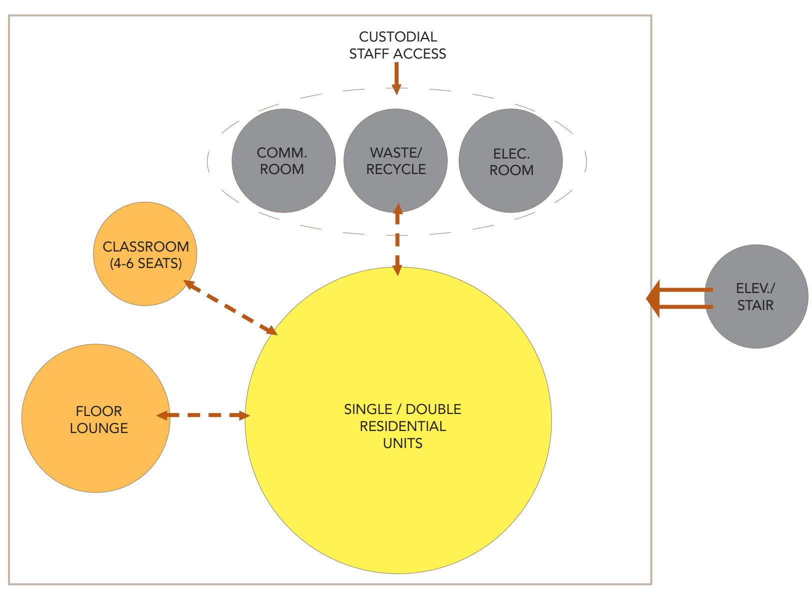
:: Residential Building: Services/Support
Service areas, such as vending and restrooms, as well as building support, such as storage and custodial areas.

:: Residential Community: Live/Learn
Includes the Wellness/Fitness Center and academic spaces available to all campus residents, such as classrooms of various sizes, video conference and computer lab facilities. These areas are primarily used on a reservation basis, and may also be used by academic departments as necessary.

UPPER RIGHT
Residential Building / Residential Community Relationship Diagram

LOWER RIGHT
Residential Floor Relationship Diagram





:: **Residential Community: Administration**
Shared administration for the residence halls, such as resident director and advisor offices, and all HFS administration areas.

:: **Campus Community: Activators and Academics**
Publicly accessible spaces that bring people in and enliven the building, such as restaurants and cafes, and market. Campus Community also include some academic spaces, such as the drama studio, academic offices and classrooms and auditorium.

PROGRAM RELATIONSHIPS

The diagram on this and the following page illustrate key relationships between program areas.

Building Community/Residential Community

Floors G1 and G2 contain areas with varying levels of security and accessibility. Areas that can be accessed by the entire residential community on campus include live/learn spaces such as classrooms and music practice rooms. Areas that are for the exclusive use of building residents, including common areas such as the TV lounge and laundry, are secured and accessible only to building residents.

Residential Floors

UPPER RIGHT
Residential Administration and Custodial Relationship Diagram

LOWER RIGHT
HFS Administration and Support Relationship Diagram

LEGEND

- Primary Relationship
- Secondary Relationship
- Area not in all Buildings
- Security Separation
- KC Key Card
- Residences
- Residential Building Community Areas
- Services / Support
- Residential Community: Live / Learn
- Residential Community: Administration
- Campus Community: Activators and Academics

The residential floors (R1-R5) are organized in the same way in all of the new residence halls. Each floor has a combination of single and double units, and one or more floor lounges and small classrooms that are accessible from all of the units. Residents also have access to the floor's waste/recycle area.

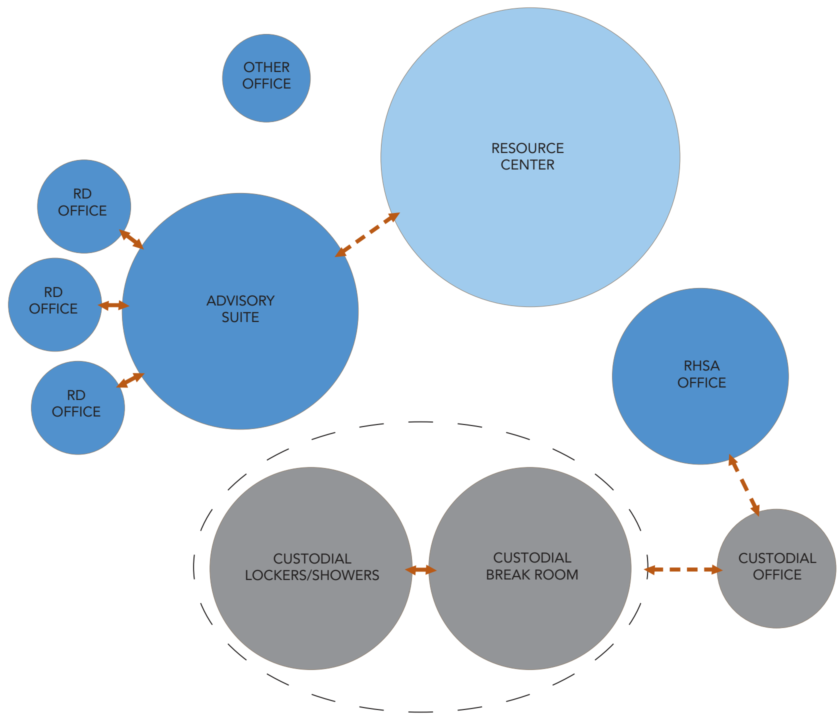
Residential Administration and Custodial (Site 33W)

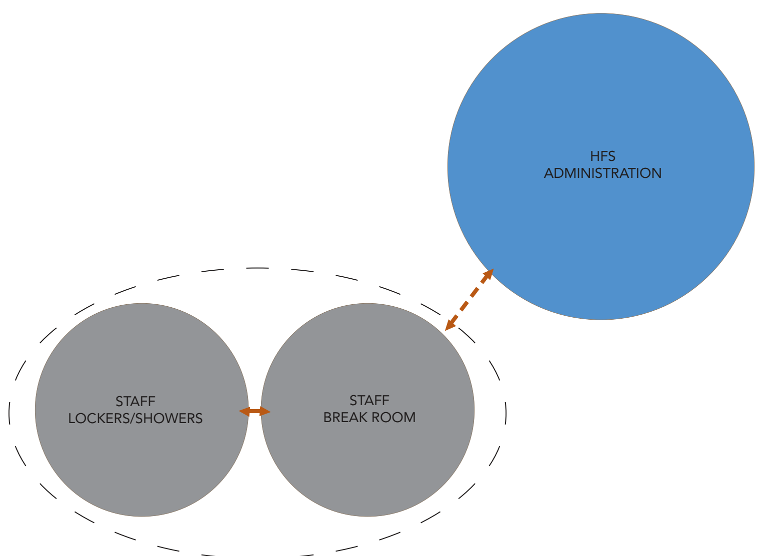
Residential administration areas are grouped together at Site 33W, and have a relationship to the resource room. One of two main custodial offices is also located in this building, along with a custodial break room and locker/shower room. The other is at Terry Lander.

Locating administrative and custodial support areas together is intended to encourage interaction between these groups which support the residential halls population.

HFS Administration and Support (Site 31W)

All of the HFS (Housing and Food Services) Administration areas are located at Site 31W. A staff break room and staff lockers/showers are also located in this building for the use of HFS Administration staff.





Building	NSF	GSF	GSF w/ Pkg/Ext	Beds
Site 31	123,204	174,950	216,550	524
Site 32	96,105	136,469	145,769	407
Site 33	56,679	80,484	83,584	237
Site 35	133,026	188,897	198,997	580
Total-New Buildings	**409,014**	**580,800**	**644,900**	**1,748**
Terry/Lander (G1/G2 only)	55,650	79,023	79,023	0
Total-Including Terry/Lander	**464,664**	**659,823**	**723,923**	**1,748**

PROGRAM SUMMARY

The UW housing program provides a total of 580,800 gross square feet of new building area and approximately 1,750 new residential beds for the campus. The chart above right illustrates the net square feet (NSF), gross square feet (GSF), gross square feet including parking and exterior areas (GSF w/ Pkg/Ext), and total number of beds for each building site.

Bed Count / Distribution

New residential buildings at Sites 31W, 32W, 33W, and 35W will provide a total of 1,750 new beds for the University. This includes 122 single units and 813 double units.

Most units are located on residential floors 1-5 in each building, with some additional units on Floor G2. Terry and Lander Halls residential units on G2 are not included in this program. The chart at right illustrates bed distribution among the new residence halls.

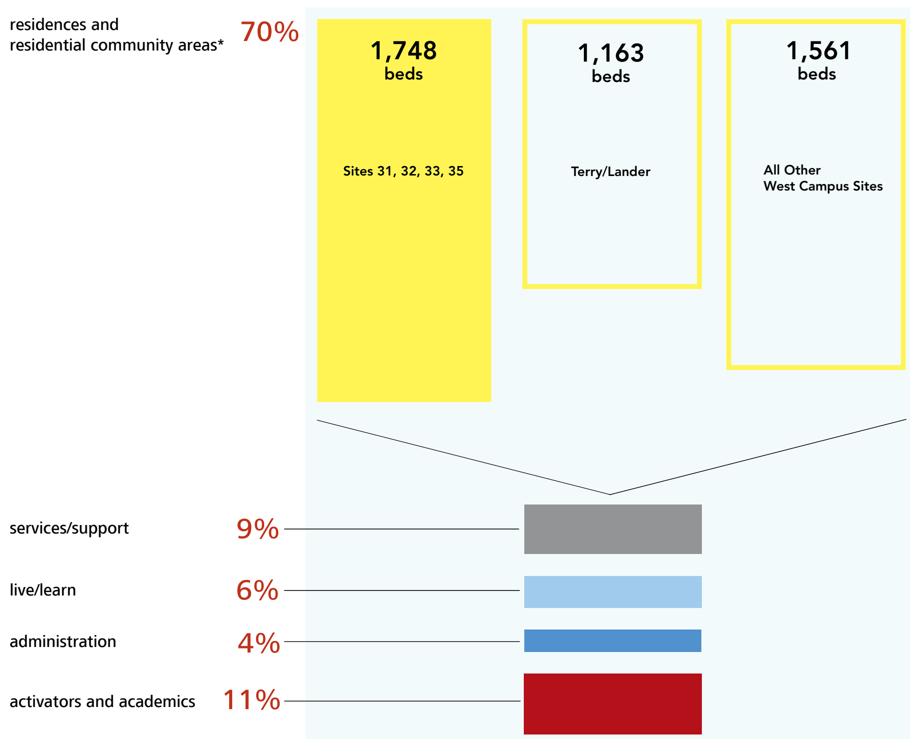
In addition, there will be four new resident director apartments and four new "other" apartments for visiting faculty or summer conference directors use. Terry and Lander Halls also have two resident director apartments.

Site 31	Floor	Resident Beds	Single Units	Double Units
	G2	49	13	18
	1	95	7	44
	2	95	7	44
	3	95	7	44
	4	95	7	44
	5	95	7	44
	Total SF	***524***	***48***	***238***

Site 33	Floor	Resident Beds	Single Units	Double Units
	G2	22	6	8
	1	43	3	20
	2	43	3	20
	3	43	3	20
	4	43	3	20
	5	43	3	20
	Total SF	***237***	***21***	***108***

Site 32	Floor	Beds	Units	Units
	G2	32	2	15
	1	75	3	36
	2	75	3	36
	3	75	3	36
	4	75	3	36
	5	75	3	36
	Total SF	***407***	***17***	***195***

Site 35	Floor	Beds	Units	Units
	G2	40	6	17
	1	108	6	51
	2	108	6	51
	3	108	6	51
	4	108	6	51
	5	108	6	51
	Total SF	***580***	***36***	***272***



* residential community areas for Terry/Lander and other west campus sites not included

Support for Residential Beds

In addition to the 1,750 new residential beds provided at Sites 31W, 32W, 33W, and 35W, the final build out of West Campus Residential Halls will include 1,163 units at Terry Lander and 1,561 units on all other West Campus sites.

The amenities included in the new residence halls will be used to support all of the residential beds in the west campus. Support areas include building services and support, live/learn spaces, wellness/fitness and administration. The majority of these areas will be accessible to all residents on campus.

The “activators and academics,” such as the market, the auditorium and quick service restaurants, will be accessible to the entire campus community and will be used to enrich the campus experience.

Site 31	**nsf**	**gsf**	**beds**
Floor G1			
Residences	0	0	0
Residential Building: Community Areas	225	320	
Residential Building: Services/Support	3,075	4,367	
Residential Community: Live/Learn	1,660	2,357	
Residential Community: Administration	13,455	19,106	
Campus Community: Activators and Academics	0	0	
Subtotal - Floor G1	*18,415*	*26,149*	
Floor G2			
Residences	10,524	14,944	49
Residential Building: Community Areas	4,870	6,915	
Residentail Building: Services/Support	4,490	6,376	
Residential Community: Live/Learn	160	227	
Residential Community: Administration	1,585	2,251	
Campus Community: Activators and Academics	0	0	
Subtotal - Floor G2	*21,629*	*30,713*	
Floors 1-5			
Residences	15,372	21,828	95
Residential Building: Community Areas	820	1,164	
Residential Building: Services/Support	440	625	
Subtotal - Floors 1-5	*16,632*	*23,617*	
Subtotal - Site 31	**123,204**	**174,950**	**524**
Exterior Open Space		2,800	
Parking		38,800	
Total - Site 31	**123,204**	**216,550**	**524**

Site 32	**nsf**	**gsf**	**beds**
Floor G1			
Residences	0	0	0
Residential Building: Community Areas	450	639	
Residential Building: Services/Support	2,720	3,863	
Residential Community: Live/Learn	11,260	15,989	
Residential Community: Administration	90	128	
Campus Community: Activators and Academics - Drama Studio	2,000	2,840	
Subtotal - Floor G1	*16,520*	*23,459*	
Floor G2			
Residences	6,740	9,571	32
Residential Building: Community Areas	2,535	3,600	
Residentail Building: Services/Support	970	1,377	
Residential Community: Live/Learn	400	568	
Residential Community: Administration	0	0	
Campus Community: Activators and Academics - Quick Service Restaurant - Café - Active Space	3,800	5,396	
Subtotal - Floor G2	*14,445*	*20,512*	
Floors 1-5			
Residences	11,868	16,853	75
Residential Building: Community Areas	820	1,164	
Residential Building: Services/Support	340	483	
Subtotal - Floors 1-5	*13,028*	*18,500*	
Subtotal - Site 32	**96,105**	**136,469**	**407**
Exterior Open Space		7,700	
Parking		1,600	
Total - Site 32	**96,105**	**145,769**	**407**

NUMERIC PROGRAM

The chart at right and on the following pages summarizes the spaces allocated in the program for each building, organized by function and by floor. Areas are listed in net square feet (NSF) and gross square feet (GSF), with the number of beds where applicable. Exterior open space and parking areas are also listed for each building.

Net square footage includes the assignable, or usable spaces within a building.
Gross square footage also includes the unassignable areas of the building, such as mechanical and electrical rooms and shafts, circulation and wall thickness. In the predesign phase, a grossing factor is used to estimate the area required for unassignable area. 1.42 is the grossing factor used for this program. Exterior open space and parking areas do not require a grossing factor.

For more information see:

Appendix E - Detailed Numeric Program

Appendix F - Room Data Sheets

Site 33	nsf	gsf	beds
Floor G1			
Residences	0	0	0
Residential Building: Community Areas	2,185	3,103	
Residential Building: Services/Support	3,970	5,637	
Residential Community: Live/Learn	3,020	4,288	
Residential Community: Administration	1,440	2,045	
Campus Community: Activators and Academics	0	0	
Subtotal - Floor G1	*10,615*	*15,073*	
Floor G2			
Residences	5,624	7,986	22
Residential Building: Community Areas	350	497	
Residential Building: Services/Support	1,220	1,732	
Residential Community: Live/Learn	120	170	
Residential Community: Administration	0	0	
Campus Community: Activators and Academics	0	0	
Subtotal - Floor G2	*7,314*	*10,386*	
Floors 1-5			
Residences	6,940	9,855	43
Residential Building: Community Areas	470	667	
Residential Building: Services/Support	340	483	
Subtotal - Floors 1-5	*7,750*	*11,005*	
Subtotal - Site 33	**56,679**	**80,484**	**237**
Exterior Open Space		1,500	
Parking		1,600	
Total - Site 33	**56,679**	**83,584**	**237**

Site 35	nsf	gsf	beds
Floor G1			
Residences	0	0	0
Residential Building: Community Areas	0	0	
Residential Building: Services/Support	4,049	5,750	
Residential Community: Live/Learn	2,070	2,939	
Residential Community: Administration	0	0	
Campus Community: Activators and Academics	12,236	17,375	
- Academic Center			
- Auditorium and Support			
Subtotal - Floor G1	*18,355*	*26,064*	
Floor G2			
Residences	8,396	11,922	40
Residental Building: Community Areas	2,535	3,600	
Residential Building: Services/Support	1,220	1,732	
Residential Community: Live/Learn	160	227	
Residential Community: Administration	90	128	
Campus Community: Activators and Academics	7,830	11,119	
- Espresso Café			
- UW Arts Ticket Office			
- Auditorium and Support			
- Auditorium Lobby			
Subtotal - Floor G2	*20,231*	*28,728*	
Floors 1-5			
Residences	17,268	24,521	108
Residential Building: Community Areas	940	1,335	
Residential Building: Services/Support	680	966	
Subtotal - Floors 1-5	*18,888*	*26,821*	
Subtotal - Site 35	**133,026**	**188,897**	**580**
Exterior Open Space		8,500	
Parking		1,600	
Total - Site 35	**133,026**	**198,997**	**580**

SPECIAL PROGRAMS

Summer Conference Accommodations

The University of Washington, like many universities around the country, is used as a venue for conferences. During the summer months HFS will be offering accommodations for these conferences. Student Housing Phase One buildings are being designed with this intent and each unit will have a private bath. An apartment will be located in each building and can be rented by the conference director and their family. A conference linen room is programmed to store all linens for summer use.

Move In

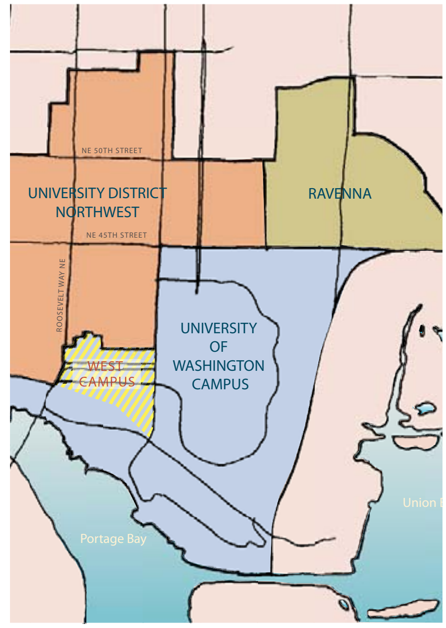
HFS will employ a staged move-in process, similar to current practices, for the new West Campus Residence Halls. With each new phase of residential halls opening the move-in process will need to be evaluated. Currently staging of vehicles occurs in W-8, W-9, and W-39 parking lots. Each new resident arriving with a vehicle to unload is asked to queue in these lots. As check-in/move-in space becomes available at a hall, the student is released to unload. HFS will need to evaluate whether check in will happen at the new 'super desk' at Terry

Lander or the individual halls. The UW will also need to work with the City of Seattle to reserve queuing area for the move-in. The main residential entries for 32W, 33W and 35W are planned to be on Campus Parkway. See the plans developed in Section 5 for the designated loading/unloading areas.

Terry / Lander	nsf	gsf	beds
Floor G1			
Residences	0	0	0
Residential Building: Community Areas	4,180	5,936	
Residential Building: Services/Support	10,650	15,123	
Residential Community: Live/Learn	2,440	3,465	
Residential Community: Administration	500	710	
Campus Community: Activators and Academics	6,146	8,727	
- Eleven 01 Restaurant (Storage)			
- Commissary			
Subtotal - Floor G1	*23,916*	*33,961*	
Floor G2			
Residences	1,600	2,272	0
Residential Building: Community Areas	3,800	5,396	
Residential Building: Services/Support	1,600	2,272	
Residential Community: Live/Learn	4,340	6,163	
Residential Community: Administration	3,240	4,601	
Campus Community: Activators and Academics	11,154	15,839	
- 1101 Restaurant (and Storage)			
Subtotal - Floor G2	*25,734*	*36,542*	
New Construction			
Campus Community: Activators and Academics	*6,000*	*8,520*	
- Quick Service Restaurant			
- Market			
Subtotal - New Construction	*6,000*	*8,520*	
Subtotal - Terry / Lander	**55,650**	**79,023**	**0**
Exterior Open Space		0	
Parking		0	
Total - Terry / Lander	**55,650**	**79,023**	**0**

FUNCTIONAL PROGRAM - SITE

DISTRICT DIAGRAM
University Community Urban Center



URBAN DESIGN PRINCIPLES

Several factors will influence the successful transformation of the West Campus into a vibrant mixed-use urban district that shares its identity with the University of Washington and the City of Seattle (District Diagram).

These factors are summarized below; more detailed descriptions are included in the Urban Design Recommendations that follow.

INCREASING 24/7 DENSITY

The increase of student housing to approximately 4,500 student residents will create a "24/7 market base" in the West Campus. Increasing the range of users and uses beyond those serving student residents will attract a broader range of campus and neighborhood users.

CREATING CONNECTIONS & ACCESS

Safe and effective connections within the West Campus and to its neighborhood-commercial zones to the north and the University's Central Campus to the east will create a seamless blending of university and city.

UPPING THE ANTE ON THE PEDESTRIAN ENVIRONMENT

Creating a vibrant pedestrian environment will foster delight and offer places to meet, linger, and engage in conversation. The outdoors should function as a teaching tool in its holistic approach to environmental and social functions.

CREATING AN ICONIC ENTRY TO THE UNIVERSITY

Redevelopment of NE Campus Parkway can bolster the stature of the West Campus and reflect the national stature of the University.

URBAN DESIGN RECOMMENDATIONS

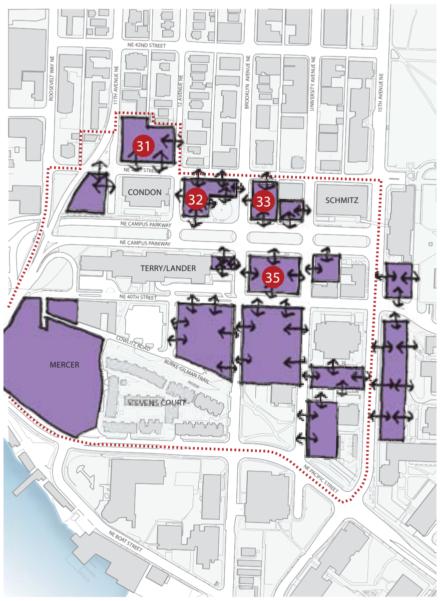
Based on our understanding of the University's goals, we recommend the following urban design improvements to the public realm of the West Campus to be considered as part of a comprehensive planning study of the West Campus. In some instances, these recommendations directly affect the planned residential hall construction on Parcels 31W, 32W, 33W, and 35W and will be studied further and incorporated as appropriate.

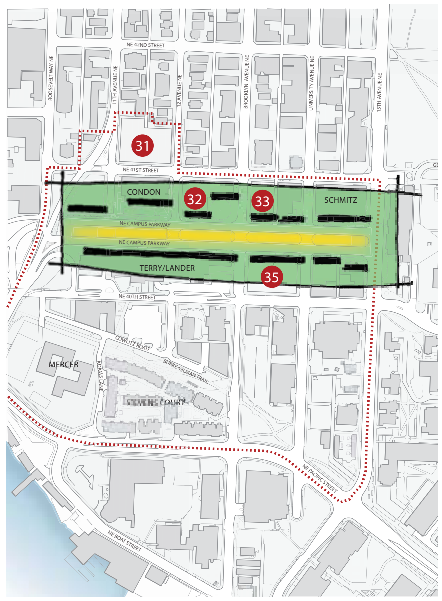
:: Activate the ground floors of the residence halls with uses that attract residence hall students and the campus community
:: Activate the ground floor of future development with uses that appeal to a broader user group— residents, other students, staff, faculty, neighborhood, etc.
:: Create visual transparency between ground-floor activities and the street to enliven the pedestrian experience
:: Locate and design identifiable, safe, and secure points of access to ground-floor uses and to the residence halls

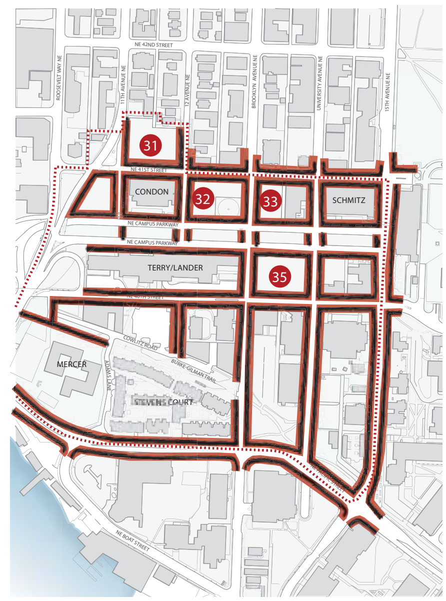
LEFT
Activating Uses

CENTER
NE Campus Parkway

RIGHT
Widen Sidewalks







ACTIVATING USES

The following uses can be used to create active spaces for the student resident community and the campus community. Some will be included in the student residential development addressed in this predesign document. We recommend the full range of uses be addressed for the West Campus as it undergoes further development.

STUDENT RESIDENTIAL COMMUNITY

:: Auditorium
:: Computer lab
:: High tech games/creative room
:: Laundry
:: Live-Learn
:: Mailboxes
:: Music practice rooms
:: Group kitchens
:: Group lounges
:: Resident Director offices
:: Wellness fitness center

CAMPUS COMMUNITY

:: 1101 Restaurant
:: Café with seating
:: Drama studio
:: Espresso stand
:: Ticket booth
:: Urban market

NE CAMPUS PARKWAY

An opportunity exists to redesign NE Campus Parkway (building face to building face) as one comprehensive design statement of a national scale, pedestrian friendly, and functional to its users and the environment

If NE Campus Parkway vehicular paving is narrowed through the elimination of one travel lane north and south of the median, it will facilitate pedestrian crossings, reduce impervious pavement, and allow more space for landscape treatments of the median and/or the sidewalk areas

Adjust signalization to facilitate pedestrian crossings.

CELEBRATE THE ELM TREE

Create a public gathering space activated by adjacent uses in the area of the elm tree to be retained at the northwest corner of Brooklyn Avenue NE and NE Campus Parkway (Parcel 32W).

WIDEN SIDEWALKS

Widen sidewalks to accommodate a comfortable flow of pedestrians:

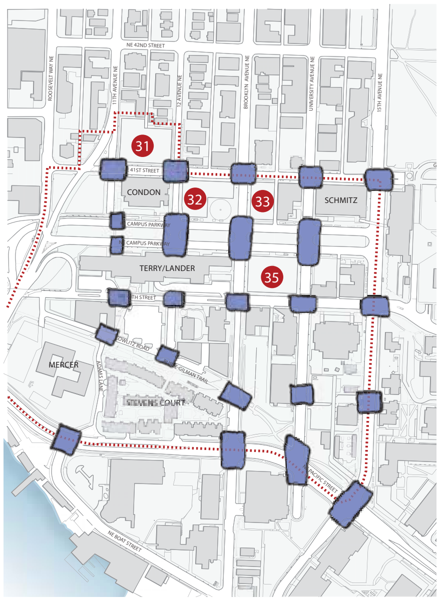
:: Standard: at Campus Parkway: 12 foot sidewalk and 5 feet of planting/bio filtration planters. Approximately 6 feet may be added for bus waiting areas

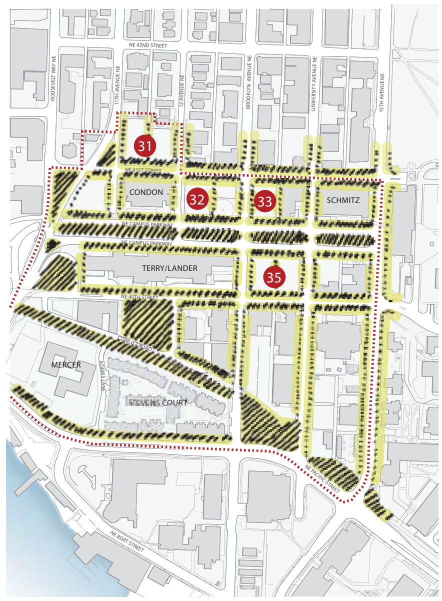
:: Typical Design Standard: 8 foot sidewalk and 5 feet of planting/bio filtration planters.

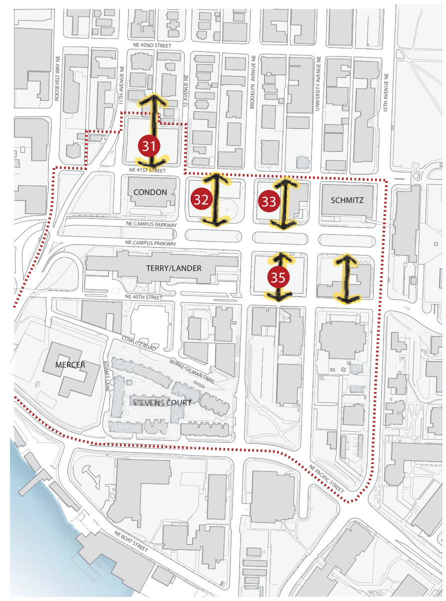
LEFT
Pedestrian Crossings

CENTER
Bio Filtration

RIGHT
Alleyways







PEDESTRIAN STREET CROSSINGS

:: Extend pedestrian pavement (curb bulbs) at street intersections to minimize distances crossing travel lanes.

:: Consider raising crosswalk elevation to the level of the pedestrian paving and discuss with SDOT.

GREEN STREET - BROOKLYN AVENUE

:: Develop Brooklyn Avenue NE as a Green Street.

:: Emulate the streetscape of Brooklyn Avenue NE below NE 40th Street: narrow roadway to two lanes shared with bicyclists, develop an extensive planting area with street furniture, widen sidewalk, etc.

BIO FILTRATION

:: Study the opportunity to develop a comprehensive stormwater planter system for each project site and on all street/ sidewalk edges to capture and treat street and sidewalk surface runoff.

:: Extend system to the NE Campus Parkway.

IMPROVE BUS STOPS

:: Provide shelter and additional seating, incorporating into building frontages as appropriate.

RELOCATE BUS LAYOVERS

:: Discuss with Metro and SDOT the possibility of relocating bus layovers to maximize views to and from ground floor uses of the adjacent buildings.

CONSIDER ALTERNATIVE ROUTE FOR STREETCAR

:: Identify a preferred route through the West Campus that provides convenient access and minimizes conflicts.

TECHNICAL PROGRAM PERFORMANCE REQUIREMENTS

SUMMARY OF INTEGRATED DESIGN PROCESS

SUSTAINABILITY

The University of Washington (UW) is one of the preeminent leaders in environmental practices in the country. It has been recognized by The Princeton Review, Sierra Magazine, and the Sustainable Endowment as one of the top 15 University leaders in sustainability in the country. The UW President, Mark Emmert, has signed onto the American College and Presidents Climate Commitment (ACPCC), which commits the University of Washington to future carbon neutrality. The state of Washington requires that all new state-funded campus construction meet a USGBC LEED Silver rating or equivalent. Along with signing the Presidents Climate Commitment, the UW is a founding member of the Seattle Climate Partnership.

The new West Campus housing is not state funded though the project offers a great opportunity to the UW and Housing and Food Service (HFS) to be an incremental success in meeting the carbon neutrality goals of Architecture 2030 and the ACUPCC.. These highly visible sites will become the character and culture of the West Campus. The sustainable attributes will become the guideline for all future development in the West Campus. Therefore, this project has an incredible ability and responsibility to reflect the sustainable goals of the UW and HFS and to work with and educate the student resident in turn.

To fully achieve sustainability one must understand their footprint on the earth. By integrating sustainability into daily rituals and making it visible within the building these buildings can create an environment and a culture which educates and establishes a foundation of sustainable values that will follow them through their entire life.

APPROACH

To achieve the sustainable design, a thoughtful integrated design process is necessary. An integrated team and design process will follow this project until completion. A building designed as an interdependent system (rather than a series of independent components) will ultimately be more cost-effective, more elegant and higher performing. An integrated design process allows the team to challenge traditional design boundaries, creating an iterative process in which each decision influences and responds to other decisions, maximizing the potential for system integration. Integrated design not only means that the mechanical and structural systems are harmonious, but that everything in the program is integrated. Recycling is not just a can, but is designed into the building.

To kick-off the integrated design process, Mahlum Architects hosted an Eco/Energy Charrette in December 2008. Attendee included individuals from the University of Washington's Capital Project, Housing and Food Services, the Campus Landscape Architect and the Sustainability Manager, Mahlum Architects, Seneca, Coughlin Porter Lundeen, Gustafson Guthrie Nichols Ltd, SvR, PAE and the City of Seattle. The purpose of this charrette was to collaboratively identify potential goals for incorporating sustainable strategies into the Pre-Design, on all levels. Presentations were made by each discipline on site issues and opportunities. Reference Appendix I - Meeting Minutes for more information.

DRIVERS

"We will create buildings with extremely low energy requirements. We have set a goal to meet the AIA 2030 Challenge and a minium of LEED Gold. For buildings in 2011/2012 the energy use should be lowered by 60% below baseline average." – Broad Program Statements | Predesign | Oct. 30, 2008

RIGHT
Signage created at Pacific University's Gilbert Hall has proved successful in educating the students about sustainable aspects of the building.

> **Turn off your lights. Reuse your plastic bags. Ride your bike. Walk to work. Turn off the tap. Take a shorter shower. Use recycled paper. Put your computer to sleep. Plant a tree. Take the bus. Buy local. Recycle. Get a ride. Use cold water. Buy a houseplant. Hang-dry your laundry. Use rechargeable batteries. Carpool. Volunteer. Drink shade-grown coffee. Print double-sided. Use a refillable cup. Buy a hybrid. Unplug. Avoid pesticides. Reuse gift wrap. Compost. Grow your own food. Collect rainwater. Don't smoke.**

By meeting these goals, HFS will support the UW pledge to the ACPCC.

PRIORITIES

Listed below are some of the goals and strategies identified at the Eco-Charrette. See Appendix, Meeting Minutes for the entire list. More analysis of strategies will follow in this section.

ENVIRONMENT (SITE & WATER)
:: Create a safe environment (actual and perceived)
:: Balance site lighting for safety and security
:: Establish storm water quality goals

WATER
:: Reduce water use by 40%

ENERGY
:: 35 KBTU/sf/year (Meet 2030 Challenge)
:: Creative use or renewables

DAYLIGHTING AND THERMAL COMFORT
"Provide individuals with a maximum control over their environment (temperature, space, fresh air, etc.)." Broad Program Statements | Predesign | Oct. 30, 2008

:: Daylight primary interior light source
:: Natural Ventilation
:: Operable Windows
:: Exterior elevations tuned to solar exposure
:: 30-35% Glazing

MATERIALS
:: Reduce Waste
:: Select for longevity and low-maintenance
:: Locally harvested materials

SYNERGY OF SUSTAINABLE STRATEGIES
:: Life-cycle cost analysis
:: Market Factors
:: Utility Incentives

EDUCATION - CHANGING CULTURE
:: Designs should inherently teach students to be more environmentally conscious.

METRICS
The primary metrics evaluated were LEED 2009, which is still in draft form and the Architecture 2030 Challenge.. The University of Washington will also complete LEED for Neighborhood Development, which is also currently in draft form and follow the guidelines for Energy Star standards.

LEED 2009 - CURRENTLY IN DRAFT FORM

LEED 2009 will be inclusive of all the different rating systems to date. It will have a 100 base points and 10 additional points, some of which will be specific to the regional points. The regional points have not been identified at this date and therefore the evaluation of those points was not possible. Following is the analysis to date of the LEED 2009 for this project by the design team. This is a preliminary count based on many assumptions and therefore will need to be evaluated at each phase of the project.

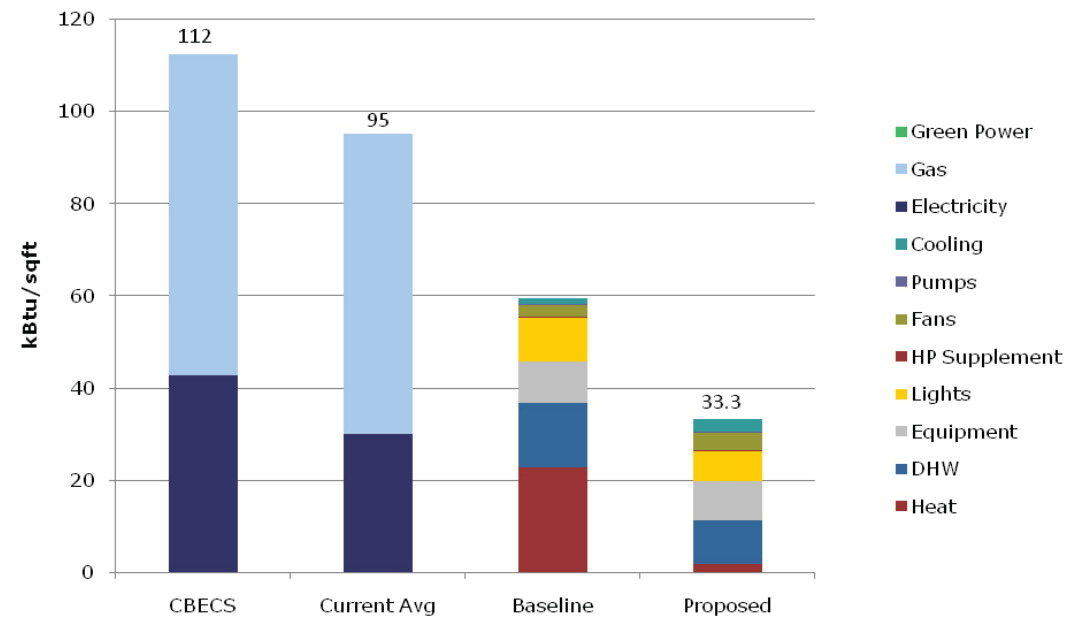
	LEED 2009 Scorecard				YES	?	NO
	Sustainable Sites		Possible Points	**26**	**16**	**2**	**5**
Prereq 1	**Construction Activity Pollution Prevention**				0		
Credit 1	**Site Selection**			**1**	1		
Credit 2	**Development Density & Community Connectivity**			**5**	5		
Credit 3	**Brownfield Redevelopment**			**1**			1
Credit 4.1	**Alternative Transportation**, Public Transportation			**6**	6		
Credit 4.2	**Alternative Transportation**, Bicycle Storage & Change			**1**	1		
Credit 4.3	**Alternative Transportation**, Low-Emission/Efficient Vehicles			**3**			1
Credit 4.4	**Alternative Transportation**, Parking Capacity			**2**			1
Credit 5.1	**Site Development**, Protect or Restore Habitat			**1**			1
Credit 5.2	**Site Development**, Maximize Open Space, OPTION 2			**1**			1
Credit 6.1	Stormwater Design, Quantity Control			**1**	1		
Credit 6.2	**Stormwater Design**, Quality Control			**1**	1		
Credit 7.1	**Heat Island Effect,** Non-Roof			**1**		1	
Credit 7.2	**Heat Island Effect,** Roof			**1**	1		
Credit 8	**Light Pollution Reduction**			**1**		1	
	Water Efficiency		Possible Points	**10**	**4**	**6**	**0**
	Water Use Reduction, 20% Reduction						
Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%			**2**	2		
Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation			**2**		2	
Credit 2	**Innovative Wastewater Technologies**			**2**		2	
Credit 3	**Water Use Reduction**	30% Reduction		**2**	2		
		35% Reduction		**1**		1	
		40% Reduction		**1**		1	
	Energy & Atmosphere		Possible Points	**35**	**7**	**14**	**11**
Prereq 1	**Fundamental Building Systems Commissioning**				0		
Prereq 2	**Minimum Energy Performance**				0		
Prereq 3	**Fundamental Refrigerant Management**				0		
Credit 1	**Optimize Energy Performance**	12% New		**1**	1		
		16% New		**2**	2		
		20% New		**2**	2		
		24% New		**2**		2	
		28% New		**2**		2	
		32% New		**2**		2	
		36% New		**2**			2
		40% New		**2**			2
		44% New		**2**			2
		48% New		**2**			2
Credit 2	**On-Site Renewable Energy**	1%		**1**		1	
		5.0%		**2**			1
		9.0%		**2**			1
		13.0%		**2**			1
Credit 3	**Enhanced Commissioning**			**2**	2		
Credit 4	**Enhanced Refrigerant Management**			**2**		2	
Credit 5	**Measurement & Verification**			**3**		3	
Credit 6	**Green Power**			**2**		2	

LEED 2009 Scorecard

				YES	?	NO
	Materials & Resources	Possible Points	**14**	**2**	**6**	**4**
Prereq 1	**Storage & Collection of Recyclables**			0		
Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof		**2**			
Credit 1.2	**Building Reuse**, Maintain 95% of Existing Walls, Floors & Roof		**1**			1
Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements		**1**			1
Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal		**1**	1		
Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal		**1**	1		
Credit 3.1	**Material Reuse**, Specify 5%, percentage based on cost		**1**			1
Credit 3.2	**Material Reuse**, Specify 10%		**1**			1
Credit 4.1	**Recycled Content**, 10% (post consumer + 1/2 pre-consumer)		**1**		1	
Credit 4.2	**Recycled Content**, 20% (post consumer + 1/2 pre-consumer)		**1**		1	
Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured		**1**		1	
Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured		**1**		1	
Credit 6	**Rapidly Renewable Materials**		**1**		1	
Credit 7	**Certified Wood**		**1**		1	
	Indoor Environmental Quality	Possible Points	**15**	**7**	**8**	**0**
Prereq 1	**Minimum IAQ Performance**			0		
Prereq 2	**Environmental Tobacco Smoke (ETS) Control**			0		
Credit 1	**Outdoor Air Delivery Monitoring**		**1**		1	
Credit 2	**Increased Ventilation**		**1**		1	
Credit 3.1	**Construction IAQ Management Plan**, During Construction		**1**	1		
Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy		**1**	1		
Credit 4.1	**Low-Emitting Materials**, Adhesives and Sealants		**1**	1		
Credit 4.2	**Low-Emitting Materials**, Paints and Coatings		**1**	1		
Credit 4.3	**Low-Emitting Materials**, Carpet Systems		**1**	1		
Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products		**1**	1		
Credit 5	**Indoor Chemical and Pollutant Source Control**		**1**		1	
Credit 6.1	**Controllability of Systems**, Lighting		**1**	1		
Credit 6.2	**Controllability of Systems**, Thermal Comfort		**1**		1	
Credit 7.1	**Thermal Comfort**, Design		**1**		1	
Credit 7.2	**Thermal Comfort**, Verification		**1**		1	
Credit 8.1	**Daylight and Views**, Daylight 75% of Spaces		**1**		1	
Credit 8.2	**Daylight and Views**, Views for 90% of Spaces		**1**		1	
	Innovation In Design	Possible Points	**6**	**6**	**0**	**0**
Credit 1.1	**Innovation In Design: Provide Specific Title**		**1**	1		
Credit 1.2	**Innovation In Design: Provide Specific Title**		**1**	1		
Credit 1.3	**Innovation In Design: Provide Specific Title**		**1**	1		
Credit 1.4	**Innovation In Design: Provide Specific Title**		**1**	1		
Credit 1.5	**Innovation In Design: Provide Specific Title**		**1**	1		
Credit 2	**LEED™ Accredited Professional**		**1**	1		
	Innovation In Design	Possible Points	**4**	**2**	**2**	**0**
Credit 1.1	**Regional Specific Environmental Priority: Region Defined**		**1**	1	1	
Credit 1.2	**Regional Specific Environmental Priority: Region Defined**		**1**	1	1	
Credit 1.3	**Regional Specific Environmental Priority: Region Defined**		**1**			
Credit 1.4	**Regional Specific Environmental Priority: Region Defined**		**1**			
	Total Pre-Certification Estimates	Possible Points	**110**	**44**	**38**	**20**
				YES	**?**	**NO**

Certified 40-49 **Silver** 50-59 **Gold** 60-79 **Platinum 80** +

FIGURE 1
Energy Use and Architecture 2030



ARCHITECTURE 2030 ANALYSIS

One of the project goals is to meet the requirements of the Architecture 2030 Challenge. For buildings constructed in 2010, the 2030 Challenge requires that the new building use 60% less fossil fuel energy than the regional average for that building type. PAE performed analyses of Seattle climate, envelope construction options, and building HVAC options to determine a design that meets the requirements of Architecture 2030.

The regional average source energy use intensity for a typical building that is 67% dormitory and 33% office is 112 kBtu/sqft. A building that meets the 2030 Challenge for 2010 will use 33.3 kBtu/sqft source energy[1].

As an initial analysis to determine whether it is feasible to meet the 2030 challenge for this project, PAE analyzed a building with the following energy efficiency features:

:: "Tight" Building construction with an infiltration rate of 0.16 air-changes-per-hour
:: 70% Effective heat recovery of ventilation air with rooftop gas furnace
:: Electric heater in student housing (floors 3-6)
:: Variable refrigerant flow system (floors G1 & G2)
:: Low flow shower fixtures (1.5 gallons/minute)
:: High efficiency gas-fire domestic water boilers (90% efficient) Low equipment power density in dorm rooms: 0.75 W/ft2 maximum
:: Low equipment power density in offices: 1.0 W/ft2 maximum
:: Low lighting power density in dorm rooms: 0.50 W/ft2 maximum
:: LED task lights required in dorm rooms
:: Low lighting power density in office areas: 0.8 W/ft2 maximum
:: 25% window-to-wall area ratio
:: Heat Mirror Glazing
:: Premium efficiency motors
:: Buy up to 17% green power to meet the 2030 requirements (architecture 2030 allows purchase up to 20%)

The results of the analysis show that the proposed building uses approximately 33.0 kBtu/sqft and can meet the architecture 2030 challenge for 2010.

Figure 1 illustrates the energy use of an average existing building of similar program, the average of select existing UW dormitories, a building built to Washington State Energy Code minimum performance standards, and the proposed building with the energy efficiency measures listed above. Figures 2 and 3 illustrate the end-use breakdown of energy used in the buildings.

[1] This EUI assumes that the building is partially heated with natural gas. Because of different fuel mixes, the proposed 2030 building's site energy use is not exactly 60% less than the regional average.
An all electric building's Architecture 2030 target would be 21.8 kBtu/sqft.

FIGURE 2
Total Energy Use for Baseline Building

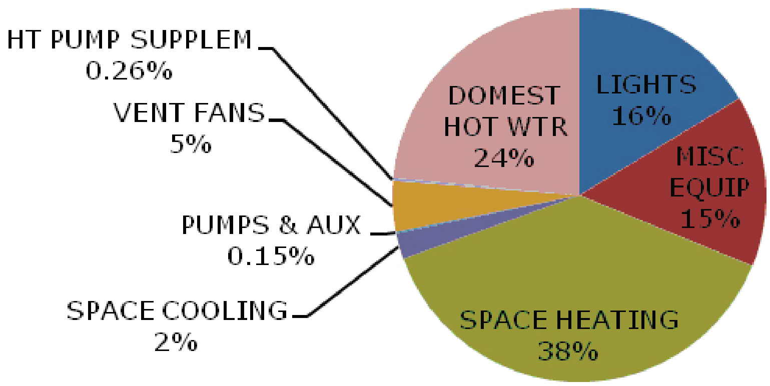
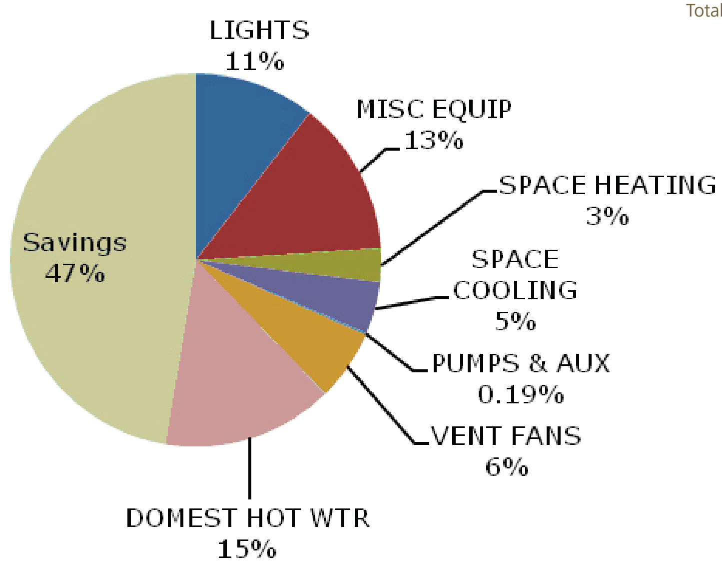


FIGURE 3
Total Energy Use for Proposed Building



TECHNICAL PROGRAM - SITE

FIGURE 4
Existing, below left
FIGURE 6
Public sanitary sewer basins in which the project sites are located

UTILITIES AND INFRASTRUCTURE

SANITARY SEWER, STORM SEWER AND WATER

The development of each project site will include storm, sewer and water connections to City infrastructure within the fronting ROW. It is not anticipated that utility extensions of the utility mainlines will be required for this project area. Utility connections for each building will include water and fire service, water metering, sanitary side sewer connections, and service drain connections, as well as gas, electrical and telecommunication service lines.

SANITARY SEWER

Each project site will require separate side sewer connections to the sewer mains within the right of way. The connection points at the existing 10-inch, 12-inch and 15-inch lines will be driven by sewer capacity as well as building layout. The addition of side sewer service connections requires a side sewer permit; the applicant is responsible for preparing as-built documentation, coordinating work with SDOT and SPU for core tap scheduling and obtaining permits for temporary dewatering. SPU charges for core and tap will be incurred by UW.

The Project area is currently served by a dedicated Public Sanitary Sewer (PSS). Existing PSS lines within the area convey sewer flows to the south, connecting into the Seattle Metro Combined Sewer Trunk line (Metro CS line) located under NE Pacific Street and the Burke Gilman Trail at two points: one near NE Pacific Street's intersection with 11th Avenue NE and a second within the Brooklyn Avenue NE ROW

Existing sanitary sewer capacity may not be sufficient to accommodate the Project. SPU is currently reviewing the existing capacity and has yet to make a final determination. However, as set forth in Table 1 below, a preliminary investigation indicates that three of the pipe segments exceed SPU's current target capacity (50% of max capacity). One 10-inch by 476-foot segment located along Brooklyn Avenue NE between NE 40th and NE 41st Streets exceeds this capacity by 14%. Two shorter segments exceed capacity by 8%. As these two segments have minimal slope, pipe upsizing may have little impact on segment capacity.

If SPU determines that additional capacity will be required in the project area, UW may wish to discuss the possibility of sharing with SPU the costs of any upgrades required for the project to accommodate future development around the project area.

STORM SEWER

The existing 42-inch concrete stormwater line that runs along 12th Avenue NE, NE 41st Street, and Brooklyn Avenue NE will be the main feed line for stormwater services to each of the four sites. The services will connect into the smaller 12-inch, 15-inch and 18-inch PSD mainlines along NE 41st Street and NE Campus Parkway.

WATER

According to the Utilities Master Plan, buildings in this development area are served and individually metered by SPU. Water service meter and line size will be determined by the unit capacity and building infrastructure design. SPU has indicated that the existing water 8-inch cast iron system should have adequate distribution and pressure for domestic water services for the project.

FIRE SERVICE

Each site will require an independent fire service for building sprinkler systems. The fire flow requirements will determine the fire meter and service line size. SPU crews will tap the water main and install the site fire service meters.

The project sites are located within a 326 pressure zone. SPU has provided the following information for hydrant flow tests at two locations within the vicinity of the project sites:

NE 42nd Street and Roosevelt Way NE (NE corner), off the 32-inch main in Roosevelt Way NE:

- :: Static Pressure: 62 psi
- :: Residual Pressure (at witness hydrant): 60 psi
- :: Flow: 1828 gallons per minute (gpm)
- :: Calculated available flow at 20 psi: 9700 gpm

NE 40th Street and University Way NE. (NE corner), off the 8-inch main in University Way NE:

- :: Static Pressure: 97 psi
- :: Residual Pressure (at witness hydrant): 79 psi
- :: Flow: 3030 gallons per minute (gpm)
- :: Calculated available flow at 20 psi: 7360 gpm

According to the 2006 Seattle Fire Code and a telephone conversation with the Seattle Fire Department, each project site will require an approximate maximum flow of 2,000 gpm at each hydrant with a minimum flow duration of 2 hours. Because each project site is located within 200 feet of the ROW, existing water pressure, fire access and the number and spacing of existing fire hydrants will be sufficient for all project sites so long as the new residence halls are no taller than 75 feet, including any rooftop patios. A higher building or a building which includes a usable rooftop that exceeds the 75-foot height limit would be classified as a "high rise building", triggering additional fire code requirements. However, additional measures to ensure adequate water pressure at the top of the buildings may be required.

UTILITY FEES

SEWER

There are several costs associated with connecting new construction to the public sewer system (PSS). All properties connecting to the sewer after February 1990 are required to pay King County a Sewer Capacity Charge. This fifteen year assessment is calculated for residential properties using units of residential customer equivalents (RCE's) and using plumbing and fixture flow projections for non-residential properties. According to King County's online Sewer Capacity Charge FAQ, In 2009 the fee per RCE will be $47.64.

In addition, the City charges a side sewer connection and inspection fee, as well as a monthly usage fee. The side sewer connection fee is a flat fee based on the number of connections. It includes the cost of the permit and one hour of inspection. Inspection fees are billed at an hourly rate for inspections in excess of one hour. Monthly sewer fees are based on the actual water use for multifamily and nonresidential customers. The monthly sewer fee is $7.75 per ccf. Sewer fees assume that all water used gets discharged to the sewer system. Connection into the City storm drain system will require permitting, inspection and maintenance. All costs will be incurred by UW.

Since sewer rates are tied to water rates, measures to reduce water consumption and maximize water reuse within the project will reduce both water and sewer costs. Installing a smaller water meter and limiting the number of sewer connections for the buildings will further reduce costs. If the project is able to reduce its sewer capacity requirements, it may also be possible to approach King County about negotiating a lower Sewer Capacity Charge, given that the project will be using less capacity.

Figure 6 illustrates the PSS basins within which the project sites are located. Pipe segments with potential capacity issues are indicated in red. Note that replacement of PSS will also require pavement replacement..

WATER

Installation and connection charges for water and fire service will be incurred by UW. Water usage fees are charged based on the amount of water used plus a monthly base service charge. The monthly base service charge for water use is based on the size of the water meter. The smaller the meter, the lower the base service charge. SPU's website notes that downsizing just one size can reduce the base service charge by as much as 60%.

OTHER UTILITIES

POWER – MAIN SERVICE

Two different options exist for serving the new residence blocks with normal power. Option 1: serve new residence halls with existing campus utility infrastructure. Option 2: serve new residence halls with new utility feeders from Seattle City Light (local electrical utility) service in the vicinity of the proposed blocks. Each option has been summarized below along with a list advantages and disadvantages associated with the installation and maintenance of each option.

OPTION 1: SERVE NEW RESIDENCE HALLS WITH EXISTING CAMPUS UTILITY 13.8KV DISTRIBUTION INFRASTRUCTURE.

There are several different configurations of medium voltage/low voltage switchgear, transformers and feeders that are possible when extending the existing 13.8kV campus utility to the new residence halls. The most direct options are locating new 13.8kV switchgear above the utility tunnel at Campus Parkway or extending 13.8kV feeds from the tunnel to the building closest to Campus Parkway.

Existing 13.8kV distribution dual service feeders are routed along Campus Parkway via an existing Utilidor. These service feeders serve most existing buildings located in west campus. New feeders to serve the new residence halls will be connected to existing 13.8kV distribution feeders in a manual "primary select" configuration.

Medium voltage switchgear will either be placed along Campus Parkway, on the site of Building 32W, or inside Building 32W to extend service from the utility tunnel. From the switchgear, the feeders will connect to transformers located at each additional building; 31W, 33W, and 35W. The transformers will either be located within the buildings or on site at each adjacent to each building. Coordination with SDOT, SCL and possible additional franchise service providers will be required for utility connections to the existing Utilidor.

Medium and low voltage feeder terminations, selection configuration and outgoing protection for all configurations will be developed to UW Facilities Services Design Guide. For life cycle costing analysis of this section, the medium voltage distribution cable cost has been based upon a stock standard cable assembly that exceeds the UW FSDG (Facilities Services Design Guide) minimum requirements. The cable assembly specified in the Facilities Services Design Guide is not a commonly used assembly in 13.8kV distribution.

Advantages:

:: University owns all medium voltage switchgear, feeders, and transformers
:: Single point of service (Building 32W) from existing campus utility infrastructure
:: No local utility coordination is required
:: Financial incentives offered by Seattle City Light listed below

Disadvantages:

:: University must maintain all medium voltage switchgear, feeders, and transformers
:: Gear located inside the building will require NEC (National Electrical Code) clearances and they can be substantial
:: Must size transformer to NEC load, not NESC (utility code), this results in a larger transformer size

TABLE 1
Life-cycle cost comparison of options

		ONE-TIME COSTS		TOTAL ENERGY COSTS			MAINTENANCE		TOTAL	TOTAL	INVESTMENT	OPERATIONS
		1ST YEAR	LCC	1ST YEAR	UNDISC LCC	LCC	1ST YEAR	LCC	UNDISC LCC	LCC	RELATED	RELATED
CASE	DESCRIPTION	$	PV $	$	PV $	PV $	$	PV $	PV $	PV $	PV $	PV $
BASE	EXISTING UW 13.8KV FEED	551,810	615,299	164,798	2,847,147	1,835,902	1,120	14,373	3,534,797	2,465,575	607,178	1,858,397
CASE1	USE SCL FEEDS	396,993	396,993	204,787	3,538,021	2,281,392	0	0	3,935,014	2,678,385	396,993	2,281,392

OPTION 2: SERVE NEW RESIDENCE HALLS WITH SEATTLE CITY LIGHT UTILITY SERVICE

An alternative to connecting to existing campus feeders listed above is to extend secondary service from the local electrical utility, Seattle City Light (SCL). This option would be independent from campus distribution and radial to each building. Connecting to SCL will require clearances per utility standards. Since the area is served underground, pad mount transformers can be located adjacent to each building or located in an electrical distribution room within the building. In either case, SCL has specific clearance requirements associated with transformer installations on site or within buildings.

Advantages:

:: Utility provides transformers
:: Utility maintains transformers, transformer primaries and secondary feeders to the buildings
:: Space savings by not having to locate any 13.8kV medium voltage switchgear on site or within a building
:: Financial incentives offered by Seattle City Light listed below
:: Smaller footprint on site since transformer is sized to NESC requirements
:: Since transformer is sized more to actual load, it will operate more efficiently than an NEC sized equivalent transformer

Disadvantages:

:: The university is responsible for covering the costs related to primary and secondary feeds.
:: SCL does not offer a line extension allowance to offset installation costs.
:: Estimated higher electric rates over life of system more costly.

See Table 1 for a life cycle cost comparison of each option presented above.

SUMMARY AND RECOMMENDATIONS

Using the existing campus electrical infrastructure, described in option one appears to be the preferred option. Utility costs for option 1 were based on existing campus electric rates. For option 2, Seattle City Light Schedule MDC was assumed for standard general service between 50 kW and 1,000 kW demand.

While first costs of option 2 are substantially lower, the energy charge, demand charge, and kVAR charge on Schedule MDC are significantly higher than campus utility rates. With lower annual electric costs, option 1 payback is realized in six years, and total costs are projected to be $212,000 lower over 20 years.

UTILITY INCENTIVES

SCL offers several incentives for medium and large businesses that demonstrate utilizing equipment and lighting the reduce electricity use. Incentive amounts can range as high as 70% of the installation costs are based upon the amount of energy a facility saves over a standard baseline building. A contract is required to be signed by the owner, prior to equipment purchasing, before incentives can be applied.

The funding amount possible for standard incentives is based on the annual kWh savings multiplied by the incentive amounts below and are related to 70% of the Energy Conservation Measure (ECM) installation cost. The incentive schedule below indicates the incentive amounts (APPLIED TO FIRST-YEAR SAVINGS) available from Seattle City Light. In addition to the schedule below, the buildings may apply for additional incentives and would be award on a case-by-case basis from Seattle City Light.

TABLE 2
Utility incentives schedule

Incentives Schedule		
Examples of Standard Measures Funded		**Incentive Amounts** (applied to first-year savings)
Lighting Fixtures	T-8 fluorescent with electronic ballasts	20¢ per kWh saved
	Metal halide	20¢ per kWh saved
	High-pressure sodium	20¢ per kWh saved
	Exit signs	$40 per sign
Retrofit Lighting	T-12 to T-8 fluorescent	20¢ per kWh saved
	Incandescent to fluorescent	20¢ per kWh saved
	Exit signs	$30 per sign
Controls	HVAC controls	17¢-20¢ per kWh saved
	Central lighting controls	21¢ per kWh saved
	Daylighting controls	17¢-20¢ per kWh saved
	Occupancy sensors - wall	$30 per unit
	Occupancy sensors - ceiling	$90 per unit
HVAC Equipment	Chillers	23¢ or 29¢ per kWh saved
	Air conditioners	20¢ per kWh saved
	Air-to-air heat pumps	20¢ per kWh saved
	Hydronic heat pumps	23¢ per kWh saved
	Variable speed drives for fans	23¢ per kWh saved
Efficient Transformers		23¢ per kWh saved

Many incentives are covered by a Simple Rebate or Standard Incentive, i.e. equipment meeting minimum energy performance requirements, minimum efficiencies. Custom incentives require calculation of a baseline building designed to state energy code. Funding for incentives will be awarded per the schedule below for the amount of energy saved from the baseline building energy consumption (Table 2).

EMERGENCY POWER

For the purpose of this narrative, the only loads required on emergency power will be life safety egress lighting in the common areas and corridors of the residence halls. This report assumes NO optional standby and that any elevators and/or pressurization fans that are required to be on legally required standby power will be fed from a tap ahead of the normal building power main, consistent with Seattle city code.

Existing campus emergency distribution is available in the form of a 2.4kV circuit in the underground utility tunnel at Campus Parkway. This circuit currently serves existing buildings at the west campus, including the Terry-Lander building. UW facilities have indicated that this circuit has capacity if project emergency loads are limited to life safety. Further design analysis will need to be completed during the design phase of the project. If further research indicates there is insufficient capacity on the existing circuit, life safety loads will be fed from a local emergency generator set. The generator set will most likely reside at building 32 and 480V emergency feeds will be routed to other buildings.

If campus distribution is extended a 2.4kV feeder will extend to building 32W where it will be transformed and distributed underground at 480V/277V to buildings 31W, 33W and 35W. The existing Seattle campus infrastructure masterplan indicates that a new 4.16kV feeder will replace the existing 2.4kV emergency distribution feeder. The timeline for transition is undetermined. Any new transformer within Building 32 will have dual voltage capabilities such that it can be easily connected to future campus 4.16kV emergency feeder. On the load side of the new transformer, 480V distribution will be provided to serve all new buildings at 480V and feeders at the new buildings and will land on service entrance rated life safety transfer switches. These transfer switches will feed 480V life safety distribution within each building.

The emergency feeder extension and connection interface will comply with the Facilities Services Design Guide; however, feeders to adjacent buildings will be distributed per NEC code.

LOW VOLTAGE

DATA AND TELEPHONE CABLING/ TELEVISION SYSTEM

All low voltage provisions for the new buildings will be extensions from the central campus existing infrastructure.

Voice/data and CATV duct banks will be extended from the existing low voltage facilities in the tunnel along Campus Parkway to each new building; backbone cable for these systems will be provided and installed by UW telecom.

A main telecom room in each building will be established on one of the lower levels. The duct banks from existing campus infrastructure will terminate in each main telecom room.

TABLE 3
Steam system heating demands, below

TABLE 4
Alternate fuel based heating demands, right

	HEATING DEMAND (LB/HR)	DOMESTIC WATER HEATING DEMAND (LB/HR)	APPROX. MAIN SIZE (STEAM & CONDENSATE)
31W	4300	2000	4"
32W	3400	1600	4"
33W	2500	1200	3"
35W	5000	2500	4"

BLDG	HEATING DEMAND (CFH)	DOMESTIC WATER DEMAND (CFH)
31W	4300	2000
32W	3400	1600
33W	2500	1200
35W	5000	2500

GAS

There are existing Puget Sound Energy gas lines in 11th Avenue NE, 12th Avenue NE, NE 40th Street, Brooklyn Avenue NE and University Way NE. Gas line capacities would be reviewed with PSE once building loadings are determined. Improvements to the gas infrastructure may be required if capacity is deemed insufficient.

CAMPUS STEAM

High pressure steam mains (125psi) are piped through the Utilidor under campus parkway; this steam could be extended from the tunnel to provide building heat and domestic water generation. A pressure reducing station would be required inside the building and utility tunnels (or direct buried piping) would be required to extend the piping into the buildings. Use of campus steam will limit the projects ability to gain Energy and Atmosphere (to 3 or less) credits due to specific modeling requirements surrounding this energy source and LEED. In addition, campus steam is generally considered to be significantly less energy efficient than site generated and will lock the buildings into dependence on fossil fuels. It would also make it difficult to meet the requirements of architecture 2030. See Table 3.

An alternate fossil fuel based heating source is site generated hydronic hot water (local high efficiency condensing boilers and water heaters). Site generated hot water for building heating and domestic water generation is more efficient the using the campus steam (92% vs ~65%) and result in considerably reduced annual operating costs. Natural gas is available in the street adjacent the building sites and could be extended into each building. See Table 4.

OPPORTUNITIES FOR RAINWATER CAPTURE AND WATER REUSE

If SPU and UW determine that sewer capacity in the project area will need to be upgraded, there is an opportunity to install a heat exchange system with the new sanitary sewer to capture and reuse heat from the pipes within the residence halls.

The proposed residential development for the West Campus area provides a unique opportunity to create a vibrant urban place that enhances UW's educational mission and serves as a model for sustainable urban development. Managing stormwater via natural drainage systems and reusing greywater can help the project achieve UW's goals and achieve the project's goal to meet national, regional and local sustainability standards. The existing utility fee structure, as well as current trends towards water conservation, water reuse, and stormwater management, support the project's goal of reducing long-term building costs via designs that leverage elements to perform multiple functions. All water systems for the project have the potential to double as green space amenities, be they visual or tactile. Stormwater planters and other green infrastructure features could be used to create and delineate public and private open space and separate pedestrians and bicycles from vehicles, as well as contribute to the creation of a unique West Campus identity.

We have set forth below a number of potential strategies for reducing water use and managing stormwater. We have included performance metrics that have been achieved on other projects as examples of what might be possible if such elements are incorporated into the project design. However, it is important to note that actual performance, including estimates of potential results, is always site specific; site specific modeling will be required in order to estimate how these systems might impact project performance.

BELOW
Bioretention planter

RAINWATER HARVESTING

Where permitted, rainwater harvesting can be used to reduce and supplement potable water and reduce peak flow rates during storm events. Currently, the City of Seattle has a water rights permit from the Department of Ecology which allows developers to pursue stormwater designs that capture and reuse rainwater. The April 2008 Client Assistance Memo 701 outlines the definitions, design considerations, and implementation guidelines for rainwater harvesting within the City. The rainwater harvesting system must also comply with permitting, planning and zoning requirements. The permit restricts rainwater harvesting to locations that are within combined and partially combined sewer basins. In locations with dedicated storm systems, rainwater harvesting is prohibited. While portions of the sites are located within areas where rainwater harvesting would be permitted, the project sites are connected to dedicated storm drains which outfall into Portage Bay. They are therefore functionally part of a dedicated storm drain system; rainwater harvesting is not currently permitted when a site connects into such a system. Thus, rainwater harvesting on the project sites is not currently allowed under by the Department of Ecology Rainwater permit.

STORMWATER CODE REQUIREMENTS

FLOW CONTROL

We do not currently anticipate that flow control will be required under either version of the Code since the Project discharges to a Designated Receiving Water which is not capacity constrained.

WATER QUALITY

Under the proposed Draft Stormwater Code, the construction and/or replacement of 5,000 square feet (sf) of pollution generating impervious surfaces (PGIS) triggers water quality treatment requirements. At present, the project intends to build out each site to the lot line limits. Consequently, the sites themselves will not include a significant amount of PGIS and may not trigger water quality treatment requirements. Sidewalks are also not considered PGIS. However, because some of the roadway will need to be repaired or replaced as part of the project's construction, water quality treatment may be required in certain locations.

Water quality performance goals within the proposed draft code include 80% removal of total suspended solids, along with goals for the removal of oil and other hydrocarbons.

The proposed draft code requires projects to use green infrastructure technologies for water quality treatment "to the maximum extent feasible". SPU has interpreted this provision to mean that projects must use Green Stormwater Infrastructure unless the site's physical limitations, practical considerations of engineering design or necessary business practices or reasonable financial considerations of costs and benefits would prohibit their use. Green Stormwater Infrastructure includes bioinfiltration and biofiltration swales, infiltration, sand filters, filter strips, basic wet ponds, wet vaults, stormwater treatment wetlands, combined detention and wet pool facilities, bioretention planters, raingardens, Silva Cell integrated tree pit systems, and certain proprietary media filtration methods.

OTHER POTENTIAL REQUIREMENTS

The proposed Draft Stormwater Code requires Green Stormwater Infrastructure to be used onsite to the maximum extent feasible on all projects that disturb 7,000sf or more of land or contain 2,000sf or more of new plus replaced impervious surfaces, regardless of whether flow control or water quality treatment is required. It also requires that all "new, replaced and disturbed topsoil" be amended with organic matter.

OPPORTUNITIES FOR STORMWATER TREATMENT AND MANAGEMENT

GREEN ROOFS

Green roofs vary in size and composition from those with thin soil profiles capable of supporting sedums, grasses, and herbaceous plants (Extensive Green Roofs) to rooftop gardens capable of supporting shrubs, small trees and usable open space (Intensive Green Roofs).

Much of the research to date regarding green roofs has focused on flow control. During low intensity rains of one-half inch or less, a green roof will absorb all water and completely prevent runoff. During higher intensity events, green roofs reduce peak flow rates and delay runoff, allowing more time for evapotranspiration and detention. Within the Puget Sound area, a roof of 4-6" in depth has been shown to provide the most stormwater flow control benefits.

Green roof systems vary in storage capacity, cost, maintenance effort and roof load. In addition to reducing peak flow rates and delaying runoff, green roofs provide water quality treatment by limiting the surface area of conventional roofs that may leach metals or other pollutants. They also retain and break down pollutants in rainwater through adsorption and biological processes. One study estimated that green roofs can remove over 95% of the cadmium, copper and lead and 16% of the zinc within rainwater. Due to their higher reflectivity, green roofs are also effective at cooling stormwater and reducing the heat island effect, thus reducing temperature loads in runoff.

At present, green roof systems cost more to install than a standard roofing system. However, over time, they can yield substantial cost savings. Because they shield roof material from UV radiation and reduce thermal flux, green roofs can increase the life of a roof's waterproof membrane by two to three times. The insulation provided by green roofs and the cooling created by plant evapotranspiration processes also reduce building cooling costs. Additional public benefits include improving air quality, reducing noise pollution. and providing habitat stepping stones for insects and birds to help increase urban biodiversity.

Green roof maintenance involves some irrigation and hand weeding during the first few growing seasons for establishment. Thereafter, supplemental irrigation is only required during the driest times of the year. Drainage systems and the waterproof membrane should be inspected semi-annually to check for damage.

Additional financial incentives for installing green roofs may soon be available. The Clean Energy Stimulus and Investment Assurance Act of 2009 (S.320) is currently under consideration within the Senate Finance Committee. Section 506 of the bill provides a 30% tax credit to residential and commercial buildings that install green roofs on at least 50% of the building's roof. The proposed tax credit is capped at $5,000 for residential buildings, with no cap for commercial buildings.

RAIN GARDENS, BIORETENTION PLANTERS, AND BIOSWALES

Rain gardens, bioretention planters, and bioswales are biofiltration systems that use amended soils and vegetation to absorb, hold, evaporate and treat stormwater by efficiently capturing and filtering the "first flush" of the storm, which carries the highest pollutant loads. Depending on the soil and water table conditions at a site, raingardens and bioretention planters can be designed to simply detain and treat stormwater prior to conveyance into the Public Storm Drain (PSD), or they can be designed to infiltrate water into the ground to recharge groundwater supplies. Bioswales are primarily used to convey flows and to remove suspended sediments - their vegetation provides resistance which slows flows enough to allow particles to settle out. An overflow, either via a perforated pipe or sheet flow, is typically included in all biosystems to manage higher flows and convey excess runoff to the PSD.

Rain gardens, bioretention planters, and bioswales are typically used to treat runoff from roads, parking lots and other pollution-generating impervious surfaces. They can be integrated into site design as landscaping features along streets, around buildings and within open space. Here they can be used in place of conventional in-road features (such as curbs and gutters), and can serve as vegetated buffers between vehicular and pedestrian areas.

Bioretention planters are usually constructed of concrete, making them well-suited for urban applications where water needs to be directed away from a structure and prevented from seeping into surrounding soil. Bioretention planters consist of a planter box made of sturdy material, amended soils, a gravel drainage layer, and plants. Although bioretention planters can be designed without a bottom in order to allow infiltration, they are typically designed to focus on treatment and flow attenuation to the PSD. They are particularly effective at handling low intensity storms.

Bioswales have been shown to remove 70% of total suspended solids, 30% of total phosphorus, 25% of total nitrogen, 50-90% of certain metals, and 67-93% of oil and grease pollutants from stormwater. Rain gardens and Bioretention Planters that include infiltration have been shown to be particularly effective at heavy metal and nutrient removal, with reductions of up to 95% of lead, copper and zinc, as well as 70-85% removal of total phosphorus and nitrogen. Soil conditions around the project sites are likely to be glacial till, which can pose infiltration challenges. However, proper soil amendment and preparation can increase infiltration capacity. Given that infiltration can provide substantial additional water quality benefits and also recharge groundwater supplies, we recommend designing project systems to provide infiltration wherever feasible.

Rain gardens and stormwater planters provide aesthetic benefits and, depending on plant selection and design, can provide habitat benefits. Additional community benefits can include increased green space, traffic calming and buffering pedestrians from vehicles. Studies that shown that people consider streets with green areas an important part of their neighborhood's open space.

At present, SDOT only permits full street ROW "natural drainage systems" (bioretention planters, rain gardens and bioswales) on residential streets, such as NE 41st Street, and low volume collector streets. The street must also have a minimum ROW of 56 feet. SDOT's standard details require a flat 2-foot wide area between the curb and the beginning of a rain garden's slope and a flat 1-foot wide area between the sidewalk and the beginning of the slope. Actual swale width may vary; provided however, that SDOT's standard side slope is 3:1 on the curb side and 2.5:1 on the sidewalk side.

SDOT does allow deviations from its standard natural drainage system design. For example, vertical stormwater planters with curbs or other barriers to prevent accidental pedestrian impact may be permitted. SDOT currently designates both Brooklyn Avenue NE and NE Campus Parkway as arterials; therefore, any bioretention planters or other natural drainage systems on these streets will require additional discussion with SDOT. One approach that the project team may wish to consider is to suggest to SDOT that the project frontages are perfectly suited to serve as limited pilot cases for the inclusion of natural drainage systems along arterials.

Given that the project's entire frontage improvement package will require negotiation with the City, proposing natural drainage systems that deviate from SDOT standards is unlikely to add significant time to that negotiation process. We would, however, recommend limiting deviations to design variations that SDOT has previously approved on other projects.

LEED AND THE SUSTAINABLE SITES INITIATIVE

All LEED ratings systems, including LEED Neighborhood and LEED 2009, include credits related to reducing water use and managing stormwater and wastewater. The Sustainable Sites Initiative (SSI) is currently under development and will be formalized as the site design component of the LEED ratings system by 2011. The SSI Guidelines and Performance Benchmarks will be completed by 2009. The current draft includes a requirement to reduce potable water use for irrigation by 50%, plus credits for further reducing or eliminating potable water use in irrigation and in ornamental water features. Credits are also provided for managing and cleansing stormwater onsite, as well as incorporating stormwater features as landscape amenities. Reusing greywater, wastewater and rainwater is encouraged, along with improving soils and using native, drought tolerant plantings.

TREES

A canopy of large, mature trees is one of the great contributors to a healthy and livable urban landscape. Trees provide many stormwater management benefits. Flow control and water quality treatment is provided through rainfall interception, adsorption of particles onto leafs and soil, evapotranspiration, infiltration into the soil beneath the tree and breakdown of pollutants via biological processes. Tree roots help to break up compacted soil, further increasing infiltration rates.

Additional benefits provided by trees include enhancing a neighborhood's visual and spatial character, improving air quality, reducing noise and light pollution, and reducing the heat island effect. Trees provide numerous habitat benefits, including refuge from predators, food and nesting resources and habitat patches. Trees enhance the quality of open space and provide visual relief within the urban environment, leading to stress reduction and other health benefits.

The extent of the benefits provided varies by location, by species choice, and by the amount and quality of the soil made available for the trees. Standard City-mandated tree pit dimensions are generally too small on their own to enable the development of a large healthy tree canopy. However, standard tree pits can be supplemented with a variety of measures. Instead of creating individual tree pits that alternate with paving, a continuous planting strip can be provided along the ROW. New support technologies, such as the Deeproot Silva cell, provide the subbases needed to support sidewalks and roads, while providing more soil and growing room for tree roots and stormwater infiltration. Such technologies can also be used selectively to connect tree planting strips to larger open space areas which may lie on the other side of a paved surface.

POROUS PAVING

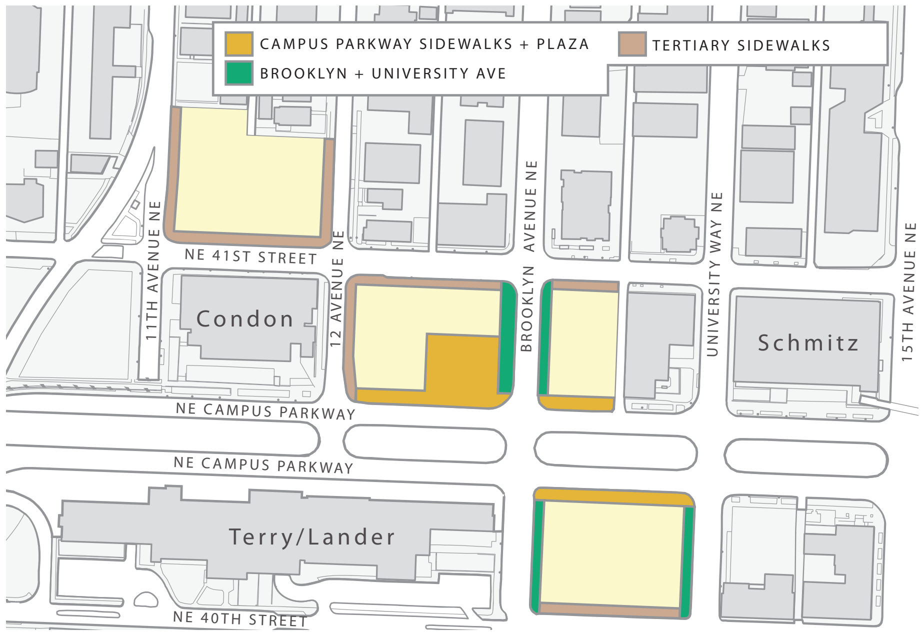
The project is located in a highly urbanized area. The project's program and the number of students to be served mean that limited space will be available onsite to minimize impervious surfaces via landscaping. Porous paving can be used in areas that require hardscape both onsite and in the right of way to provide additional stormwater flow control and treatment.

Porous paving provides hard surfaces for walking and driving while allowing stormwater runoff to percolate into an underlying soil or reservoir base where it can infiltrate into native soil or be conveyed offsite via an overflow drainage system. In addition to providing flow control, the void spaces within these pavements trap oils, grease, and other roadway pollutants and create opportunities for micro-organisms to break them down.

Pervious paving systems may be used in place of conventional impervious paving in almost any location. They are typically used more extensively on alleys and low-traffic streets, such as residential streets and pedestrian corridors, and are especially appropriate for parking areas, driveways, sidewalks and public plazas.

SDOT currently permits pervious paving only for sidewalks in the ROW unless otherwise negotiated. All types of pervious paving are permitted, but the particular wearing course must be on SDOT's Approved List. As with natural drainage system designs, SDOT will allow pervious paving in the roadway and in alleys on a case by case basis and has done so in the past.

FIGURE 7
Overall landscape concept diagram, below



LANDSCAPE INTEGRATION

The landscape for the West Campus Residence Halls will be required to integrate a range of programmatic requirements. Primarily, the landscape will strive to create a safe, inviting environment for students and pedestrians in the West Campus area. Pedestrian access and amenities will need to be carefully balanced with the high volumes and requirements of bus traffic in the area, particularly along Campus Parkway. Both pedestrian and vehicular access will need to be balanced further against the goals of creating a more unified landscape which relates to the University campus, strengthens neighborhood connections, and incorporates sustainable construction and management strategies. Programmatic opportunities exist for a close integration of landscape with building design and systems. Prototypical approaches to landscape integration focus on the following areas:

:: Sidewalks and open space along Campus Parkway
:: Sidewalks along 40th and 41st Streets NE and 12 Ave NE
:: Sidewalks along Brooklyn Ave NE and University Ave NE
:: Building-integrated landscapes.

Sidewalks and open space along Campus Parkway will face the greatest programmatic demands of the West Campus Residence Hall landscape areas. These spaces will be required to serve a greatly expanded student population in the area while simultaneously accommodating increased levels of bus traffic and the potential of a future streetcar in the West Campus area. They will also be called on to support a healthier, more consistent tree canopy appropriate to the alignment and significance of NE Campus Parkway to the UW Campus (Fig 7). The combination of these requirements with the goal of integrated stormwater management in many of the landscape areas of the project will demand a 'hardscape' treatment capable of withstanding high volumes of pedestrian and vehicular traffic in combination with 'softscape' performance characteristics which supporting healthy plants and integrated stormwater management. Suspended tree grate systems, structural soils, Silva cell technology and continuous soil trenches are all landscape technologies which can provide this combination of hardscape and softscape characteristics (Fig 8).

At the corner of Brooklyn Ave NE and NE Campus Parkway, an existing American Elm tree of extraordinary age and form will anchor the pedestrian spaces along Campus Parkway and help provide a heart to the West Campus Residence Halls in combination with adjacent ground floor uses. In addition to high volumes of pedestrian traffic this area should offer adequate outdoor seating and bike parking. The landscape treatment of this area should combine hardscape surfaces with softscape characteristics, for the purposes of preserving the health of the Elm tree while accommodating high volumes of pedestrian traffic and other programmatic demands.

The sidewalks and open space along Campus Parkway will represent the most significant streetscape modifications along the Parkway since its construction in 1953. It is critical that they establish a precedent for future development which is more pedestrian and bicycle friendly, better connected to the heart of the UW Campus (east of 15th Avenue NE), and exemplary from a standpoint of environmental stewardship.

FIGURE 8
Photograph of urban low-impact development (LID) technology

View to Olympic Mountains from Red Square

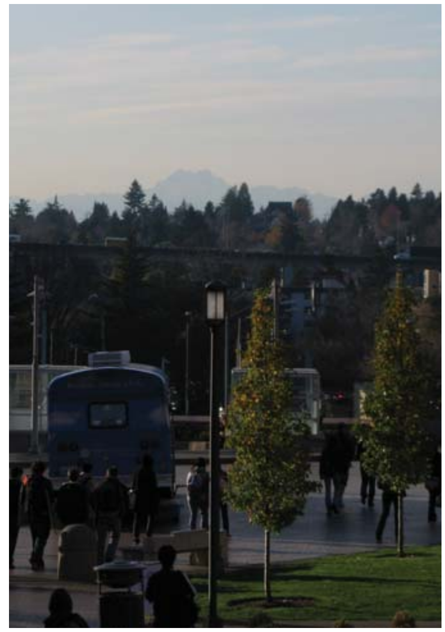
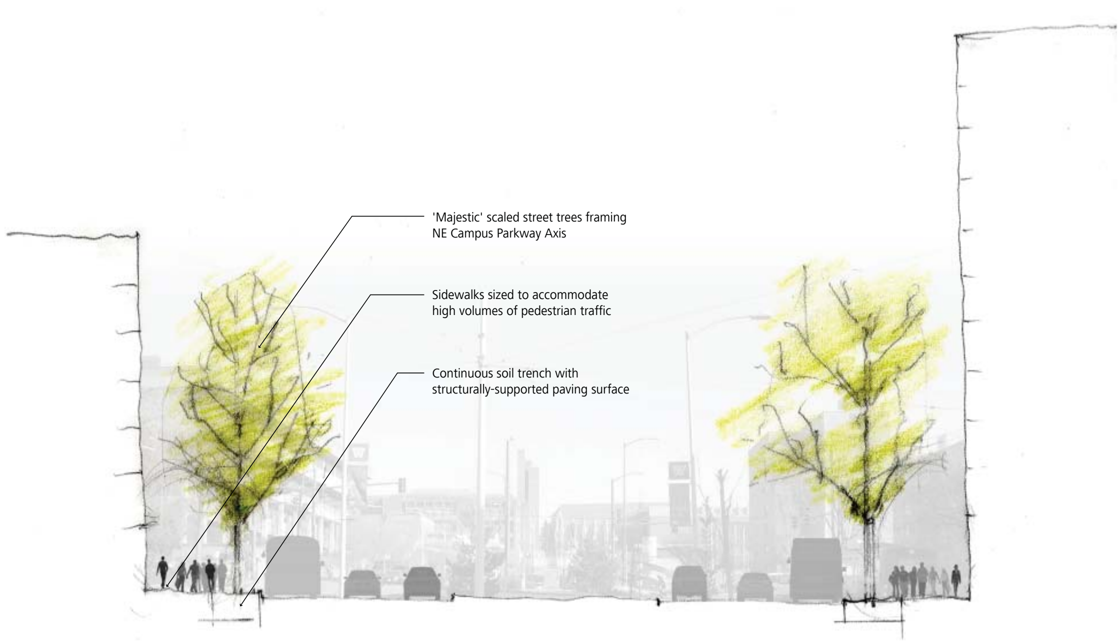


FIGURE 9
Proposed cross section, NE Campus Parkway, below



Sidewalks and open space along 40th and 41st Streets NE, and 12th Avenue NE will be narrower in width due to existing right of ways. These should be sized primarily to accommodate the pedestrian traffic associated with trips between the new Residence Halls and the main academic campus east of 15th Avenue NE (Fig 9). This will include street tree planting with suspended tree grates where possible, and where sidewalk area is limited building-integrated landscapes such as vine screens or window planters may be advisable.

Sidewalks along Brooklyn and University Avenues NE will incorporate stormwater management strategies for adjacent roadways along with pedestrian connections to the commercial core of the University District to the North, and the Portage Bay waterfront to the south. The design of the right of way along Brooklyn Avenue NE should reflect its designation as a Neighborhood Green Street (Fig 10), as well as the future location of a light rail station at 43rd Street NE and Brooklyn Avenue NE. Sidewalk planters with layered groundcover, shrub, and tree plantings, integrated seating and stormwater elements will provide needed spaces for small group gatherings, as well as educational landscapes for the University (Fig 11). The area requirements of these elements will need to balance localized pedestrian requirements, the building footprint, and any possible adjustments to traffic and parking lanes.

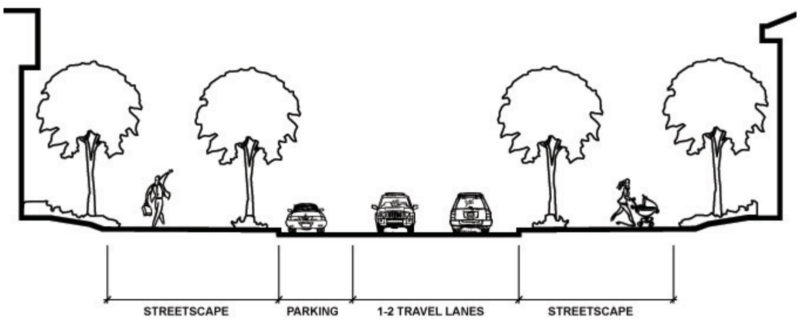
Building-integrated landscapes will potentially include planting and soil volume on structure designed to filter building greywater, and vertical green elements such as vine screens. Many of these integrated landscape technologies will help the West Campus Residence Halls achieve Seattle City Green Factor Status, per the larger project goals (Fig 12).

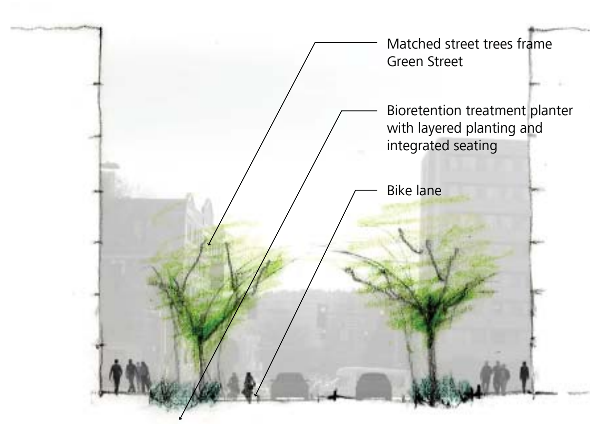
The integration of various programmatic requirements and opportunities within the landscapes of the West Campus Residence Hall areas will reinforce overall design concepts and the urban and campus connections of the West Campus area. The landscape will foster a vibrant, pedestrian-oriented cultural identity for the West Campus Residence Halls, and help to connect the UW campus with its urban and regional context.

FIGURE 10
Typical Green Street Section, SDOT, top left

FIGURE 11
Proposed cross section, Brooklyn Ave NE, top right

FIGURE 12
Reference Images of Green Factor Strategies, bottom





SDOT REQUIREMENTS FOR FRONTAGE IMPROVEMENT

Pursuant to SMC 23.69.006(B) all relations between UW and the City of Seattle, including without limitation, zoning, development standards, transportation policies and the like, are governed by the 1998 Agreement between the parties, by the University of Washington Master Plan, Seattle Campus (2003) (UW Master Plan) and by other agreements that may be worked out between the parties. As a result, determining the scope and extent of required frontage and street improvements for the project will be an iterative process involving UW, the Department of Planning and Development (DPD), SDOT, SPU and others.

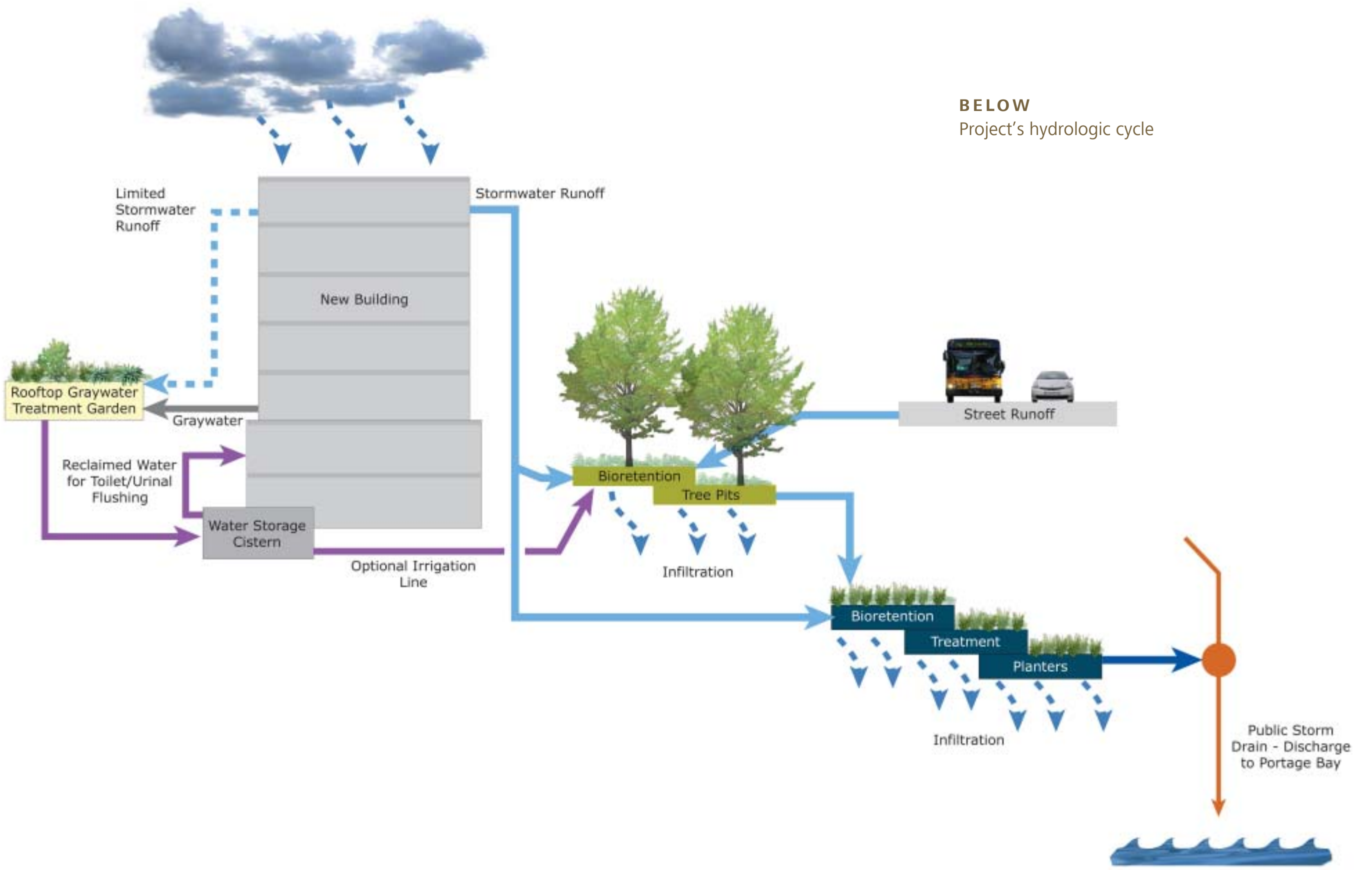
At a minimum, the project would be required to mitigate construction impacts to the existing street frontage at each site. The first level requirement will be the replacement or planting of new street trees as required by the City for the particular impacted street. Mitigation of direct impact or damage to streets as a result of normal construction activity will also be required. This includes street damage due to utility trenching (electrical, etc.), fixing and widening broken sidewalks, and fixing roadway damaged beyond repair by construction. Improvement requirements are triggered by work in the roadway. Sidewalk replacement does not trigger them.

As noted on page 3-47, SDOT is likely to require the project to make certain ROW improvements for ADA access, including relocating curbs and widening sidewalks to meet current standards for a 6-foot minimum width in residential areas, adding curb bulbs and bringing curb ramps into compliance with the City's current ADA standards. UW and the City may also consider other desired roadway amenities, including moving curbs to appropriate locations to provide more room for street trees, wider sidewalks and narrower roadways.

As noted on page 3-47, Brooklyn Avenue NE is a designated "Green Street" and is also a designated Collector Arterial. Since SDOT has not released specific guidelines for Arterial Green Streets, the specific requirements for Brooklyn Avenue NE will likely be defined in a development process with City staff.

While the streets in the project area are already established with existing curb lines and sidewalks, development review may require that 5 foot sidewalks constructed under previous standards be replaced with sidewalks that meet the new 6-foot standard. Should bike lanes be incorporated into Brooklyn Avenue NE, they will need to be a minimum of 5 feet and be located adjacent to any parking lane.

With respect to mobility, LEED Neighborhood includes Neighborhood Pattern and Design (NPD) credits for creating walkable streets and a bicycle network that links sites to local amenities and businesses. LEED Neighborhood NPD Credit 7 includes standards for sidewalk width and street trees, among other frontage design standards. Bonus points are provided for including street trees onsite or within the ROW that will shade one-half the length of the sidewalk within 5 years. Credits are also provided for ensuring transit stops within project boundaries include an illuminated shelter and at least one bench (LEED Neighborhood NPD Credit 9).



BELOW
Project's hydrologic cycle

OVERALL VISION AND RATIONALE

Over time, West Campus will substantially increase in density and develop as a neighborhood with a unique identity that also serves to connect UW to the rest of the City. The Project is only beginning this process, yet as the first step along this path, it provides the opportunity to ensure that green infrastructure is incorporated into West Campus' essential character and functionality. Our overall infrastructure vision is centered on the following high level principles:

:: **Reestablish natural flow patterns within the neighborhood:** divert surface runoff from the storm drain system into a system of bioswales, rain gardens and bioretention planters that treat and control flows and direct them south into Portage Bay.

:: **Use stormwater treatment facilities as an integral element in site and streetscape design:** vegetated stormwater treatment facilities provide multiple benefits. They can reduce long-term operation and maintenance costs, while providing additional public benefits, such as reducing the heat island effect, providing open space and habitat, buffering pedestrians from vehicles and contributing to the development of a distinct neighborhood character.

PROJECT AREA LAYOUT

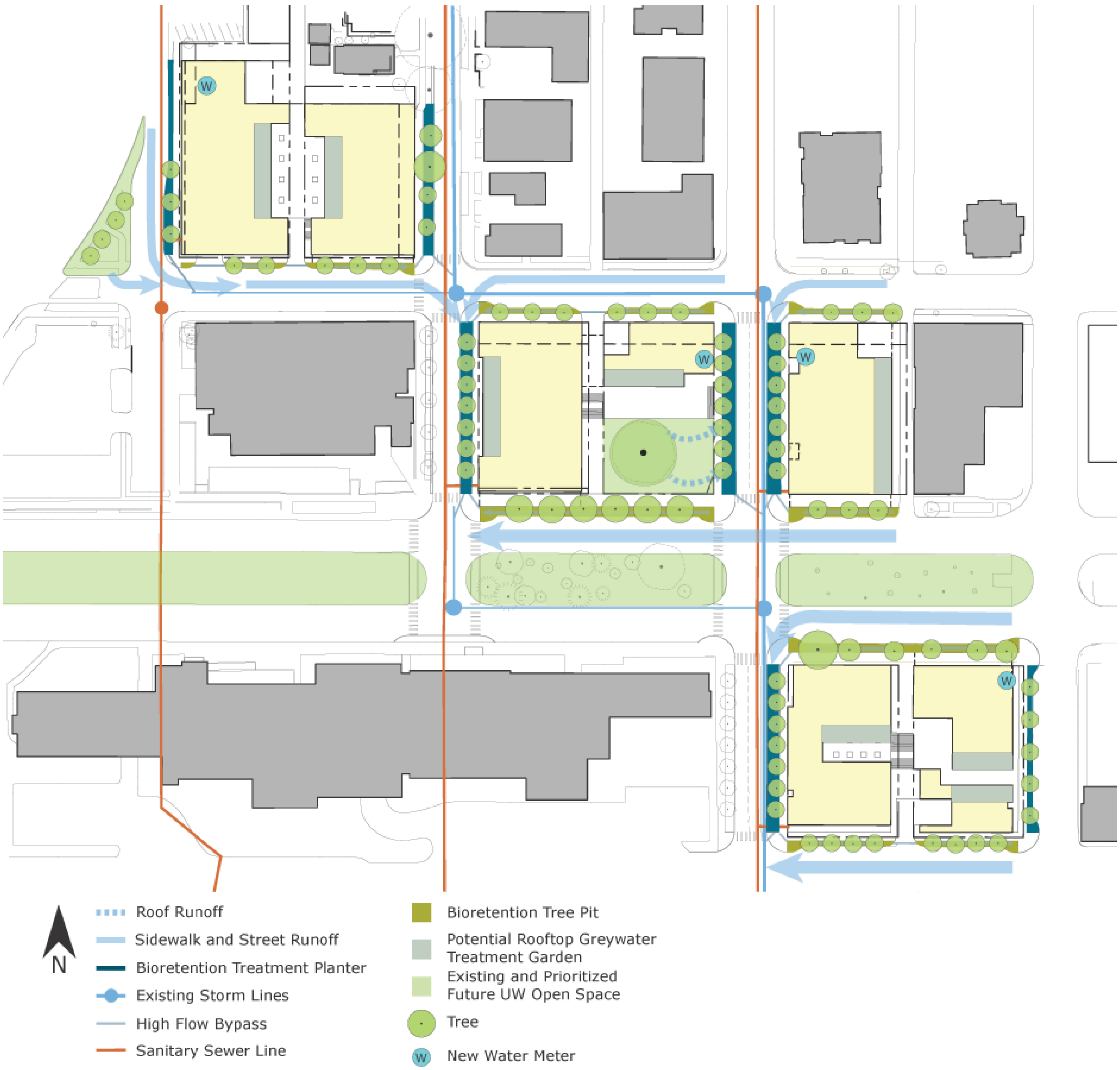
The concept for the project's infrastructure layout reflects the long-term vision discussed above. Water use and stormwater management systems are integrated into the streetscape's infrastructure in order to enhance the pedestrian experience and support mobility. Figure E illustrates how water will move through the system components described below for treatment, reuse, and ultimate disposition, while Figure F proposes an infrastructure layout that integrates project specific infrastructure components into the larger vision for the West Campus Neighborhood. The infrastructure layout includes the following components:

1) Green Roofs and Greywater Systems. We recommend incorporating green roofs/ greywater treatment systems into each residence hall site where feasible. Such treatment systems will help slow and detain stormwater flows, while enabling reuse of building water onsite, thus lowering building fees associated with water and sewer usage and adding visual green space to the buildings.

2) North-South Stormwater Treatment Streets. Due to the greater slopes along 12th Avenue NE and Brooklyn Avenue NE, bioretention features along these streets will provide stormwater treatment. In order to conserve space and provide a buffer between pedestrians and vehicles, we may wish to design these features as a series of vertical walled planters connected by slotted weirs. As such, the planters could serve as streetscape water features in addition to providing treatment. The planters would tie into the PSD system and be fitted with overflow pipes that will convey excess flows directly into the PSD. Sidewalk and bicycle lane improvements should also be considered to enhance Brooklyn Avenue NE's Green Street designation.

3) East-West Residential Streets. Frontages along NE 41st Street and NE 40th Street will be residentially oriented streets. Large street trees with access to ample soil should also be installed to provide additional stormwater management and enhance the streetscape. Because these streets are more flat, stormwater elements will be focused on conveying flows to treatment cells along the north-south streets.

BELOW
Integration of stormwater management into project sites and streetscapes



TECHNICAL PROGRAM - BUILDING

BUILDING ORIENTATION AND SOLAR POTENTIAL

In order for a building to minimize its energy use and maximize its solar potential five factors must be addressed: sun, light, wind, sun + wind together, and comfort.

Sun availability needs to be addressed by utilizing either the Sundial or Sunpath techniques which evaluate the effects of existing site conditions, impacts of building massing alternatives, extent of sun penetration into buildings and the effectiveness of shading devices. In addition, this evaluation determines what areas of the future building will benefit the most from the solar radiation available for passive heat gain and which area will require additional shading.

For daylighting purposes, sky conditions are classified as either overcast, clear or partly cloudy. Each condition has different properties that influence the effectiveness of various envelope opening locations and exposures. A close review of historical sky cover data during the design stages of the project will allow decisions to be made as to what daylighting approach is most beneficial for the local climate, individual space dimensions and building form.

Wind direction, frequency and speed at a particular site are important in determining the effectiveness of a cross-ventilation design and general airflow movements on and around the site. Wind data provides detailed wind speed and direction frequencies for a specific site for the month or even the whole year. Typically, wind data is evaluated using wind rose and wind square diagrams. Wind data is typically collected at nearby airports; however it is important to properly apply this information to the site based on local terrain characteristics while applying known air movement principles.

By analyzing the combined availability of sun + wind in a specific microclimate, building form, materials, glazing percentages and orientation can be chosen that optimize the bioclimatic potential. During the design stages of a project, the seven stepped Microclimate Analysis Method (Brown & DeKay) is a good technique to understand which combinations and permutations of building massing, form, envelope and orientations are most suitable for the site.

The primary goal of a built environment is to provide a comfortable and enjoyable space for building occupants. A bioclimatic chart (see pg 4-45) helps define perceived comfort boundaries and the effects on these boundaries due to various design strategies. Understanding site and local climatic conditions, while evaluating building design strategies, is an important step in defining building performance and maximizing use of sun, light and wind while minimizing energy use.

BUILDING ENERGY AND WATER

INTERNAL AND EXTERNAL LOADS

Major cooling loads in building will be from solar radiation, internal equipment, internal lights, occupants, conduction through the envelope, infiltration, and cooling of ventilation air. Reducing cooling loads will reduce the energy required for air conditioning and, in naturally ventilated spaces, space temperatures.

Major heating loads will be losses from the envelope, infiltration, and heating ventilation air. Reducing heat losses will reduce the energy required to maintain space temperatures during the heating season.

The following strategies can reduce heating and cooling loads:

:: Reduce heating and cooling load by limiting the quantity of glazing to as much as is required for daylighting
:: Reduce cooling load by providing glass with low solar heat gain coefficient
:: Reduce cooling load by providing solar shading (potential 5% reduction in cooling energy, but increases heating energy)
:: Reduce cooling load by mandating certain levels of internal equipment (LED desk lamps, etc.)
:: Reduce cooling load by providing low power internal lighting
:: Reduce heating and cooling by providing high performance envelope – especially with respect to infiltration
:: Reduce heating and cooling by providing heat recovery for ventilation air

BUILDING ENVELOPE

The minimum envelope performance is defined by the 2006 Washington State and Seattle Residential Energy Codes. Further improvement of the envelope beyond code-minimum construction can reduce the energy use of the building to help achieve the project's energy-related goals; however, the energy savings achieved by improving the envelope beyond Seattle Residential Code requirements is not anticipated to be sufficient to offset the cost of additional insulation. Building an exceptionally "tight" building with limited infiltration, limiting glazing area, and designing a high performance HVAC system are more effective ways of achieving energy savings. Therefore, PAE recommends designing the building envelope to Seattle Residential Energy Code minimum standards. The one exception to this is the solar heat gain coefficient of the installed glass; Washington and Seattle codes do not regulate solar gain from windows although in a large residential structure, this will have a significant impact on energy use and space conditions. PAE recommends meeting or exceeding the ASHRAE 90.1-2004 minimum solar heat gain coefficient requirements.

TABLE 5
Envelope performance requirements and recommendations

			2006 WASHINGTON STATE CODE (glazing is percent of floor area)	2006 SEATTLE RESIDENTIAL CODE	ASHRAE 90.1 - 2004	RECOMMENDED VALUES
LESS THAN 25% GLAZING	WALL		R-21 / 0.057	R-21 / 0.057	0.089	R-21/ U-0.057
	WINDOW (ASSEMBLY)	U-VALUE	0.4	0.4	0.67	0.4
		SHGC	NOT REGULATED	NOT REGULATED	0.39	0.39
	ROOF		R-38 / 0.031	R-38 / 0.031	0.063	R-38 / 0.031
GREATER THAN 25% GLAZING	WALL		R-21 / 0.057	R-21 / 0.057	0.064	
	WINDOW (ASSEMBLY)	U-VALUE	0.35	0.35	0.47	
		SHGC	NOT REGULATED	NOT REGULATED	0.25	
	ROOF		R-38 / 0.031	R-38 / 0.031	0.063	

Table 5 summarizes the envelope-specific code requirements for Washington State, Seattle, ASHRAE 90.1-2004 (the LEED Standard), and the recommended envelope parameters.

To determine the recommended envelope, PAE performed an analysis of various envelope configurations to determine the effects of each option on energy use and cost. The following assumptions guided the analysis:

:: Seattle, WA weather data
:: Buildings will be heated to 70˚F
:: Buildings will not be mechanically cooled
:: Total envelope to floor area ratio = 5.2

The following envelope configurations were considered:

WALL-1: CODE ENVELOPE

This wall will consist of 6” wood studs spaces at 16” oc. The following parameters define the envelope performance:

:: Wall R-Value = 17.52
:: Window U-Value = 0.4
:: Window-to-wall ratio = 30%
:: Overall Envelope R-Value = 6.26

Eight alternate walls were analyzed; the walls are identical to the “Code Envelope” except for the differences noted below:

WALL-2: R-5 CONTINUOUS

:: Assumes an additional continuous layer of 1” extruded polystyrene.

WALL-3: 8” STUDS

:: Assumes 8” wood studs spaced at 16” oc.

WALL 4: 20% GLAZING

:: Assumes a 20% window to wall ratio.

WALL 5: HEAT MIRROR GLASS

:: Assumes Heat Mirror Glass with assembly U-value of 0.2.

RIGHT: FIGURE 13
Wall and overall envelope R-values for each envelope alternative

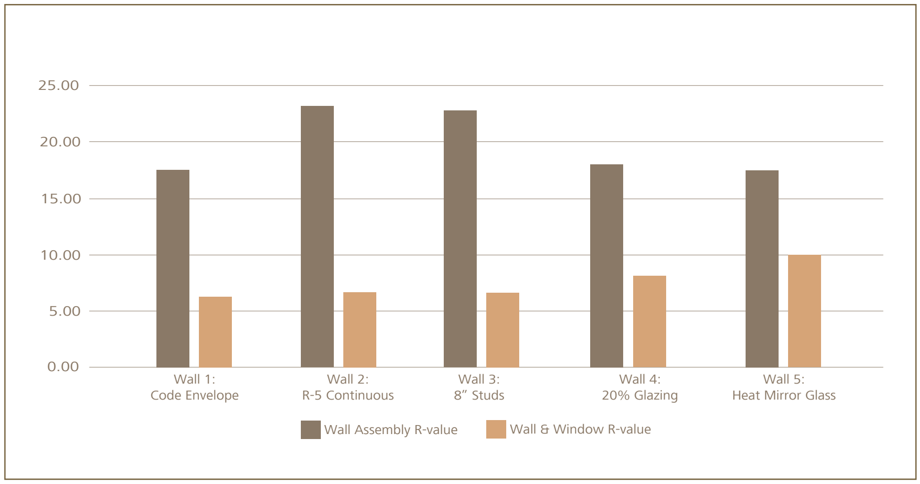


Figure 13 illustrates the wall and overall envelope R-values for each envelope alternate.

Recommendation: Based on the results of the wall-system and Equest analysis, Wall-Type 1: Code Envelope is recommended. Savings of increased wall isolation are insufficient to justify the additional first cost. PAE recommends minimizing the solar heat gain coefficient of the installed glass to minimize the solar heat gain during summer months; a SHGC value of 0.39 is suggested.

The minimal effect of wall insulation on the building's energy use is due to the already aggressive construction standards mandated by Washington State. A "balance point" calculation determines the temperature at which a space's internal loads balance with the heat loss to the outside. Theoretically, no heating is required at or above this temperature. The balance point calculation, at right, shows that with the proposed envelope, nighttime balance point temperatures may be as low as 45°F for the new UW buildings.

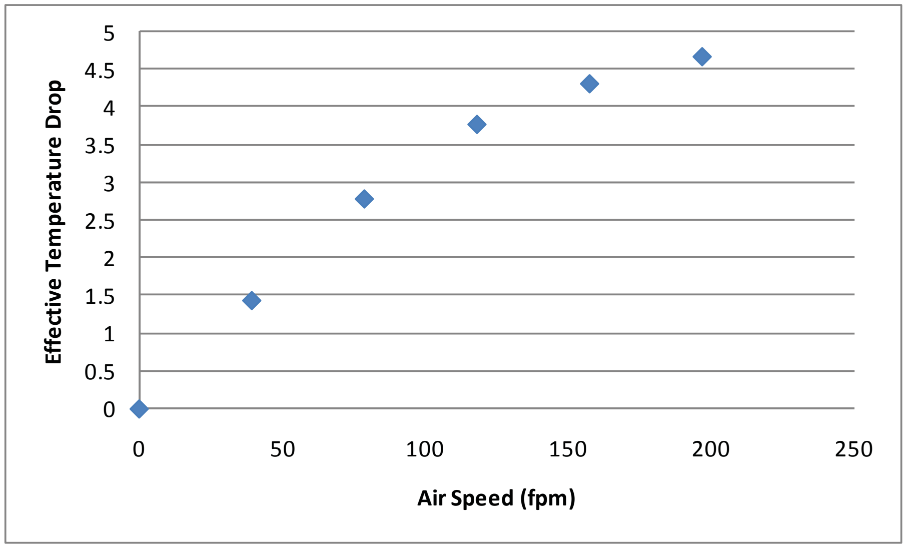
Calculations of Balance Point Temperatures for Varying Heating Load Components

Ext Wall length	11.5	**Internal Gains at NIGHT:**			
Ext wall hieght	15	People	2.00		
Vertical Ext (sf)	172.5	Heat/Person	150	Btu/h	Sleeping Person
Floor Area (sf)	300	Lighting and Equipment	0.25	W/sf	Lower internal loads
		Total Heat Gain	**556**	**Btu/h**	

	Wall U-factor	Glazing U-factor	% Glazing	Infiltration Rate (cfm/sf ext wall)	Ventilation (cfm/person)	Total OSA CFM (Vent + Infil)	Indoor Temp Setpoint (°F)	Temperature Difference (°F)	Balance Point Temperature (°F)
Tight Envelope	0.057	0.40	**20%**	0.10	0	17	60°F	14°F	46°F
	0.057	0.40	**30%**	0.10	0	17	60°F	12°F	48°F
Very Tight Envelope	0.057	0.40	**20%**	0.05	0	9	60°F	18°F	42°F
	0.057	**0.40**	**30%**	**0.05**	**0**	**9**	**60°F**	**15°F**	**45°F**

Notes:
1. ASHRAE 99.6% Heating DB for Portland at 21°F
2. Without mechanical ventilation, provide operable w indow free area at 5% of floor area (11.25 sf free area)
3. Glazing areas represented by percentage of exterior w all: 10% = 15 sf, 20% = 30 sf, 30% = 45 sf
4. This calculation is valid for night conditions; it does not take solar gains into account. Therefore, equivalent daytime outside air db temperatures w ould result in low er daytime balance point temperatures
5. This calculation applies to rooms w ith only one exterior w all, and no roofs (ie. floors 2-3, rooms not located on corners)
6. The balance point temperature is the temperature below w hich, heat input w ould be required to maintain the indoor temperature setpoint

FIGURE 14
Effective "Wind Chill" Versus Air Speed



COMFORT CONDITIONS

For standard mechanical heating and cooling, design comfort conditions are between about 70 and 75°F dry bulb and between relative humidities of 30 and 70%. If outdoor conditions are in this range, no mechanical heating or cooling would be needed.

If natural ventilation is used as the primary cooling strategy for the residential spaces, temperatures will exceed the 75F maximum design comfort condition that is defined for typical air-conditioned spaces. However, this does not necessarily mean that the spaces will overheat. In a naturally ventilated space, comfort expectations are different and the definition of overheating changes. The Carbon Trust Natural Ventilation Applications Manual (Carbon Trust) describes thermal comfort as a "complex mix of physiology, psychology, and culture." Clothing, temperatures, air speeds, and humidity levels also all play a role in thermal comfort.

In an ASHRAE research study published by Center for Environmental Design Research, University of California, Berkeley, researchers found that occupants with control over their thermal conditions accepted 2.7°F higher temperatures than occupants in a similar thermal environment but without control (Brager).Additionally, a "wind chill" effect will reduce the effective temperature that occupants experience. The Carbon Trust manual quantifies the wind chill due to air movement: a 50 fpm draft is equivalent to nearly 2°F and 100 fpm is the same as a 3.5°F temperature drop. The effect of air movement as presented by the Carbon Trust is shown in Figure 14. Air movement at 40 fpm is generally considered the slowest air speed that will change comfort conditions (ASHRAE Standard 55).

The result of shifting comfort criteria is that though spaces cooled with natural ventilation will not provide a constant indoor temperature in the cooling season, the spaces can still be comfortable. Occupants will adapt to higher temperatures by controlling their environment though operable windows, different clothing levels, and different expectations.

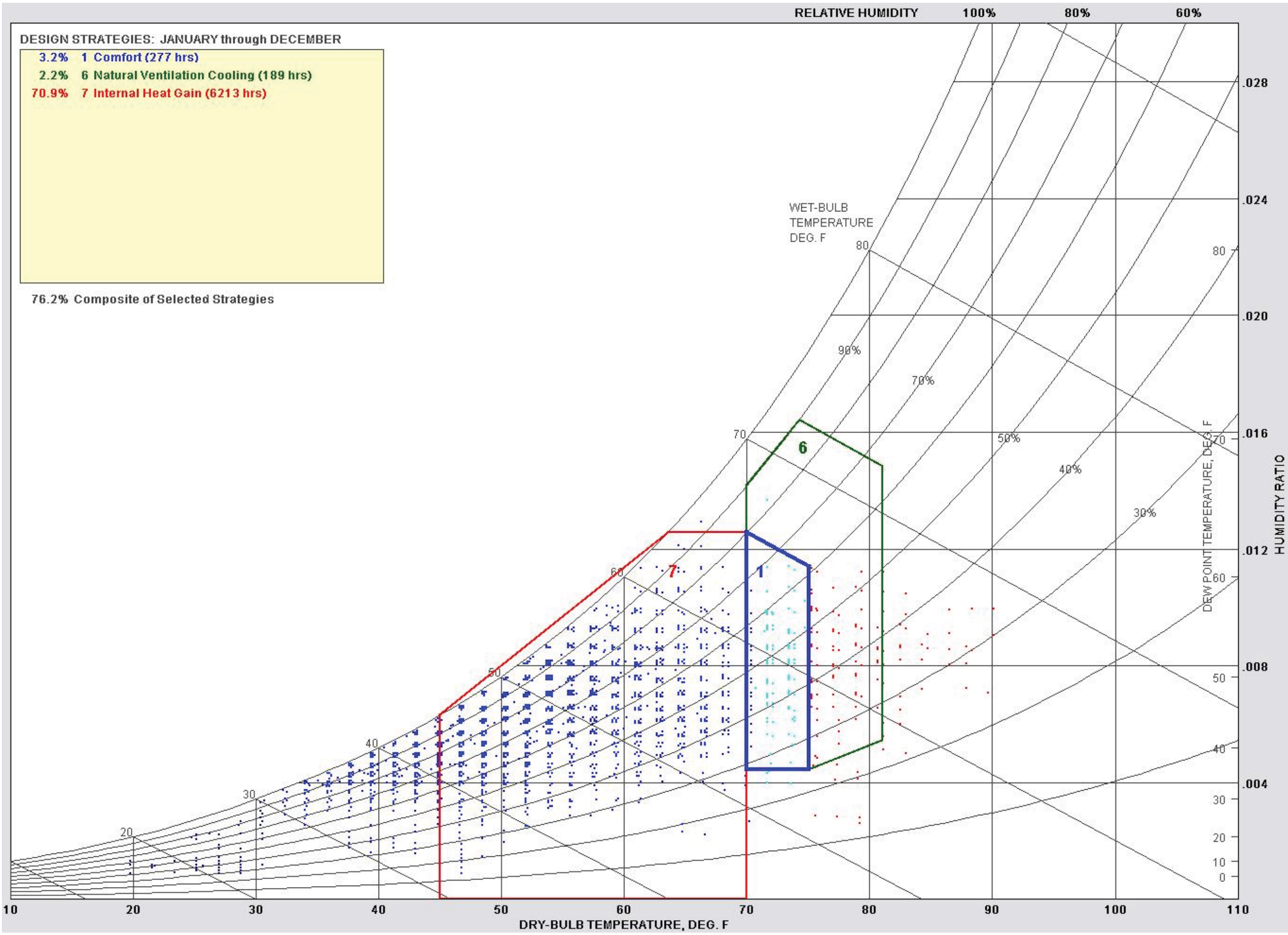
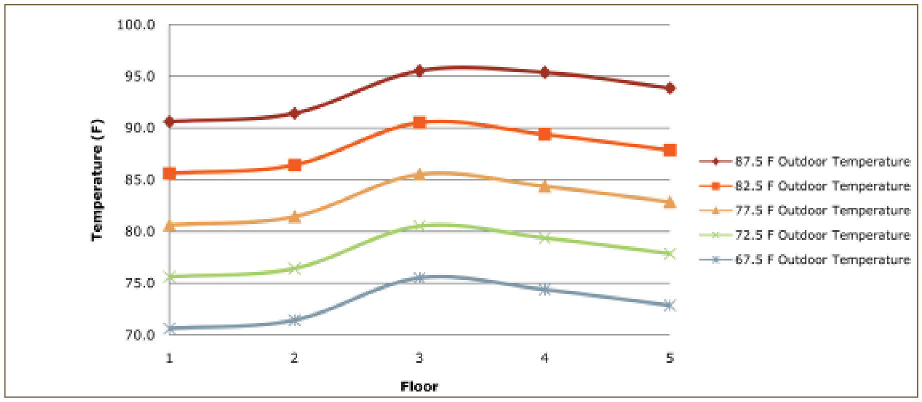


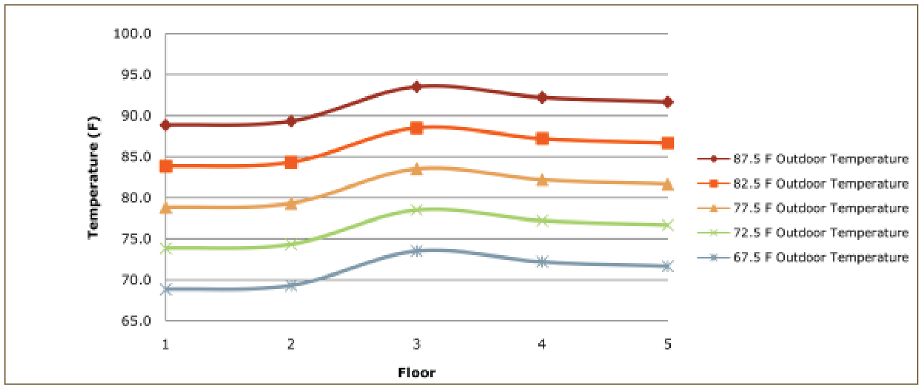
FIGURE 15
Bioclimatic Chart, above

The bioclimatic chart illustrated in Figure 15 graphically summarizes appropriate climatic conditions for thermal comfort in a particular environment. By plotting the temperature and relative humidity one can determine if a resulting condition is comfortable (within the comfort zone), to hot (right of the comfort zone), or to cold (left of the comfort zone).

The chart's comfort zone assumes an office work activity level and winter clothing. Zone 1 on the bioclimatic chart is the "standard" comfort zone for a mechanically ventilated space. Zone 6 illustrates the expanded comfort zone in naturally ventilated spaces. The expanded comfort region is based on the physiological and psychological reactions to naturally ventilated spaces discussed above. Zone 7 illustrates the "balance point" zone where the space has enough internal loads to meet the heating demands; in this zone no mechanical heating is required.



UPPER RIGHT: FIGURE 16
Expected South- and West-side temperature ranges



LOWER RIGHT: FIGURE 17
Expected East- and North-side temperature ranges

NATURAL VENTILATION/ NON-MECHANICAL COOLING

Because of Seattle's favorable climate, natural ventilation is proposed as the most energy efficiency strategy for space cooling of the residential floors. Most Seattle homes do not have air conditioning and are effectively cooled by naturally ventilation (even without an engineered system). Advantages of natural ventilation are reduced energy use, increased occupant connection with the outdoors, and increased supply of fresh air in the building. Disadvantages of natural ventilation are reduced control of ventilation air, increased space temperatures, and no ability to filter fresh air supply.

The natural ventilation strategy for the new dormitories will rely on a two-stage design. First, single sided ventilation (dorm room window open) will provide cooling; single sided ventilation will provide sufficient air movement and space control when outside air temperatures are between 70 and 75°F. For temperatures above 75°F, the building will be designed to ventilate using thermal buoyancy airflow (stack effect). To benefit from the stack effect airflow, occupants will leave their doors open to the common corridors; the corridors will be open to the stairwells which will be used as chimneys to enhance the stack effect.

The expected room temperatures were calculated for each temperature range above 65°F. Figures 16 and 17 illustrate the expected room temperatures. The following assumptions were made as part of the calculation:

:: Window-to-wall area per room = 30%

:: Window free area per room = 10 ft2

:: Stairwells will be open to corridors and will be used as "chimneys" to enhance natural ventilation

:: Students will open dorm room windows and doors to control space temperature

:: Total free area at top of stairwell = 200 ft2

:: Total load for north– and east– facing dorm rooms = 2000 Btu/h

:: Total load for south– and west– facing dorm rooms = 5000 Btu/h (higher due to daytime/afternoon solar load)

:: Insignificant thermal massing (note that increasing the thermal massing will flatten the daily temperature profile and reduce the peak zone temperatures)

Higher temperatures are expected in the central floors of the building because the stack affect will draw cool air into the bottom of the building and push hot air out from the top. The central floors will have less outside air flow and will have higher indoor temperatures because of the reduced air movement. A solution to the high temperatures in the central floors is adding a "solar chimney." A chimney will increase the pressure difference within the building and result in greater airflow volumes in the central and upper floors.

BUILDING SYSTEMS

HVAC SYSTEMS

The choice of heating and cooling systems for a building will largely determine a building's life-cycle energy use. One of this project's goals is to limit energy use to meet the requirements of the Architecture 2030 Challenge. The Architecture 2030 Challenge is described in more detail later in this document. The following narrative presents one high-efficiency residential option and various options for heating and cooling the non-residential spaces. The benefits, drawbacks, and estimated costs of each are summarized.

RESIDENTIAL (DORM ROOM) SYSTEMS

Heating System: Electric resistance radiant heating and wall mounted programmable electronic thermostat for each room. The electric heating elements may be baseboard or valence-type heaters.

EXHAUST SYSTEM

Bathroom exhaust would be through an exhaust grille in each bathroom and ducted to vertical sheet metal lined shaft (subduct into sheetmetal duct in shaft) and routed to rooftop, then connected to gas-fired rooftop units with integral air-to-air heat exchangers. All ductwork outside building envelope will have to be insulated per code and have an external metal jacket.

VENTILATION SYSTEM

Outside air would be provided from the rooftop air-to-air heat exchangers (same units that the bathroom exhaust is ducted to) allowing heat exchange to happen between the airstreams, the exhaust fans will be required to be on emergency power because of the sub ducting into the shafts. The supply duct from roof top heat exchange units would be routed down shafts, then out of shaft through fire smoke damper (FSD) on each floor and down corridor into each dorm room. Ventilation air will be ducted to corridors directly from the shaft through front access grilles with FSDs. Ventilation air supply temperature would be controlled based on outside air temperature. The temperature would be increased to 75°F on cold days on decreased to 55°F through DX-cooling on hot days. This will allow a modest amount of cooling in the rooms on hot summer days.

Probable cost: $31/SF, including:

:: Electric Resistance Heat & Thermostat

:: Dedicated outside air system

:: Plumbing ($18/sf), and Fire Protection ($2.5/sf)

NON-RESIDENTIAL FLOORS, HEATING VENTILATION AND COOLING SYSTEMS

(Includes Residential Corridor Heating and Cooling)

Non-residential areas will be air conditioned and therefore require a HVAC system capable of cooling and heating. Residential zones will be heated with electric radiant heating and cooled with natural ventilation. Preliminary calculations were performed to approximate the heating and cooling capacities for these areas. The results of these calculations are summarized here:

BLDG	HEATING DEMAND (MBH)	COOLING DEMAND (TONS)
31W	2200	120
32W	1800	120
33W	1500	100
35W	3100	220

HVAC SYSTEM ALTERNATIVES

THE FOLLOWING FIVE SYSTEM SUMMARIES DESCRIBE POSSIBLE MECHANICAL SYSTEMS FOR THE COMMON BUILDING SPACES:

SYSTEM 1: 4-PIPE FAN COIL UNIT

General: Console or ceiling mounted Fan Coil Units utilizing chilled and heating water would be used throughout the building to provide comfort heating and cooling. These units would be supplied with approximately 140ºF (hotter water can be used if a steam system is installed) entering water during heating and 45ºF entering water during cooling.

Advantages:
- :: Long life expectancy
- :: Modest maintenance cost
- :: Low to moderate operating cost
- :: Flexibility for future alteration

Disadvantages:
- :: Requires separate ventilation system
- :: Requires separate condensate drain system from each zone
- :: Moderate to high installation cost
- :: Filter replacement not centralized

Cooling Plant: An air cooled chiller would provide chilled water for the system. The chiller would utilize the refrigerant R-134A.

Heating Plant: If natural gas service is made available at building site, it would be possible to use high efficiency , natural gas, modulating/condensing boilers and hot water heaters to produce heating and domestic hot water directly at the building. This would significantly improve the overall water heating cycle efficiency by eliminating central plant distribution losses as well as allowing some recovery of the latent energy associated with the combustion process.

Alternatively, a shell and tube heat exchanger would convert campus steam to heating water for the system and would be located within the mechanical room.

Distribution: Variable flow heating water and chilled water distribution pumps, expansion tanks, chemical feeders, and air separators would also be installed in the mechanical room to support the system. Heating water and chilled water supply and return piping would be routed to Fan Coil Unit control valves.

Mechanical Room: An estimated 700-1000 square feet would be required to support the 4-pipe Fan Coil Unit plant equipment.

Probable Cost: $48/sf of non-residential area, including:

- :: 4-pipe Fan Coil Unit System
- :: Dedicated Outside Air System
- :: Plumbing ($7/sf)
- :: Fire Protection ($3.5/sf)

SYSTEM 2: RADIANT CEILING PANELS (RCP)

General: Radiant Ceiling Panels (RCP) would provide comfort heating and cooling within the building through radiative and convective heat transfer between the paneling and room occupants and surfaces. These panels would be hung from the ceiling and supplied with approximately 140ºF (hotter water can be used if a steam system is installed) entering water during heating and 58ºF entering water during cooling (reset based on space humidity levels).

Advantages:
:: High efficiency system
:: Higher chilled water temperatures (higher cycle efficiency)
:: Reduced fan energy
:: Minimized ductwork
:: Low resistance panels provide quick response to changes in space conditions
:: Radiative heating / cooling allows slightly lower / higher building temperatures to meet occupant comfort
:: Low to moderate maintenance cost

Disadvantages:
:: Requires another system to provide ventilation and remove latent loads (dedicated outside air system)
:: Natural ventilation not advisable under some conditions
:: Varying capacity claims from system manufacturers
:: Installation inexperience by local contractors

Cooling Plant: Same as 4-pipe FCU.
Heating Plant: Same as 4-pipe FCU.
Distribution: Same as 4-pipe FCU.
Mechanical Room: Same as 4-pipe FCU.

Probable Cost: $52/sf, including:
:: Radiant Ceiling Panel system
:: Dedicated Outside Air system
:: Plumbing ($7/sf)
:: Fire Protection ($3.5/sf)

SYSTEM 3: VARIABLE REFRIGERANT FLOW ZONING SYSTEM (VRFZ)

General: A Variable Refrigerant Flow Zoning System (VRFZ) would provide comfort heating and cooling to the building. This type of system utilizes a network of split system heat pumps, air conditioners, and air-cooled condensing units to manage building conditions. By varying the flow of refrigerant in the system, many different sizes and capacities of individual units can be used, local control of temperature conditions can be accomplished, and simultaneous heating and cooling as well as heat recovery between zones is possible.

Advantages:

:: System does not require chillers, boilers, or pumps
:: Variety of unit types and sizes
:: Minimizes ductwork
:: High part-load efficiency
:: Increased local control
:: Similar systems already planned for installation at UW

Disadvantages:

:: Large quantity of refrigerant required, refrigerant has non-zero ozone-depletion and global warming potential.
:: Requires separate ventilation system
:: Lower life expectancy compared to hydronic systems
:: No ARI-certified rating system for measuring efficiency
:: Requires a floor plate with “interior zones” that would take advantage of heat recovery. The system would function similar to an air-source heat pump.
:: Requires condensate piping system from each zone
:: Difficulty of locating refrigerant leaks in sealed piping system
:: Potential aesthetic and acoustic issues

Cooling Plant/Heating Plant: Air cooled condensing units (outdoor units) would be provided to support individual split system heat pumps and air conditioners (indoor units). Each outdoor unit would be approximately 6’H x 7’W x 3’L and could support 24 indoor units. These units would require space on the ground or on the roof.

Distribution: Refrigerant piping (2 or 3 pipe systems).

Mechanical Room: This system would not need a mechanical room for plant equipment. However, space would be required for domestic hot water heating.

Probable Cost: $40/sf, including:

:: Variable Refrigerant Flow Zoning system
:: Dedicated Outside Air system
:: Plumbing (7$/sf)
:: Fire Protection (3.5$/sf)

See estimates for additional information.

SYSTEM 4: GEOTHERMAL – GROUND SOURCE HEAT PUMPS

General: A geothermal system utilizing ground source heat pumps would provide comfort heating and cooling to the building. This type of system utilizes horizontal, vertical, or a combination of both , closed loop well fields to reject thermal energy to or draw thermal energy from the ground. Condenser water is circulated through the well fields and to heat pumps located within the building. These units (similar in appearance to 4-pipe Fan Coil Units) utilize a refrigeration cycle with the condenser water to provide heating or cooling to the building spaces. Similar to VRFZ systems, simultaneous heating and cooling as well as heat recovery between zones is possible.

Due to space limitation on this site vertical closed loop and horizontal systems may not be viable. An open loop type well system would most likely be the most cost effective and require the least land area in this application. This system removes ground water from the earth and re-injects it, with heat transfer occurring between the ground water and a closed condenser water loop via heat exchanger. In this case, the heat pump system within the building is the same as with a closed loop well system.

Advantages:
- High efficiency units
- Minimizes ductwork
- Increased local control
- Variety of unit types and sizes
- Low to moderate maintenance costs
- Does not require a chiller or steam main connection

Disadvantages:
- Requires separate ventilation system
- Requires condensate piping system from each zone
- Moderate unit noise levels
- Closed loop well systems can require large land areas
- Open loop well systems can require special permitting / licensing and larger land surface area

Cooling Plant / Heating Plant / Distribution

1. Closed Loop Well System: Due to limited land area available a closed loop geothermal system is not likely – however it should be investigated in SD when the building areas are better defined. This system would consist of multiple vertical wells (5-inch diameter with 1-inch u-tube) at 12'-15' on center, sized roughly at 1.5 tons of cooling per 300ft well. Providing a boiler for the system would allow optimization of the well field size. This boiler could be natural gas (modulating/condensing) or electric. The system would utilize 18% propylene glycol (food grade) for freeze protection. Provide variable flow condenser water distribution pumps. Route condenser water supply and return to heat pumps within the building.

2. Open Loop Well System: Provide a production and injection well for approximately 2-3 gallons per minute of flow per ton of cooling capacity. Provide a plate and frame heat exchanger, secondary variable flow condenser water pumps, and surge tank (if necessary). Providing a boiler for the system would allow optimization of the system similar to the closed loop system. Route condenser water supply and return to heat pumps within the building.

3. Seattle City Light: JR Fulton (UW) is discussing the potential of SCL providing geothermal condenser water to the site, this option will be investigated further during predesign.

Mechanical Room: This system would need mechanical space for a small boiler (if incorporated), condenser water pumps, glycol treatment equipment, and domestic hot water heating. An estimated 500-750 square feet would be required to support the Geothermal – Ground Source Heat Pump system plant equipment .

Probable Cost: $62/sf, including:
- Geothermal – Ground Source Heat
- Pump system with vertical closed loop well system
- Dedicated Outside Air system
- Plumbing ($7/sf)
- Fire Protection ($3.5/sf)

SYSTEM 5: TRADITIONAL ROOFTOP PACKAGED VARIABLE AIR VOLUME SYSTEM

Heating water would be provided by high efficiency, condensing boilers and distributed to air handling unit heating coils and VAV box heating coils. Packaged rooftop air handling units would be provided on roof, each unit consisting of supply/return fans, economizer mixing section, filter, condensing unit, variable speed drives, heating coil, cooling coil and controls. Air distribution would be via medium pressure duct mains to conventional overhead ducted system with VAV terminal units located throughout the building.

Advantages:

- Conventional system, similar to existing campus systems.
- Additional zones easy to add or modify.
- Ability to utilize true air-side economizer cycle (100% circulated volume).
- Least first cost system.

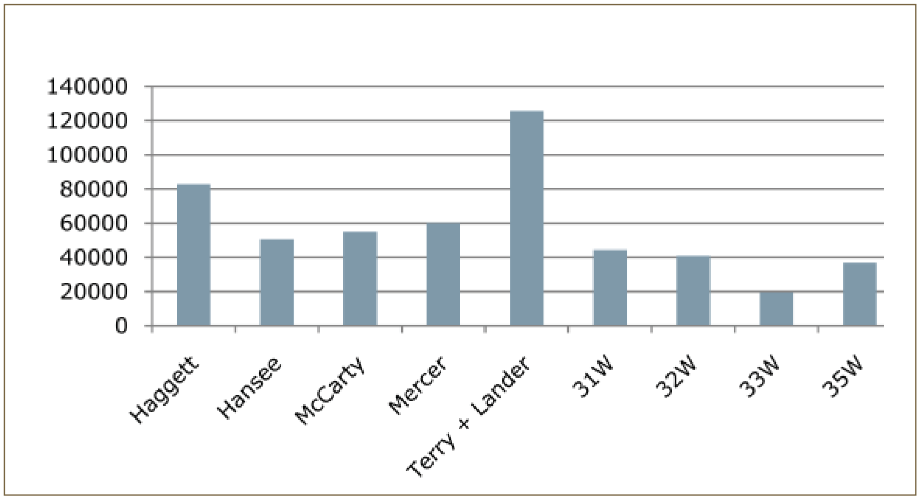
Disadvantages:

- Air conditioned areas are on lower floors; therefore ducts would have to run from roof through five residential floors to non-residential levels.
- Packaged rooftop units have increased maintenance and shorter equipment life than other systems.
- Least energy efficient system.

Probable Cost: $36/sf, including:

- Rooftop Units
- Hydronic Heating Piping Loop
- VAV terminal units and overhead distribution
- Plumbing (7$/sf)
- Fire Protection (3.5$/sf)

FIGURE 18
Annual cost of potable water use ($)



PLUMBING/WATER EFFICIENCY SYSTEMS

DOMESTIC WATER

Water mains are located in the streets adjacent to each site; however, available pressure/flow will have to be confirmed (by civil). Domestic water booster pumps may be required at each building to ensure a minimum of 30psi is provided at Level R5 bathrooms. With the exception of building 33W, all building are anticipated to require 6" water mains. Building 33W will require a 4" main. Refer to civil water section for additional information.

DOMESTIC WATER HEATING SYSTEM

High efficiency condensing central gas fired water heaters should be provided for all plumbing fixtures. The central gas fired water heaters will be located in the lower levels in a conditioned Water Heater Room (this may change due to venting limitations). Gas is proposed for the water heaters because it consumes less source energy than a similar electric water heater and because Architecture 2030 requirements are based on source energy.

SEWER SYSTEM

Sanitary waste within the space shall drain by gravity where possible. A duplex sewage ejector system will be used for drainage of fixtures not possible to gravity drain. All piping within vehicle traffic lanes in the parking structure shall be a minimum of 7'-0" A.F.F. to bottom of pipe, refer to civil for connection point in the street.

Sewer mains are present in the street adjacent the building sites, however the mains near Terry Lander are nearing their maximum capacity and may need to be upsized (see Utilities and Infrastructure section). For building sites 35W and 32W it may be beneficial to use two 8" sewer mains from each building instead of a single large 10 or 12" main; building 33W will require a single 8" waste line.

STORM DRAINAGE

Roof and overflow drain system will be needed as required by code. Overflow storm drain system may daylight downspout nozzles immediately below the roof level.

WATER USE/PLUMBING FIXTURES

The existing housing buildings on campus use an average of 41 gallons/sf-year (non-irrigation); a project goal is to reduce the use of potable water for sewage conveyance by more than 35%, to about 26 gal/sf; this can be achieved by using dual flush toilets in the dorm rooms, lower flow shower heads, and by choosing lower flow commercial fixtures in the non-residential spaces.

Campus rate based on the 07/08 period is $8/CCF (other non-residential buildings on campus pay $11/CCF). See Figure 18.

Low flow fixtures that reduce the domestic water use 35% is expected to save $1,000-2,000 per building per year, with minimal additional first costs; this option will result in an excellent return on investment (ROI).

GREYWATER SYSTEM

Greywater is defined by the Uniform Plumbing Code as "untreated household wastewater which has not come into contact with toilet waste". Sources for greywater systems are generally restricted to bathtubs, showers, bathroom sinks, clothes washers, and laundry fixtures. Kitchen sinks, dishwashers and toilets are generally excluded due to the risk of bacterial contamination. The bacteria limit the length of greywater storage time without treatment to ~24-48hrs (this varies depending on ambient conditions and water quality).
The easiest and least expensive way to use greywater is to pipe it directly outside and

use it for irrigation purposes; this avoids many legacy code driven health concerns that need to be addressed if water is desired for reuse in the building, reference the Civil - Sanitary Sewer section, Greywater Systems.

The future residence halls will have a large amount of suitable greywater than could be captured and reused (water from showers, sinks and clothes washers). The periods of water use for toilet/urinal flushing, and greywater generation do not generally coincide requiring the greywater to be stored. Since greywater does not store well, it not as simple as routing all greywater to a large storage tank for future reuse. One method to allow extended greywater storage is to provide a basic level of water treatment by flowing the greywater through a constructed wetland where water loving plants (bulrushes, cat-tails et cetera) remove nitrates (and other contaminates) and soil microbes lower the bacteria count to acceptable levels. A properly designed constructed wetland would "treat" the water to a point where it could be stored and reused within the building similar to reclaimed rainwater. However since this system is unique it would require some discussion with Washington State Department of Health before permitting.

The benefits of this system would be multiple, it could provide lush functioning green spaces (constructed wetland) as part of the landscape, reduce, and in some cases eliminate greywater leaving the site (the wetland plants transpire large amounts of moisture though the photosynthesis process), reduce the use of potable water for sewage conveyance, and decrease overall sewage flow rates from the sites. Reduction of sewage flow rates may play a significant role in site development cost since the sewer mains adjacent building 35W may not have sufficient capacity and may need replacement to handle the new building load (see pg 4-21).

Toilet flushing (using efficient fixtures) consumes ~1 gal/sf-year; utilizing a greywater reclaim system could eliminate this volume of potable water flow to the site and reduce annual water/sewage cost by $1000-2000 per year per building. However the first cost for this system can be quite large (over $50k per building without the constructed wetlands) therefore unless the first cost can be offset by incentives, reduced SDC (system development charges), or reduced site work (sewer main size upgrading) the ROI will be less than the minimum cost of capital threshold (5.5%) established by HFS.

FIRE PROTECTION SYSTEMS

The buildings will be fully protected by a sprinkler system. Structured parking will be considered ordinary hazard (0.3 GPM/500 SF) and will be a dry steel piped system. Residential floors will be considered a light hazard (0.15GPM/1500 SF) and be a wet CPVC piped system. Mechanical rooms will be considered an ordinary hazard (0.2 GPM/1500SF) and be a wet steel piped system. Generally a 6" fire main will be required to serve each building. Depending on the results of flow/pressure tests at the various building sites, and the fire protection contractor's hydraulics calculations, fire pumps and local secondary storage tanks may be required to serve the building.

POWER SYSTEMS

INTERIOR BUILDING POWER

Each building will have a larger main electrical room to house service and distribution equipment. Preliminary sizes for these rooms will be determined during Schematic Design; initial estimates are included in this report. The size of the room will depend on the configuration of electrical switchgear and will increase if transformation takes place within the building.

Transformers can be placed either inside or outside the buildings. Building transformers may reside on the building interior, in which case the main electrical room size will increase to provide physical space and clearances per NEC (option 1) or NESC (option 2) requirements. If there is available room on-site, the transformers can be located adjacent to the building; the main electrical room would only need to be large enough to house distribution gear and will require NEC clearances.

To maintain efficiency, smaller electrical rooms will be centrally located on upper floors to minimize homerun distances. These electrical rooms shall be vertically stacked to for efficient distribution within the building. 480/277V loads such as mechanical and lighting loads will be fed from distribution panels located in these smaller electrical rooms. 480V to 208Y/120V transformers and 208/120V panelboards will be located in these smaller electrical rooms to provide power for general purpose receptacles and miscellaneous 208/120 loads.

INTERIOR BUILDING LIGHTING

Energy efficient sources such as linear fluorescent and compact fluorescent lamps will be utilized in residence and common areas including corridors. These same sources will be used in areas such as mechanical rooms, electrical rooms, and other similar service areas.

Luminaires will be selected based upon performance and the ability to provide adequate security lighting. Luminaires that provide high amounts of vertical footcandle distribution will be utilized in all student housing corridors. These luminaires allow for more accurate facial recognition, a key component for student safety within residence hall corridors.

Overhead energy-efficient (compact fluorescent) sources shall be used in residence units living rooms, restrooms, and bedrooms to provide a general level of overhead lighting. Providing adequate, energy-efficient overhead ambient lighting will reduce the amount of student furnished, less energy efficient, supplemental task lighting. This will assist in lowering the overall building power density.

EXTERIOR BUILDING LIGHTING

Site lighting luminaires (pole, ground-mount, bollards, and wall-mount) will be selected based upon their ability to provide higher amounts of vertical footcandles for facial recognition and student safety. Exterior luminaires will be shielded and full cut-off whenever possible to minimize amounts of stray light and disability glare. Shielding will aid in keeping site lighting from exiting the property boundaries. Exterior lighting levels will comply or be below ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section. While the exterior lighting design strategy will strive to exceed minimum energy codes and cut-off requirements for Dark Sky compliance, lighting for student safety will be paramount. In some cases, elevated lighting levels and non-cut off luminaires may be utilized to provide a basic level of site security lighting.

INTERIOR/EXTERIOR BUILDING LIGHTING CONTROL

Automatic lighting control will be provided to switch common areas and corridor lighting off during non-essential hours. The University will have input as to the level of control students will be given in the common and corridor areas. Smaller service areas such as janitorial rooms, ADA restrooms, and closets will utilize a stand alone occupancy sensor to automatically shut off overhead luminaires during unoccupied hours.

Lighting zones will be created within the building where there is adequate daylighting. These zones, whenever possible, will contain compact or linear fluorescent sources with continuous dimming ballasts and shall automatically dim via photocells when predetermined daylighting levels reach task surfaces. Continuous dimming provides an even amount of illumination on a given surface at all times, regardless of cloud cover, solar gain, or available daylight. In addition continuous dimming integrates seamlessly into the architectural design to provide energy savings without affecting the visual comfort of the occupants.

The same automatic lighting control system that controls interior lighting will control outdoor and exterior lighting to provide shut-off of during daylight hours.

LOW VOLTAGE SYSTEMS

INTERIOR BUILDING SIGNAL (FIRE ALARM)

Fire alarm devices (detection, notification, and pull stations) within residence units, common areas, and corridors will be designed and installed per UW Facilities Services Design Guidelines recommendations. Each residence room will also contain a photo electric smoke detector and audible annunciation. ADA residence rooms will have visual notification in addition to sound. As part of the Facilities Services Design Guidelines recommendations, voice evacuation will be provided throughout the building, including all residence rooms. Further research is required during the schematic design phase to determine if sounder bases can be combined with the voice evacuation speakers to provide dual purpose speakers. All devices will be monitored by a central building fire alarm control panel.

New fire alarm communication off-site notification will connect to existing UW infrastructure in the utility tunnel under Campus Parkway. The available capacity of the existing loop is currently being researched by UW at this time to determine available capacity. If it is determined there is no available capacity on the existing loop, off-site notification to a central monitoring facility will be required.

INTERIOR BUILDING SIGNAL (CATV/VOICE/DATA)

A series of smaller telecom rooms will be established on the upper floors. These telecom rooms shall be vertically stacked, if possible, above the main telecom room to minimize the number of conduit offsets between floors. The rooms will serve telecom and data equipment on the floors they reside on. Quantity and location of smaller telecommunication rooms will ultimately depend on floor plate configuration. Data cabling will meet the maximum distance limitations set forth by BICSI (Building Industry Consulting Service International) standards, and will be coordinated with UW IT personnel.

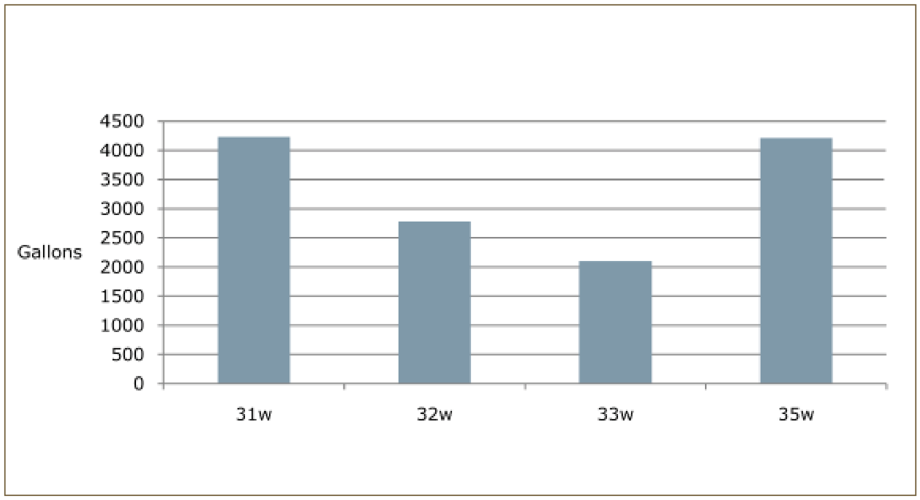
Terminations for signal systems such as coaxial cable television, voice, and data will occur in the main telecom room in each building. From these termination racks, vertical low voltage risers will ascend to the series of smaller telecom closets on residence floors as mentioned above. Vertical riser conduit quantities and routing will be coordinated with UW IT personnel during the design development phase of the project.

Residence units will contain coaxial cable television outlets, (2) data drops per each room, and (1) telephone/voice drop per room. The exact quantity and location of these devices will be developed during the schematic and design development phases. Layout and specification of these devices will require input from UW IT personnel. The telecom/data system will be sized primarily for heavier data usage rather than voice; historical data has indicated that a minimal number of students actually activate and use residence room wired telephones.

INTERIOR BUILDING SIGNAL (ACCESS CONTROL)

Access control devices (card readers, electric strikes, request to exit devices) will be designed and installed per UW Facilities Services Design Guide recommendations. The design will incorporate UW Housing and Food Service recommendations for locations of secured interior and exterior doors. During the design development phase of the project, devices will be located to provide separation between common area floors and housing floors. Card readers at interior and exterior doors will segregate private areas from public use on lower floors (i.e. electrical rooms, janitor closets, mechanical rooms, stairwells). Upper housing floors will contain a secured door perimeter, i.e. securing stairwells and elevators that route through housing areas, to limit the number of secured doors within the housing floors. A secure perimeter will allow students to travel between rooms on their floor without the use of a proximity card and will assist in protecting residence rooms from public occupants. Access control will be coordinated with the mechanical design to possibly allow stairwells to function as natural ventilation stacks.

FIGURE 19
Annual domestic hot water use



SOLAR WATER HEATING SYSTEM

A solar water heating system can offset the domestic hot water heating by using renewable solar energy. Figure 19 outlines the expected annual domestic hot water use for the new housing project. The values below anticipate 65% occupancy during the summer months.

Based on the above indicated daily demand we would expect a moderately sized solar water heating system, with a steam/water convertor auxiliary heating source to perform similar to the charts below, reducing the annual water heating requirements by ~50%:

The anticipated thermal output of the solar water heating system is summarized in Table 6. In the table, the Solar column represents the available solar energy; the Domestic Hot Water (DHW) column represents the DHW energy demands; the Auxiliary column represents the auxiliary power needed to meet the DHW demands. The data from Table 6 is illustrated in Figure 20. From the figure, it is apparent that the DHW demand for all of the year exceeds the solar capacity, but that in the summer months, the solar system's capacity will nearly match the DHW requirements. Auxiliary steam or gas heaters will provide the water heating that the solar system cannot provide.

Table 7 (following page) summarizes the energy savings and payback of a potential solar water heating systems for this project.

TABLE 6
Annual solar heating system performance, above

	SOLAR	DOM. HOT WATER	AUX	F
	(10^6 BTU)	(10^6 BTU)	(10^6 BTU)	(DEG)
JAN	17.68	93.96	90.32	0.039
FEB	35.16	85.32	68.65	0.195
MAR	39.52	93.4	74.59	0.201
APR	54.65	87.96	59.55	0.323
MAY	55.73	87.63	56.76	0.352
JUN	55.55	82	53.88	0.343
JUL	72.61	82.04	43.99	0.464
AUG	65.17	81.45	47.43	0.418
SEP	61.83	79.9	47.9	0.401
OCT	32.02	85.08	71.97	0.154
NOV	15.98	85.5	83.05	0.029
DEC	13.82	91.13	90.52	0.007
YEAR	523.74	1035.36	788.6	0.238

FIGURE 20
Annual solar heating system performance, above

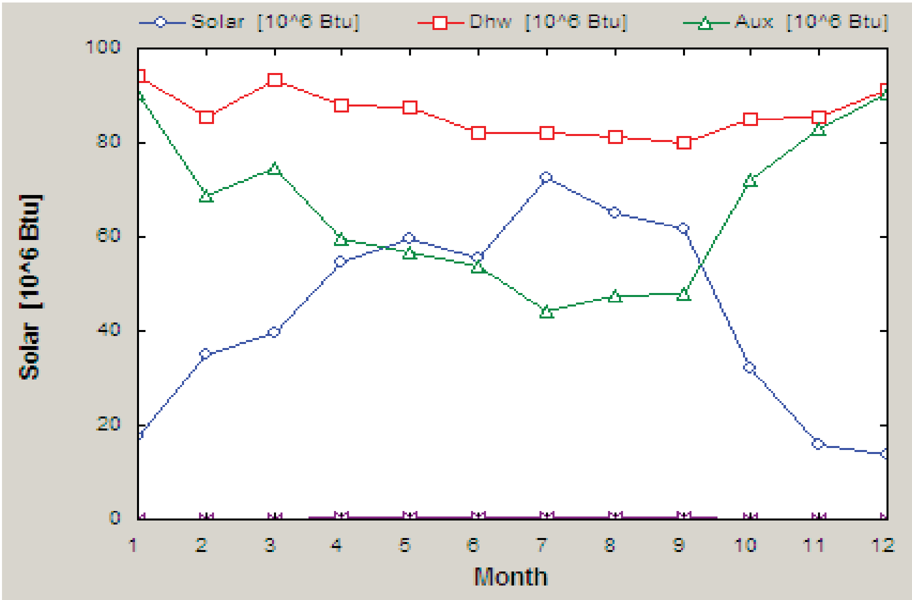


TABLE 7
Solar water hearing system economics, below

BUILDING	TOTAL (GAL/DAY)	# OF PANELS	ANNUAL SAVINGS (THERMS)	SYSTEM* COST ($/SF)	SYSTEM COST* ($)	SIMPLE PAYBACK* (YEARS)	ROI*
31W	4230	30	8060	150	180,000	22	4.80%
32W	2780	20	5298	150	118,313	22	4.80%
33W	2100	15	4007	150	89,490	22	4.80%
35W	4210	30	8018	150	179,064	22	4.80%

*ESTIMATED COSTS DO NOT INCLUDE INCENTIVES; SIMPLE PAYBACK AND ROI WILL IMPROVE WITH INCENTIVES.

RENEWABLE ENERGY OPPORTUNITIES

The two primary renewable energy opportunities for the UW housing buildings are solar photovoltaic and solar water heating. Both technologies convert solar energy into usable energy; solar PV generates energy in the form of electricity that can be used in the building or sold to the serving utility grid; solar water heating converts energy as a source of domestic hot water.

SOLAR ELECTRICAL SYSTEM

A standard photovoltaic system requires approximately 100 square feet per kW generated. Roof-mounted solar PV systems for the new buildings would most likely share roof space with solar hot water system, elevator overruns, and mechanical equipment.

The monthly cost savings of a typical 25kW solar array installed on a rooftop in Seattle, WA has been summarized in Table 8.

In additional to the annual building demand offset listed above, the state of Washington offers solar photovoltaic incentives depending upon where parts of the solar array are manufactured:

The incentive range is between $0.15 and $0.54 per kWh, capped at $2000 (annually) for an installed system.

- The base incentive is $0.15/kWh
- An installation will receive $0.36/kWh if modules used are manufactured in the state of Washington.
- An installation will receive $0.18/kWh if the inverters used are manufactured in the state of Washington.

If an installation uses both modules and inverters that are manufactured in the state of Washington, it would receive an overall incentive of $0.54/kWh of electricity generated from the solar array. The estimated first cost for a 25kW system is approximately $215,000.

While the incentives list describes the use of modules and inverters that are manufactured in the state of Washington, further research to determine whether a system comprised of both components manufactured in the state of Washington is possible. Washington state manufactured products may be available at the time these buildings are completed.

TABLE 8
Average domestic hot water energy use

	SOLAR RADIATION	AC ENERGY	ENERGY VALUE
MONTH	(KWH/M2/DAY)	(KWH)	($)
1	1.54	833	53.31
2	2.5	1258	80.51
3	3.71	2094	134.02
4	4.37	2393	153.15
5	5.31	2944	188.42
6	5.52	2917	186.69
7	5.88	3179	203.46
8	5.17	2800	179.2
9	4.98	2620	167.68
10	3	1643	105.15
11	1.76	926	59.26
12	1.26	641	41.02
YEAR	**3.76**	**24248**	**$1551.87***

BUILDING SITING AND STRUCTURE

STRUCTURAL PRE-DESIGN NARRATIVE OUTLINE

GENERAL

The University of Washington Housing and Food Services' Comprehensive Housing Master Plan includes new construction of multiple mixed-use residential buildings on 4 West Campus sites. The sites are 31W, 32W, 33W, and 35W. The construction type proposed includes up to 5 stories of Type V wood-framed construction supported by up to 2 stories of Type I concrete. These structures will be designed to meet strict economic, durability, and sustainability goals. It is very common in Seattle to construct mixed-use buildings using wood framing at the residential levels and post-tensioned concrete at the lower mixed-use levels.

DESIGN CRITERIA

LIVE LOADS

:: Residential: 40 psf
:: Corridors: 100 psf (40 psf at residential levels)
:: Assembly Areas: 100 psf
:: Retail Spaces: 100 psf reducible
:: Office Spaces: 80 psf reducible; 15 psf partitions
:: Roofs: 25 psf snow load

Seismic and wind design in accordance with the 2006 International Building Code.

The draft soils report, written by Shannon & Wilson, Inc., and dated January 13, 2009, recommends conventional spread footings at each site. Allowable bearing pressures are as follows: 4,000 psf at site 31W; and 5,000 psf at sites 32W, 33W, and 35W. The sites are classified as Site Class C in accordance with the 2006 IBC. Lateral earth pressures applied to retaining walls include 35 pcf for active conditions, 55 pcf for at-rest conditions, 350 pcf for passive resistance, and an additional lateral pressure of 8H psf to account for seismic-induced pressures.

FOUNDATION DESIGN

According to the draft soils report, Sites 31W, 32W, and 35W appear to contain fill materials ranging between 5.5 and 12 feet deep. Site 33W received only one boring that encountered very dense glacial till 6 inches below the surface. The maximum depth of fill recorded by the borings occurs at site 32W. Subgrade preparation may require overexcavation of fill materials and backfilling with structural material. Foundations for all buildings will consist of shallow, conventional spread footings constructed of reinforced concrete. Footings will bear on undisturbed dense glacial till, recessional outwash, or structural fill. A subdrainage system consisting of perforated plastic pipe and gravel will be installed around the perimeter of each building. Slabs-on-grade will consist of 4 inch thick concrete reinforced with 6-inch x 6-inch W1.4xW1.4 welded wire mesh. Slabs will be placed over a vapor barrier and 4 inches of capillary break material.

Several of the sites are sloping and will require both temporary shoring and permanent retaining walls. Temporary shoring walls will likely consist of steel H-piles with timber lagging. Shoring walls taller than 15 feet will require tiebacks or internal bracing. Alternatively, soil nail wall construction may be possible where dense till soils are present. Concrete building walls will permanently retain the soil. These walls will be designed to span vertically between the slab-on-grade and elevated slabs.

CONCRETE SUPERSTRUCTURE DESIGN

The slab thicknesses will vary depending on the areas they support and the column spacing. A column layout with spans not exceeding 26 to 28 feet will lead to economical slab construction. It is especially important for economy and performance to maintain end spans at or below the 26 to 28 foot range.

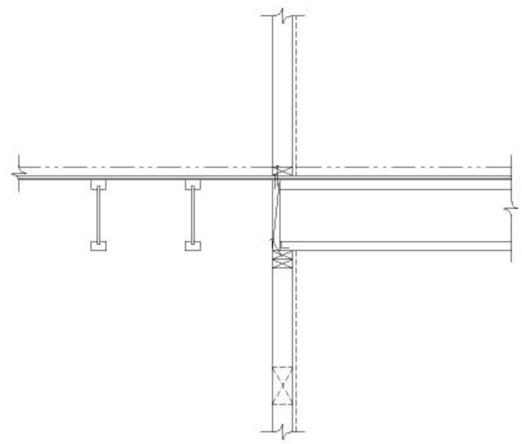
The uppermost slab, also known as the podium slab, will range in thickness between 10 and 12 inches. Exterior plazas on the podium slab must slope to drain, and the drains should be centered in each of the column bays. Numerous drains will assist in keeping slab thicknesses to a minimum while maintaining flat soffits that are easy to construct.

The lower elevated slabs support the mixed-use spaces. These spaces may include restaurants, retail, or office space. These slab thicknesses typically range between 9 and 10 inches. Stud rails are commonly installed at the column connections to avoid drop caps.

For optimum performance but still a reasonable cost, post-tensioned slabs of mixed-use buildings can be designed to meet a combined live load deflection plus long-term creep of L/600, where "L" is the span in a given direction. The deflection and creep figures are additive in each of the two directions. For a 28 foot span in each direction, the resulting deflection and creep could lead to a 1" total deflection at the center of a given bay. This criteria is conservative and may be relaxed at a long end span condition in order to maintain an economical slab thickness. It should be noted that deflection does not normally govern the design of podium slabs, so the resulting deflection and creep figures are often lower.

For optimum economy and performance, columns should stack from the foundation to the underside of the podium slab. Columns that do not stack require expensive transfer beams. Column geometry can vary between square, rectangular, or round cross-sections. The majority of Type V over I buildings have rectangular columns sized 12 inches in width to allow optimum parking efficiency.

The vertical lateral force resisting system consists of concrete shear walls. These walls are normally located at stair and elevator shafts. Additional shear wall locations are often required in excess of the shaft walls.



WOOD FRAMING

Economical and sustainable floor systems that perform with low perceptible vibrations are possible using engineered lumber I-joists. I-joists that are 11 7/8 inches deep can span up to 17 feet while meeting conservative floor performance criteria. Lightweight cementitious toppings, such as Gypcrete, are normally used along with ¾ inch thick tongue and groove plywood (OSB is reserved for interior vertical surfaces only). Span directions are normally oriented parallel to corridor and exterior walls to take advantage of the shorter spans between bearing walls. Routing of ventilation ducts must be coordinated early in design.

Economical roof framing systems include connector-plate wood trusses. These trusses have the roof slope built in to the top chord to save on labor-intensive cricketing. Span directions will be dictated by the roof slope, but typically run between the corridor and the exterior walls. Labor savings are also realized when integral parapet framing is included with the truss fabrication. Trusses can be spaced at 24 or 32 inches on-center for material and labor savings.

Stud wall sizes vary with the wall use and location. In general, corridor walls and exterior walls are constructed with 2x6 studs. Interior partition walls normally consist of 2x4 studs, however 2x6 stud partition walls are more economical at the lowest levels. Demising walls commonly consist of double 2x4 walls, but can be reduced to single walls with staggered studs depending upon the acoustical criteria. Plumbing walls can be furred out in front of any walls mentioned above, or can be integrated in to those walls by using larger studs such as 2x8's. Furring provides for fewer errors and inspection issues during construction.

The vertical lateral force resisting system at the residential levels consists of plywood-sheathed stud walls with continuous floor-to-floor holdowns. Shear walls are strategically located at the interior of the building such as at the corridor and demising walls. These walls should stack to avoid discontinuities in the lateral load path, and to avoid oversized framing that is expensive and intrusive to the interior space. Additional plywood can be added to any wall for increased durability. These walls, including the exterior walls, can be factored into the overall lateral force resisting system to achieve a dual purpose for the added sheathing.

Douglas-Fir lumber is locally-harvested, commonly stocked material and is preferred for large multi-level buildings. Douglas-Fir is stronger and straighter than most other commonly stocked lumber species in the Puget Sound area. This leads to less construction waste, straighter stud walls, and a more durable structure. Kiln-dried Douglas-Fir #2 grade is recommended for stud material. Moreover, stud walls can be panelized locally off-site while the concrete construction is underway and delivered to the site ready to be erected. Panelized stud walls reduce material waste, increase the quality of wall construction, and save time on the overall construction schedule.

LATERAL FORCE RESISTING SYSTEM

Lateral forces induced in the building by wind or seismic are resisted by a system of interconnected diaphragms and shear walls. At the wood-framed levels, flexible plywood diaphragms deliver lateral loads to the supporting shear walls. The shear walls are wood walls sheathed with plywood and stack vertically from level to level. At the concrete levels, the rigid podium slab absorbs the lateral loads delivered to it from the wood shear walls above. The elevated concrete slabs are supported by concrete shear walls. These concrete shear walls must stack between the concrete levels to the foundation, but do not need to stack below the wood shear walls.

SUSTAINABLE DESIGN GOALS

Structural concrete members can be constructed with mix designs that substitute recycled pozzolanic materials, such as fly ash, to reduce the amount of Portland cement. In general, the maximum amount fly ash (or slag) in each component is as follows: post-tensioned slabs = 15%; columns = 20%; cast in place walls (not shotcrete) = 25%; slabs-on-grade = 30%; footings = 35%. The cost for using fly ash and slag depends greatly on its availability.

Wood framing has many sustainable characteristics. It is locally grown and harvested, can be obtained from sustainably managed forests, and is available in engineered products that are comprised of smaller wood parts. FSC-rated lumber can be obtained and normally comes with a 10% cost premium. Engineered lumber I-joists and laminated strand lumber beams are the most common elements used for floor framing.

In additional to these sustainable building products, advanced framing techniques can be used to reduce the amount of material in the building. Walls at the upper levels can be framed with studs at 24 inches on center instead of 16 inches on center. Floor joists can be spaced at 19.2 inches on center rather than the conventional 16 inches on center. These adjustments reduce structural costs and the amount of waste generated during construction. Another waste-reducing measure that may be implemented during design is to modularize the unit sizes and building dimensions to 2-foot increments. This allows the use of more stock framing sizes, and reduces the potential of cutting-to-fit in the field.

Moreover, stud walls can be panelized off-site and delivered to the jobsite during concrete construction. Panelized stud walls reduce waste, increase labor efficiencies, and potentially shorten the construction schedule.

Green roof construction may be supported by wood framing. Green roof selection depends on its intended purposes, and the thickness and weight varies based on its design. Similarly, bioretention planters can be constructed on the podium slab, and can be designed with lightweight materials below the soil to reduce the impact to the post-tensioned slab. See pg 4-27 for more discussion of bioretention planters.

The materials involved in wood/post-tensioned concrete design each have energy saving properties. Wood is a very sustainable material, taking comparatively little energy to produce and transport. It may also act as a carbon sink, serving to reduce atmospheric CO2. The concrete portion of the building has a high 'thermal mass', helping to retain heat during cold spells and cool the building in hot weather.

MATERIALS AND ENVIRONMENTAL QUALITY

RESOURCE EFFICIENCY

As natural resources become scarce, materials must be conserved, recycled, and harvested appropriately. Salvaging materials, deconstruction versus demolition, using recycled and recyclable products, purchasing products locally, and proper construction management plans are among the concepts that reduce the material impact of construction.

Care taken during the building design can reduce construction waste and improve construction efficiency simultaneously. The 'five-over-two' construction type is driven by efficiency, striving to maximize building volume within the constraints of the building code. This same rigor can be applied to maximize resource efficiency. Standard floor joist lengths can drive room/unit dimensions, minimizing field cutting and waste. Determination of floor-to-floor and ceiling heights should consider both standard stud lengths and drywall/finish dimensions.

Asking materials to do double duty is another strategy with merit. Levels G1 and G2 will have a concrete structure, a relatively expensive, yet durable construction type. Utilizing concrete as a finish material where appropriate, at either interior or exterior locations, can reduce the need for additional materials (metal studs, drywall) and long term maintenance (painting).

From an operations standpoint, Housing and Food Services has implemented an exemplary waste, recycling and composting program. The buildings should not only support these efforts but integrate them into the design. Convenient access to waste/recycling stations for residents is as important as ease of transfer and pickup of these materials from a centralized location to curbside.

Finally, waste management during construction will be given careful consideration. Demolition/deconstruction of existing buildings should consider salvage or recycling of usable materials; with care this approach can be more economical than the landfill option. Similarly, careful separation and recycling of construction waste can yield savings and reduce the impact on the environment.

ENVIRONMENTAL QUALITY

Concerns regarding indoor environmental quality have increased in recent years, as health and performance impacts of poor IEQ have become more apparent. Building occupants require clean air, natural daylight, pleasing surroundings, good acoustics and comfortable temperature to support good health and comfort.

Daylight and Views

The 'window to the world' of the residential unit is one of the most important components of the design. First, it provides a critical connection to the environment, and the potential for stunning views from many rooms is great. It must also be large enough to provide adequate light, but also properly sized and oriented to prevent excessive heat loss or solar gain. It must be operable to allow immediate access to fresh air.

Building openings at lower level public spaces also serve as social connectors and activators. Great care will be taken to locate programmatic functions strategically to enhance the urban environment of the district. Openings here must consider views both into and out of the buildings to support this goal. Daylight into these spaces must also be balanced and controlled to maximize comfort and reduce energy loads.

AIR QUALITY

Strategies for ensuring good air quality include providing proper ventilation and reducing pollutants. Ventilation quality relies on careful design of mechanical systems, active and passive, to balance occupant health with energy efficiency. Operable windows help, providing enhanced user control and immediate, localized access to fresh air.

Outdoor pollutants can be captured at building entries by providing both interior and exterior walkoff mats and/or grates. Design and detailing must allow for proper maintenance to ensure continued effectiveness. Careful selection and application of materials, paints and sealants will also ensure good and enduring air quality beginning at building occupancy.

ACOUSTICS

Poor acoustics/noise transfer is a far too common complaint in residence halls. Wood framed construction, with its inherent lack of mass, necessitates good acoustical design and detailing. Sound transfer between rooms and floors must be controlled to help support a safe, comfortable environment for residents. Social interaction and activity in common areas should be supported, but noise generated should not interfere with a student's study activities (for example) in his or her room.

Specialty spaces such as classrooms, cafe and auditorium require additional care in design to ensure occupant performance and comfort during occupancy.

NATURAL LIGHT AT GILBERT HALL, PACIFIC UNIVERSITY

LIGHT, DAYLIGHT AND HEALTH

Light has a significant impact on our quality of life, and impacts our perception of a quality environment. Most research to date has focused on our visual response to light and its effect on our functional vision and task performance. Recent discoveries in photobiology, however, highlight the fact that daylight also has a significant impact on health, productivity, and learning. This research underscores the importance of incorporating natural light into the built environment, especially in educational facilities. Significant to these findings, is the importance of the cyclical nature of light, the specific spectrum of light and the intensity of light to which people are exposed.

:: Natural light sources can provide views and visual relief and environmental information can be perceived from natural sources of light such as the spectral quality of the light and the variation of the light source over time and across a space.

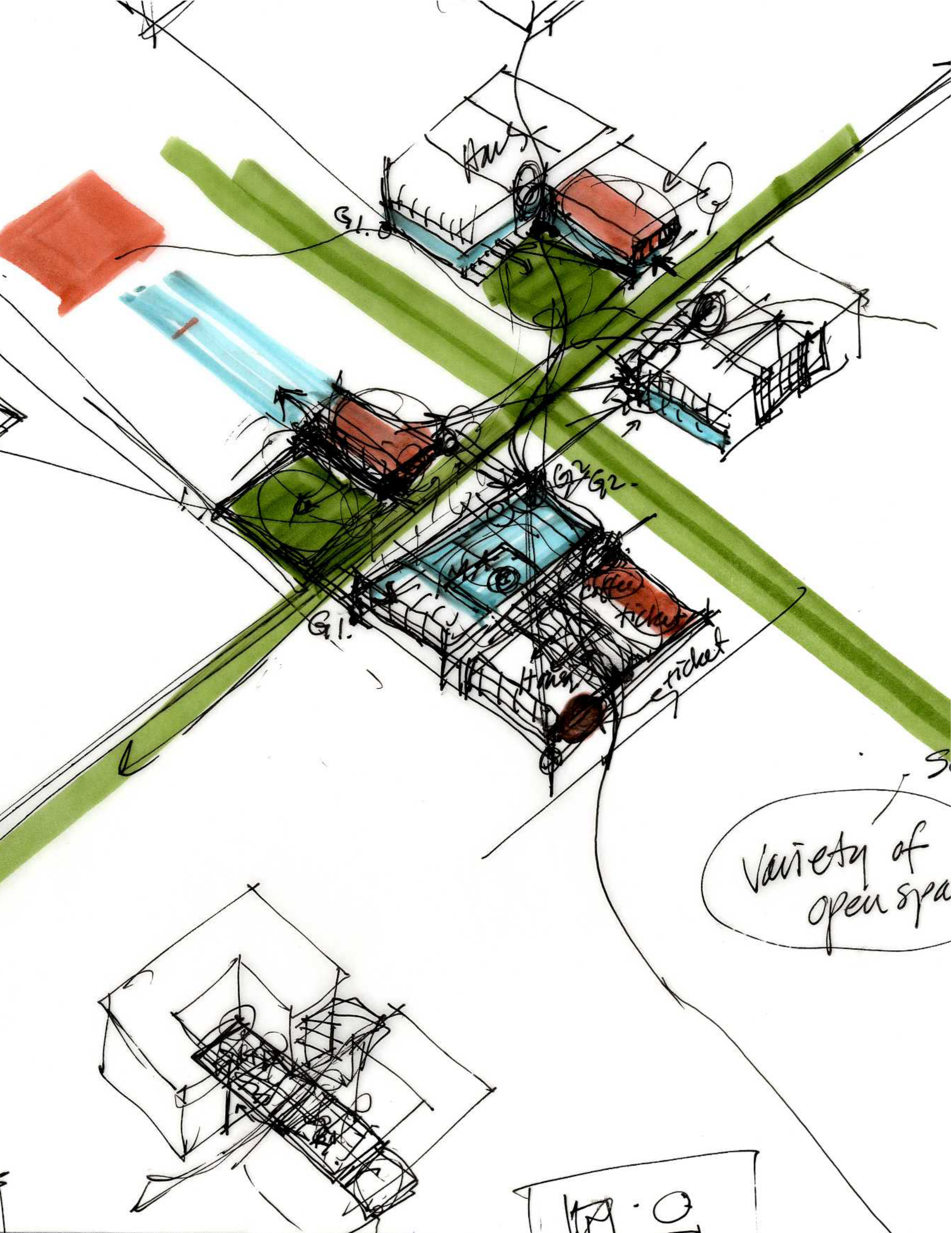
:: Quality lighting should enhance seeing and provide views of nature in all living and study spaces, and spaces where students congregate for more than several hours.

Seeing a view to nature reduces chronic stress, thus is critical in an academic study environment.

Windows and their immediate surrounding spaces should be designed as a critical interior spatial light sources and access portals to the exterior environment. In this way, the interior and exterior space fuse and the exterior space becomes part of the living space of the dormitory. Achieving this goal will provide views of the outdoors that link students to outside environmental information through observations of the day's weather and daily or seasonal variability in the rich landscape of plants and changing daylight.

The varying tasks within the dormitory and academic environment should be expressed appropriately for the functional program. Distinctions for the variable needs of light need to be expressed in a quality lighting design for a healthy, productive learning and living environment.

The discovery of a non-visual light responsive receptor that regulates physiological processes highlights the fact that light must be thoughtfully examined in the built environment. The biggest architectural implication for light and human health is designing a building that creates as much opportunity for accessing daylight as possible. Our non-visual system has evolved to respond to natural light, thus it is critical to provide spaces that work with the natural rhythms of the environment and allow occupants access to natural light. To achieve this relationship, the building form will be thinner and have more surface area, thus more opportunity for natural light. Spaces that have been traditionally thought of as 'dark' spaces can even have windows incorporated to include natural light. This thinner plan building can then be complemented with an electric lighting scheme that takes into account the importance of limiting the amount of blue light exposure in the evening and allows complete darkness at night.


G1.
G2
G1.
ticket
ticket
Variety of
open spa

CONCEPTUAL FRAMEWORKS:

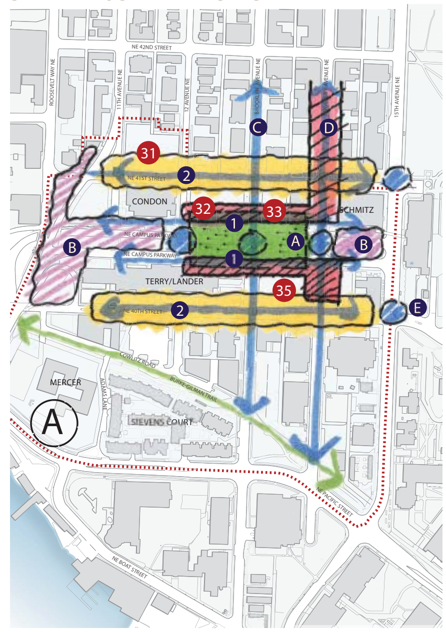
URBAN RELATIONSHIPS

URBAN DESIGN FRAMEWORK CONCEPTS

LEGEND

- Iconic Open Space
- Village Green
- Active Uses on Ground Floor
- Residential Front Doors
- Pedestrian Flows
- Improved Pedestrian Crossings
- Current Residential Projects
- West Campus Boundary

SHARED USE VILLAGE GREEN



FOUR URBAN DESIGN FRAMEWORKS FOR THE WEST CAMPUS

Four urban design frameworks for a portion of the West Campus are outlined here to provide context and guidance to the development of the housing schemes and the flexibility these schemes must exhibit as this urban district matures and undergoes further study in the future. This predesign study is not a master plan for the West Campus. In addition, we recognize that current and future pedestrian circulation will inform us on how to best locate entries and through-block circulation of each parcel. We discuss this below under "Pedestrian Flow".

These urban design framework options organize land use and access within the West Campus and NE Campus Parkway. The diagrams provide a means of organizing uses, their frontages, and their connections to the West Campus. As such, the framework elements imply how to orient the buildings (where is the front door?), where to position indoor and outdoor supportive uses (such as bicycle parking and storage), how to treat the streetscape (commercial or residential), where to service the buildings (how do you provide access that minimizes conflicts with building frontages and pedestrian flows?).

SHARED CHARACTERISTICS

A. Village Green—Created as a focal point at the intersection of NE Campus Parkway and Brooklyn Avenue NE, recognizing the increased ground floor activities that will take place on the parcels that face onto these roadways

B. NE Campus Parkway—Designed as a gateway to the university and as a functional environmental element

C. Brooklyn Avenue—Re-planned as a Green Street whose lush plantings and residential scale contrast with the harder retail character of University Way NE

D. University Way NE—Continuation of the urban retail character to the north

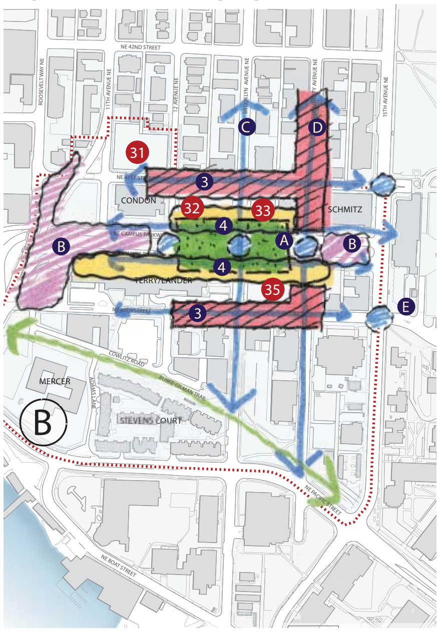
E. Pedestrian Crossings—Redefined to provide safe and effective pedestrian movement

SHARED USE VILLAGE GREEN

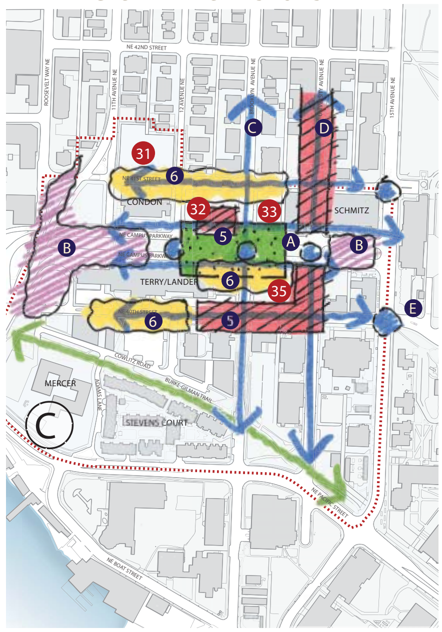
1. Extends activating uses south along University Way NE and concentrates these uses on the NE Campus Parkway from University Way NE to 12th Avenue NE

2. Places the front doors of the residential halls along NE 41st and NE 40th Streets

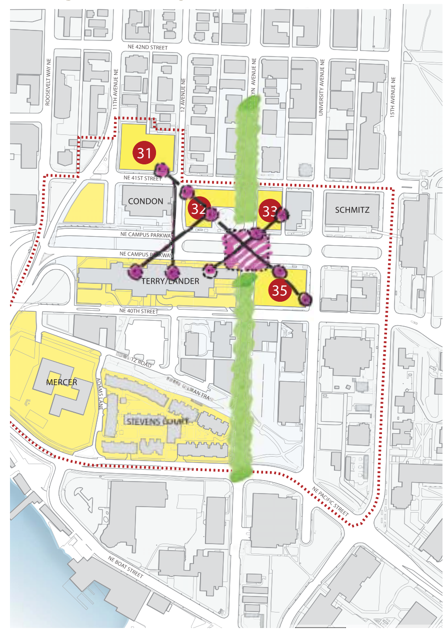
RESIDENTIAL VILLAGE GREEN



HYBRID & CLIMATIC RESPONSE



PEDESTRIAN FLOW



RESIDENTIAL VILLAGE GREEN

3. Extends activating uses south along University Way NE and concentrates these uses on NE 41st and NE 40th Streets from University Way NE to 12th Avenue NE.

4. Places the front doors of the residential halls along NE Campus Parkway.

HYBRID & CLIMATIC RESPONSE

5. Extends activating uses south along University Way NE and takes advantage of south-facing exposure by concentrating these activating uses partially on NE Campus Parkway and NE 40th Street from University Way NE to 12th Avenue NE.

6. Places the front doors of the residential halls along NE 40th and NE 41st Streets and partially along NE Campus Parkway.

PEDESTRIAN FLOW

Acknowledges the desire lines of student travel and connections and builds upon these to place key activators and entries. Activating uses face prominent public spaces and public transportation nodes. Places the front doors of the residential halls at the diagonal entry points of the sites and provides open pedestrian passages through each site.

CONCEPTUAL FRAMEWORKS:

PREFERRED SCHEME

PREFERRED URBAN DESIGN FRAMEWORK

A refined pedestrian flow scheme exploits the natural behaviors of students to provide a rich and diverse resident experience within the developing West Campus. Careful attention to safe street crossings, elevation changes and entry locations will support the successful realization of the interconnectivity of the concept. Creating areas of both prospect and refuge within a dense urban environment will play upon the social instincts of being seen and seeing others. Strategically placed pedestrian walkways, entries, activating spaces, common areas, drop-offs and bus canopies will support serendipitous interactions, making for a socially-rich community.

A combination of campus and residential activating uses are placed within each site at key nodes, creating both gateways and destinations to encourage flow and community mixing.

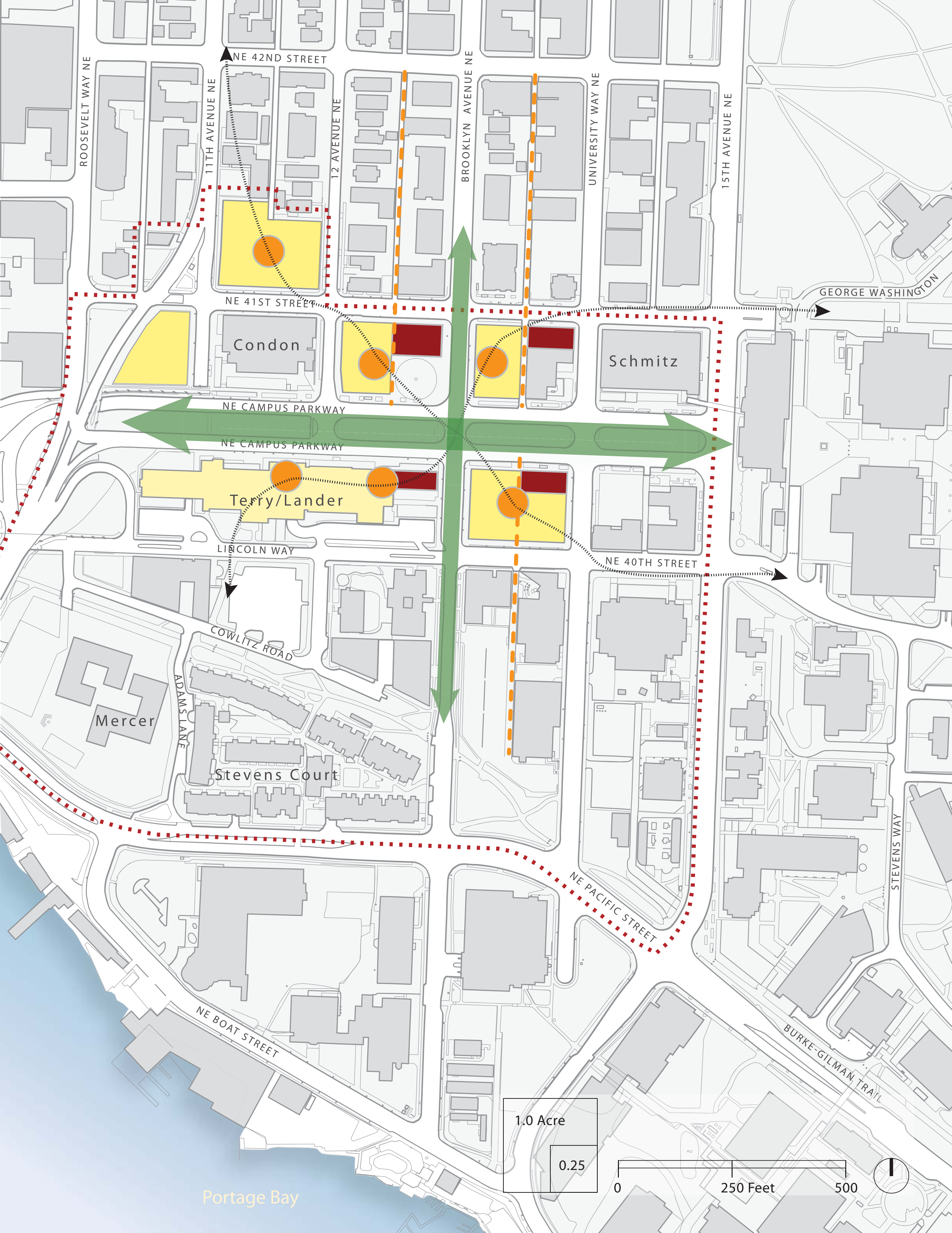
The intersection of two major landscaped vehicular/pedestrian corridors (NE Campus Parkway and Brooklyn Avenue NE) will form the nexus around which four (32W, 33W, 35W and Terry Lander) of the residence halls will associate. This crossing, though currently a large swath of asphalt, can be developed into a safe crossing that supports casual interaction. Site 31W is connected to the complex with its main entry at its southeast corner.

As the West Campus expands, the pattern of permeated blocks with pedestrian oriented alleyways and diagonal circulation can be expanded, creating a pattern language unique to the district.

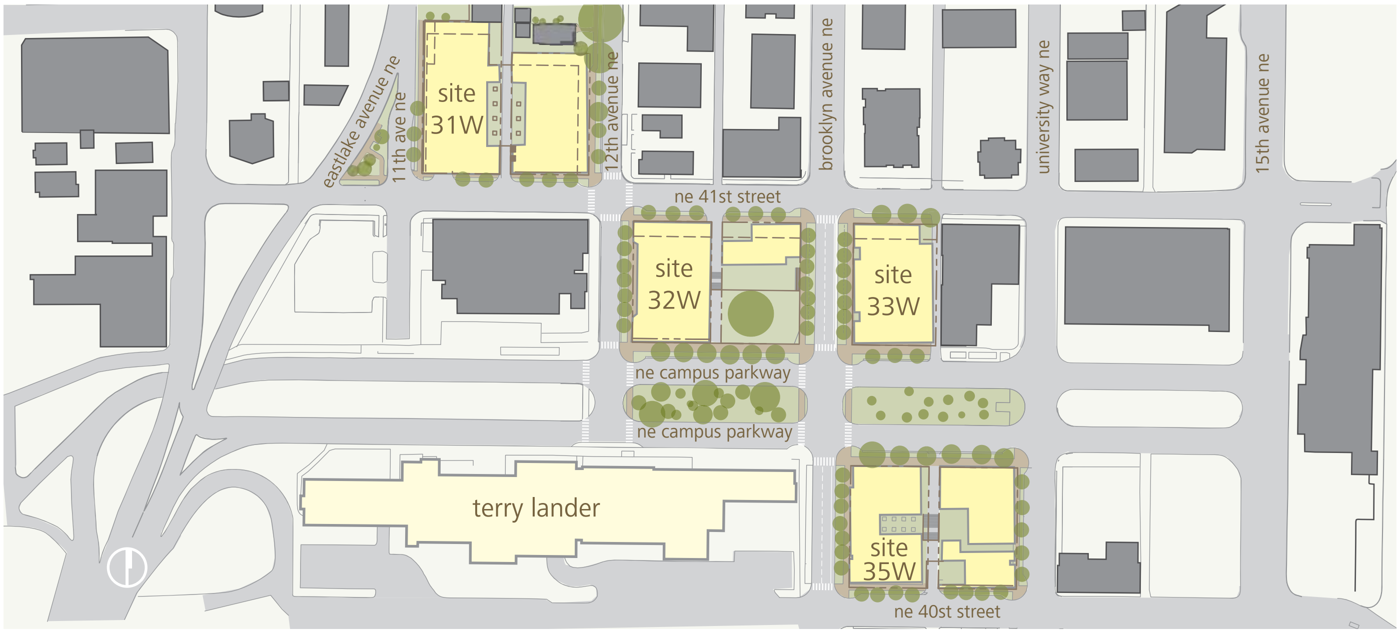
>
PREFERRED URBAN DESIGN | PEDESTRIAN FLOW DIAGRAM

LEGEND

- Primary streets
- Pedestrian flow/circulation
- Alley circulation
- Common spaces
- Activating spaces
- Current Residential Projects
- West Campus Boundary



NE 42ND STREET
ROOSEVELT WAY NE
11TH AVENUE NE
12 AVENUE NE
BROOKLYN AVENUE NE
UNIVERSITY WAY NE
15TH AVENUE NE
NE 41ST STREET
GEORGE WASHINGTON
Condon
Schmitz
NE CAMPUS PARKWAY
NE CAMPUS PARKWAY
Terry/Lander
LINCOLN WAY
NE 40TH STREET
COWLITZ ROAD
ADAMS LANE
Mercer
Stevens Court
NE PACIFIC STREET
STEVENS WAY
NE BOAT STREET
BURKE-GILMAN TRAIL
1.0 Acre
0.25
0
250 Feet
500
Portage Bay



WEST CAMPUS HOUSING SITE PLAN

The initial phase of the West Campus Residence Hall project supports housing for 1,748 students within four parcels (31W, 32W, 33W and 35W). Height and massing are limited by both zoning and construction type to yield buildings of 6 to 7 stories. Access to daylight for demands that portions of the site remain open, creating light courts and articulation to the facades. Ground levels (G1 and G2) are maximized while providing open pedestrian ways aligning with the alley structure of the adjacent urban context and creating diagonal movement through the blocks.

PEDESTRIAN ENVIRONMENT

Providing a safe and healthy environment for pedestrians is a priority for the West Campus. A series of transit strategies which consider the pedestrian first will support an environment that is traffic calming. To the extent possible, streets are narrowed to minimum standards to slow traffic speed. Bulb-outs are located at street crossings to minimize crossing distances. Street trees and planting buffers will create an environment for the pedestrian that is sheltered from vehicles and aesthetically pleasing.

BICYCLE ENVIRONMENT

The West Campus will consider the bicyclist second in priority in transit decisions. A new, dedicated bike lane is proposed northbound on Brooklyn Avenue NE and a sharrow lane will be provided southbound. NE 40th Street will continue to provide a dedicated bike lane, providing a direct connection from the Burke Gilman Trail into the main campus. Additional bike and sharrow lanes will be considered in the development of the campus. In addition, convenient bike parking will be located within each building.

PUBLIC TRANSPORTATION

Buses dominate the vehicle environment currently in the West Campus and provide a vital transportation mode for commuters and residents. Bus maneuvering, power and layover requirements will drive many urban design solutions. Improved and building-integrated bus shelters will be provided at two major bus stops along NE Campus Parkway adjacent to sites 32W and 35W.

VEHICULAR CIRCULATION AND PARKING

Slowing traffic throughout this district will provide a safer environment for pedestrians. Streets will be narrowed to minimum standards and street parking will be maintained along the perimeter of each site. Designated load/unload areas and off-street ADA parking will be provided within each site.

OPEN SPACE

Open space within an urban environment is extremely valuable and its quality sets the tone for the campus. Improvements to NE Campus Parkway and the elm tree garden at site 32W will provide a strong identity and character for the West Campus.

NE Campus Parkway will be re-designed as a gateway to the University and as a functional, iconic environmental element. Travel lanes will be reduced and the medians flanking the intersection of NE Campus Parkway and Brooklyn Avenue NE will be improved to support pedestrians crossing intersection.

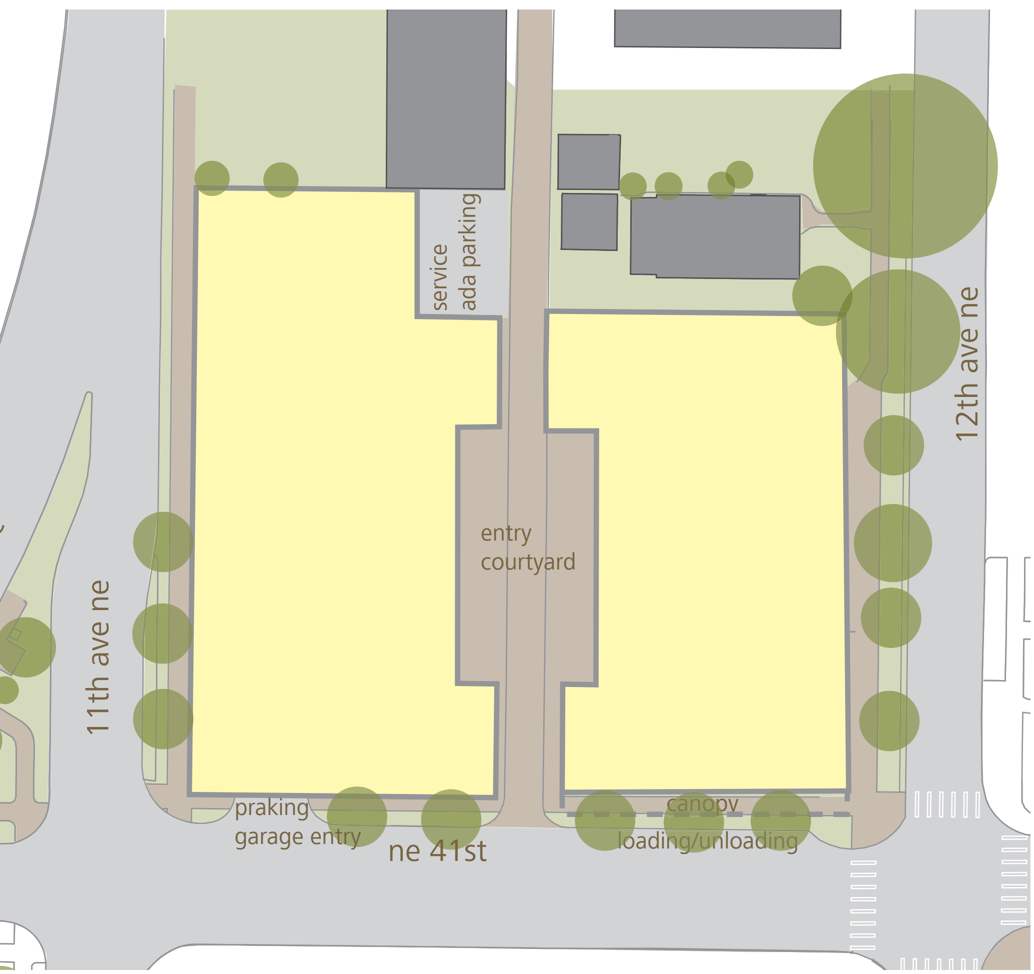
Brooklyn Avenue NE will be upgraded to “Green Street” standards, increasing its planting buffer and providing street trees. NE 40th & 41st Streets will also be supplemented with street trees and planting beds for a greener and cooler urban environment. University Avenue NE along site 35W will be narrowed and will be “greened” to support the goals of the Green Factor.

SOLAR ORIENTATION

An effort has been made to orient a majority of the residential bedrooms to either the north or south to increase thermal comfort. In all sites, however, a percentage of the beds will face either east or west. Sun studies and shading will be evaluated during design.


NE CAMPUS PARKWAY
BROOKLYN AVENUE NE
Terry/Lander Hall

SITE 31W



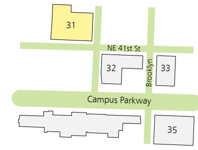
SITE 31W

Site 31W is located to the north of Condon Hall and will support 524 beds, UW Housing and Food Services (HFS) classrooms, HFS offices, support services and commuter parking.

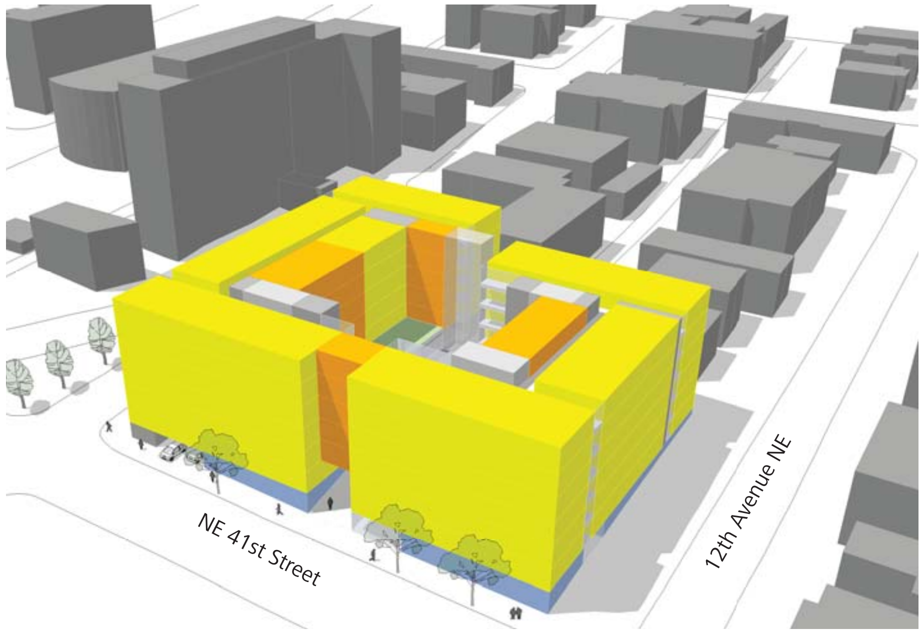
Designed as inward focused, the building design orients all residential units outward and draws community functions inward to a shared "open center" defined by common spaces and a pedestrian dominated alley. The site is designed to connect to the main campus and other west campus amenities by placing its main entry in the SE corner of the site. This entry will support all components of the building program and connect its occupants into the pedestrian stream.

The site will maintain an alley easement running north-south bisecting the site at the G2 level, dropping down to NE 41st Avenue. The alley will be designed primarily as a pedestrian environment but will incorporate vehicle standards for width and height clearances.

A majority of the surface commuter parking lot capacity that currently exists on the site will be replaced with an underground garage that covers the entire site area.

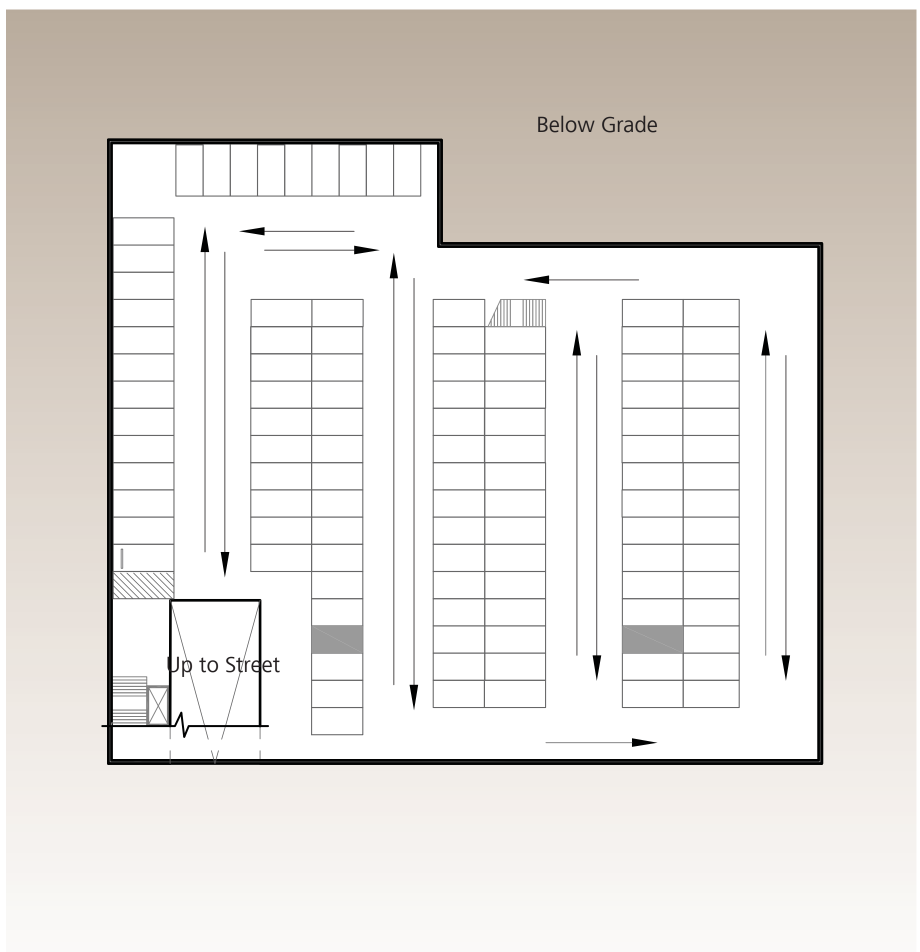


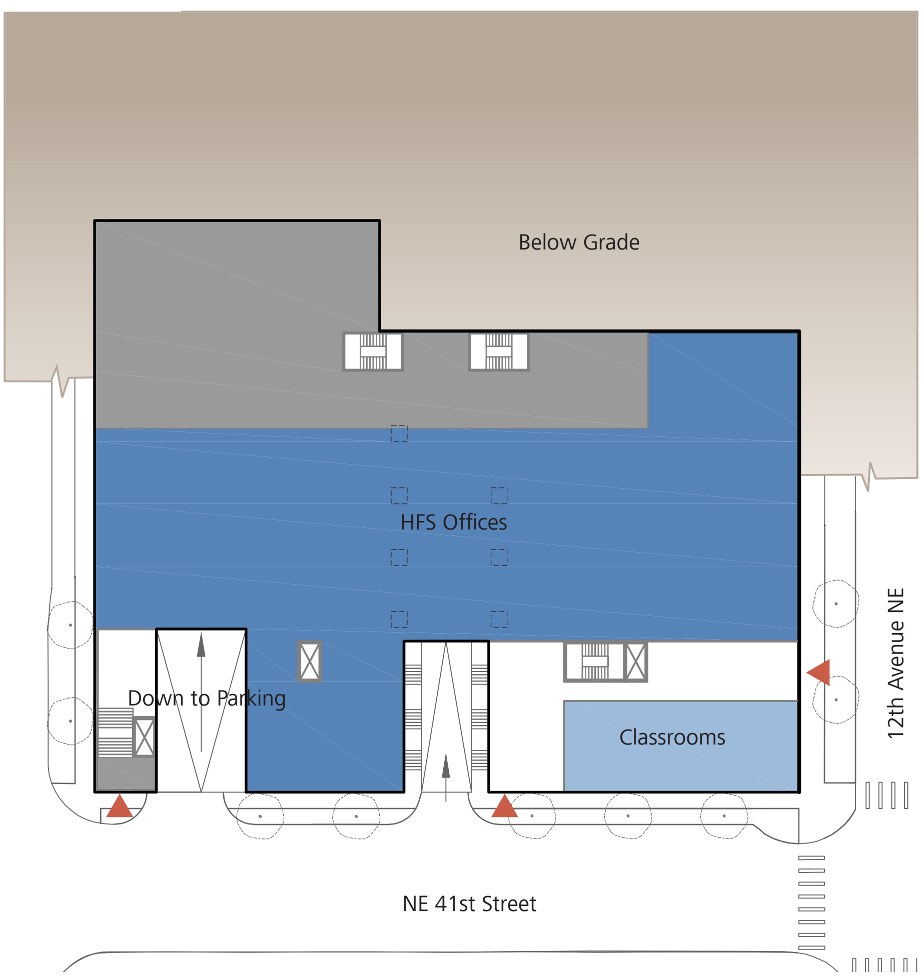
RIGHT
Aerial Perspective Site 31W



PARKING LEVEL P1

The commuter parking structure is located one level underground from NE 41st Street and will provide parking for approximately 105 vehicles. Access is via an express ramp from the west end NE 41st Street with a separate and secure pedestrian entry, accessing stairs and elevator just to its west. An emergency exit stair will discharge to the alley at the G2 level and will not be interconnected with any housing or office uses. Passive ventilation will be provided within the setbacks at the north property line. A secure bicycle storage area for residents of the housing above is also provided at this level.



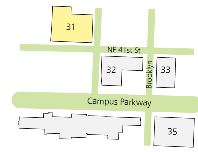


GROUND LEVEL G1

- Services/Support
- Residential Community: Administration
- Residential Community: Live/Learn
- Entry

GROUND LEVEL G1

The main building entry is provided at the southeast corner of the site where both the main student entry lobby and shared classrooms are provided. A load/unload zone with canopy is provided along NE 41st Street adjacent to the entry. The entry is connected via an open stairway to the residential common spaces above and directly to the adjacent HFS office spaces at this level. The HFS offices occupy over half of the floor area with access to daylight provided at the south, east and west sides or the perimeter. Additional daylighting in the center of the space is provided by skylights adjacent to the alley above. Building service is located in the below grade portion of this floor to the north. At the midpoint of the site along NE 41st Street, vehicular and pedestrian access to the alley is via an express ramp and adjacent stairs up to the G2 level.



LEFT
South Facade of Site 31W

RIGHT
ramp leading to interior court at site 31W

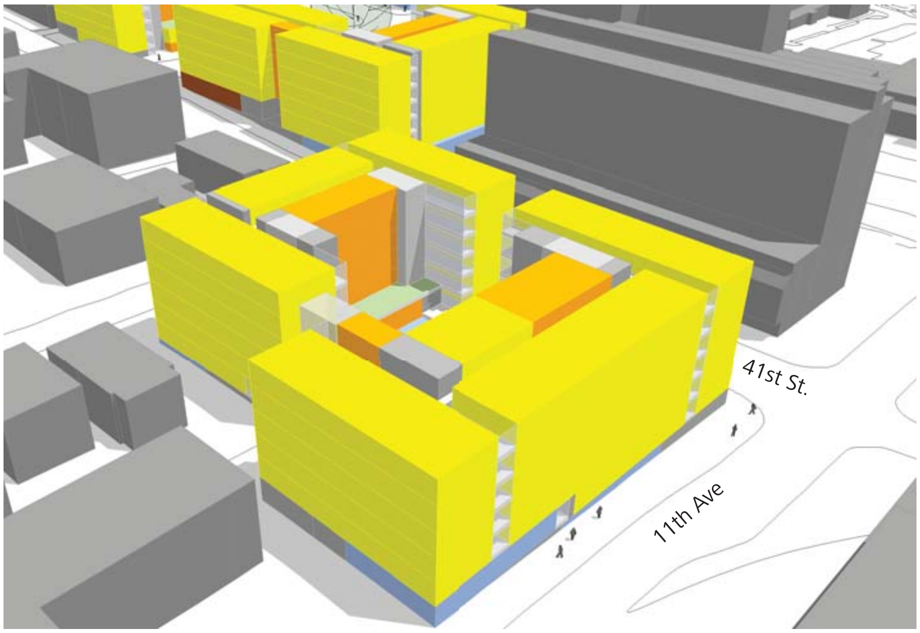
GROUND LEVEL G2

- Residences
- Residential Building Community Areas
- Services/Support
- Residential Community: Administration
- Terrace at level G2

GROUND LEVEL G2

Level G2 is the main common floor for the Site 31 residential complex. At this level, the building is divided in half by the alley, yet the common spaces will be shared by the residents of the entire block. The alley and the spaces adjacent to it provide a semi-protected open space for the residential community. The alley will allow vehicles to pass but will be designed primarily as a pedestrian environment.

Residential units wrap the perimeter of the site, including two apartments. Space for additional HFS offices are located at the northern end of the site with ample access to daylight, while service, trash, recycling and compost are located adjacent to the alley and service pick-up to the west. ADA parking for both car and van are provided adjacent to the alley at this end of the site also.



LEFT
Northwest Corner of Site 31W

RIGHT
Section through Site 31W

RESIDENTIAL FLOORS R1-R5

Residences

Residential Building Community Areas

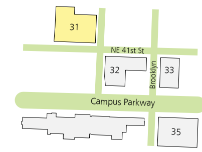
Services/Support

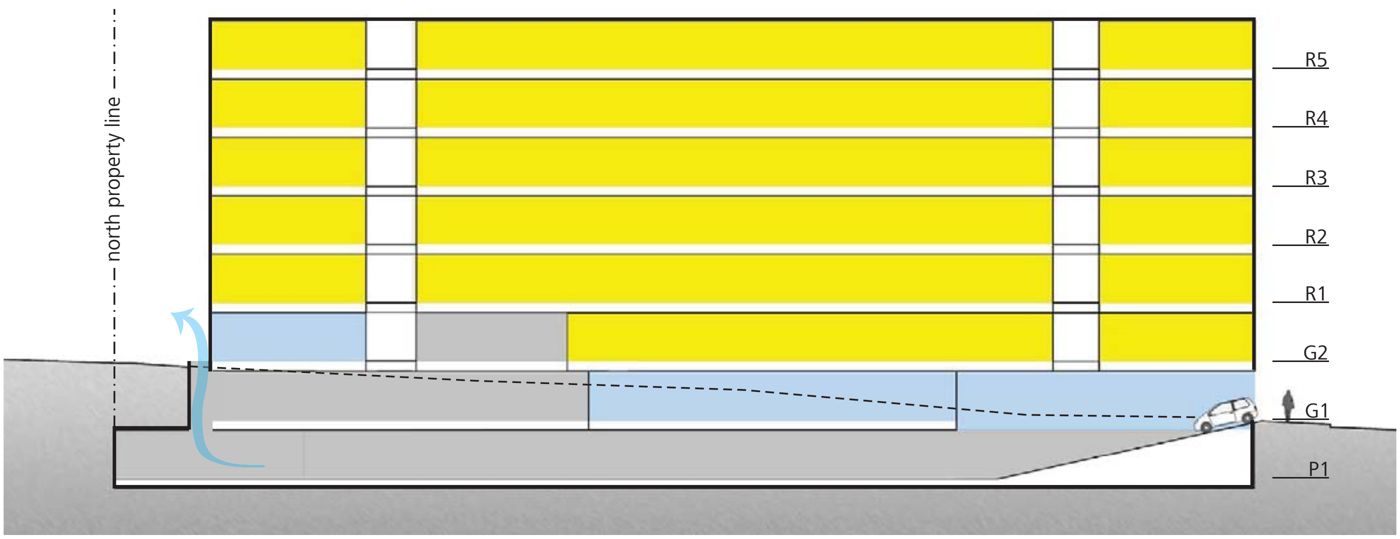
Terrace at Floor R1

RESIDENTIAL FLOORS R1-R5

The floors contain a mixture of double and single occupancy rooms in clusters of 14-16 residents per corridor and are connected across the alley to form a single floor. At each level, all rooms but three face outwards. Common spaces are provided with the two major spaces focusing on the open area formed around the "open center" of the complex formed by the improved pedestrian friendly alley and the building form. Four open stairwells flow into the main commons spaces on each floor, connecting floors to each other and providing centralized "chimneys" for natural ventilation.

Two roof terraces are provided at the R1 level directly above the commons, orientated to and creating the "open center" of the complex.





BUILDING SECTION

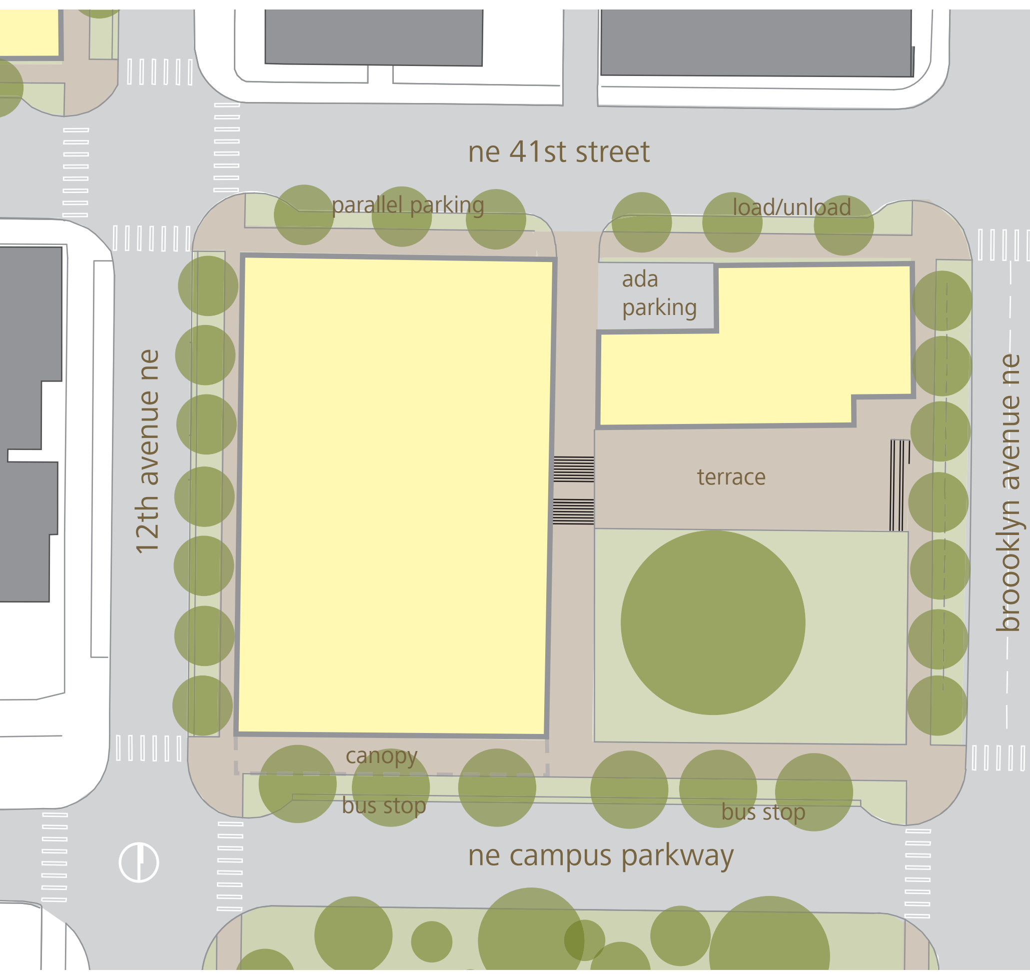
- Residences
- Residential Community: Administration
- Campus Community: Activators & Academics

BUILDING SECTION

The parking level is located one level below grade at the south end of the site and two levels below grade at the north end of the site. Vehicular access to the parking garage is limited to NE 41st Street. G1 has access to daylight at its perimeter for the south half of the site only. G2 matches grade at the alley at the north end of the site and provides opportunity for service and access points.

SITE 32W

RIGHT
Aerial Perspective of Site 32W



SITE 32W

Site 32W is prominently located along NE Campus Parkway at the intersection of Brooklyn Avenue NE. The site will support 407 beds, a café, the wellness center, HFS classrooms, the drama studio, support services and an additional activating space.

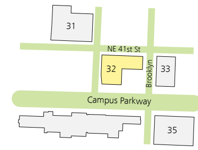
The site will provide a significant open space for the west campus and will support the existing American elm tree on the southeast corner of the site. The elm tree and the garden that surrounds it provide a focal point for the organization of the residence hall and will ground the activating spaces that flank it.

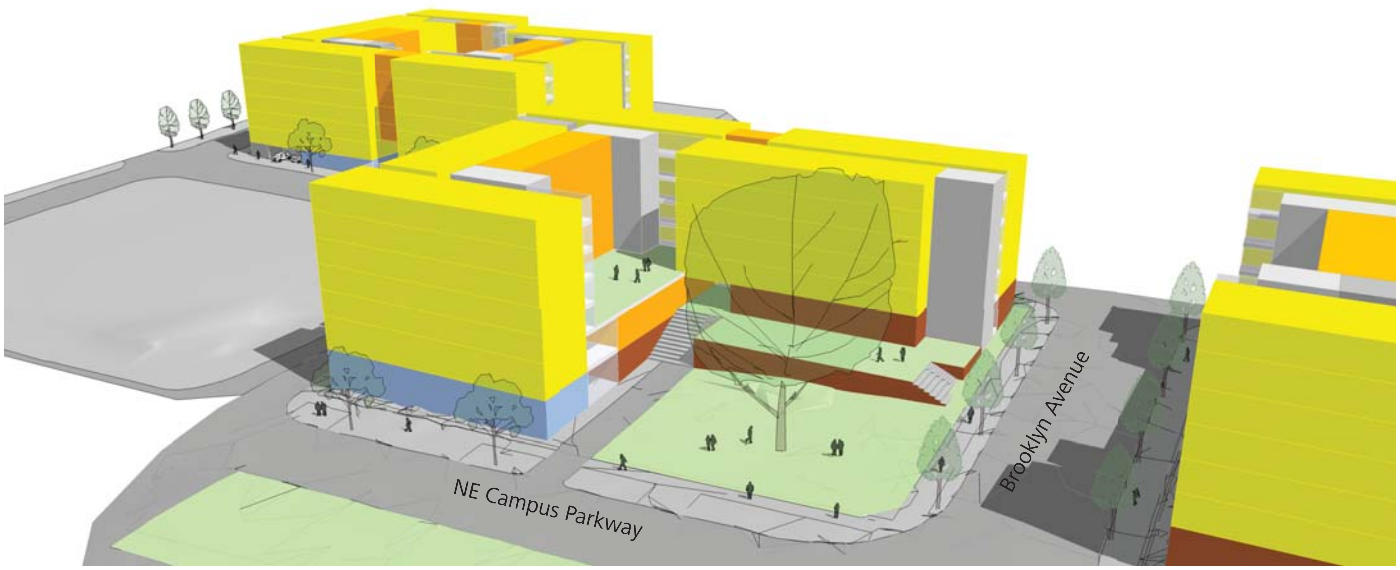
Solar orientation allows the building wing to the north of the garden to be dappled in sunlight and provides a prime location for the café and terrace. Under this and to the west of the garden, the wellness center further complements the activated space.

Open pedestrian walkways and terraces at level G1 and G2 provide free pedestrian flows though the block and allow the residence hall to serve as a gateway to other sites in the West Campus.

GROUND LEVEL G1

- Services/Support
- Residential Community: Live/Learn
- Campus Community: Activators & Academics
- Building Entry

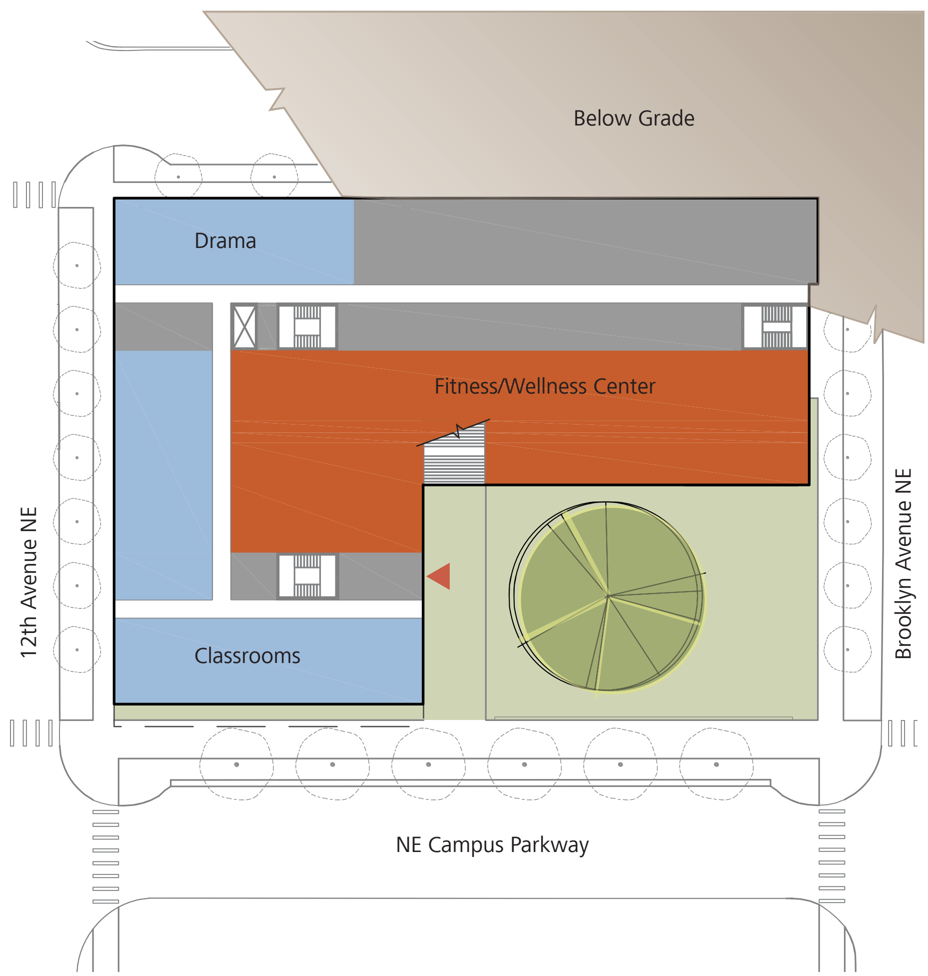


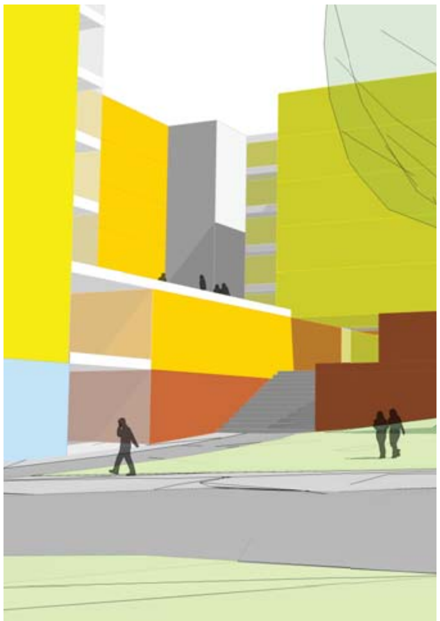


GROUND LEVEL G1

Site 32W at ground level G1 is dominated by the American elm tree. The building footprint is therefore limited to the existing building line to the north of this tree. The plan at this level (and all levels) uses the tree and the open space around it, and beyond to the parkway, as its focal point. A pedestrian connection from south to north is created along the original alley right-of-way, allowing pedestrians to move through the center of the block from level G1 to level G2 along the side of the tree garden. It is at this pedestrian walkway that a building entry is provided into level G1. This entry provides access to the main activating use on this level, the Wellness Center as well as the HFS classrooms and the drama studio.

An improved bus stop will be created by installing a canopy along NE Campus Parkway adjacent to the classrooms. A load/unload area will be provided adjacent to this, just to the south of the elm tree along NE Campus Parkway providing a "front door" along the parkway similar to sites 33 and 35. Service functions of the building are located in the areas to the north where there is no access to daylight. Garbage, compost and recycling pick-up will be along the relatively flat 12th Avenue NE.





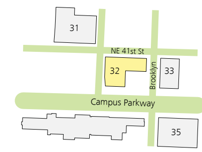
GROUND LEVEL G2

- Residences
- Residential Building Community Areas
- Services/Support
- Campus Community: Activators & Academics
- Terrace

GROUND LEVEL G2

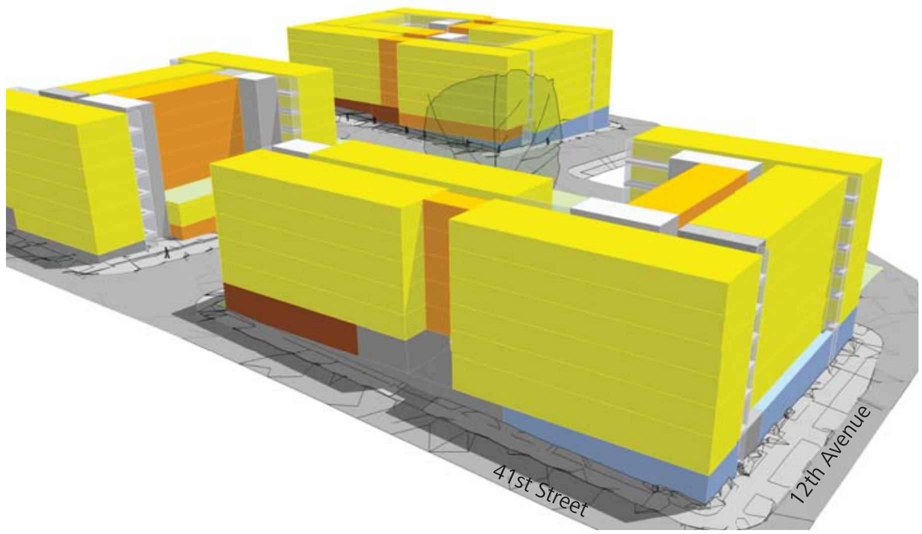
Level G2 provides a prominent location for the café accessing a terrace for seating and overlooking the tree garden to the south. Space for another activating use is provided at the northeast corner of the building facing the corner of Brooklyn and NE 41st Street. At this level, the building is split by an exterior pedestrian way leading from G2 down to G1, connecting the campus community activators with the residential community areas and the main entry into the residential floors. The main common areas for the residence hall look out to the tree garden and have access to the elevated terrace.

Residential units wrap the perimeter of the west site, including two apartments. ADA parking for both car and van are provided from NE 41st Street, adjacent to the activating uses, pedestrian walkway with convenient access to the main residential entry.



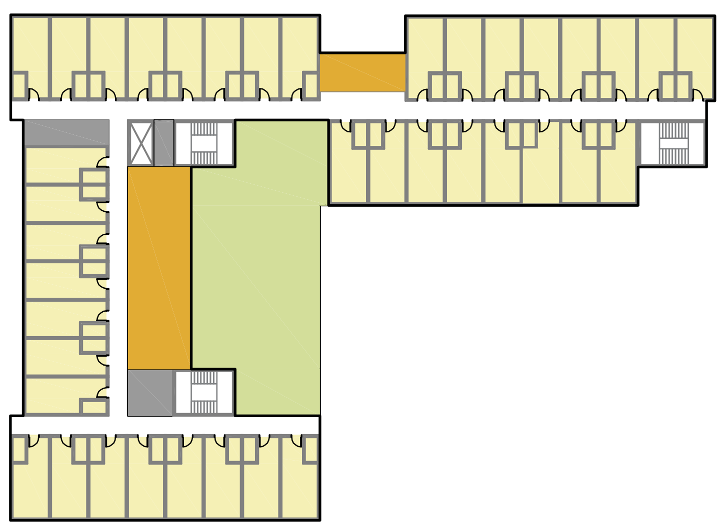
LEFT
South Facade Site 32W

RIGHT
North Facade Site 32W



RESIDENTIAL FLOORS RI-R5

- Residences
- Residential Building Community Areas
- Services/Support
- Terrace at Floor R1

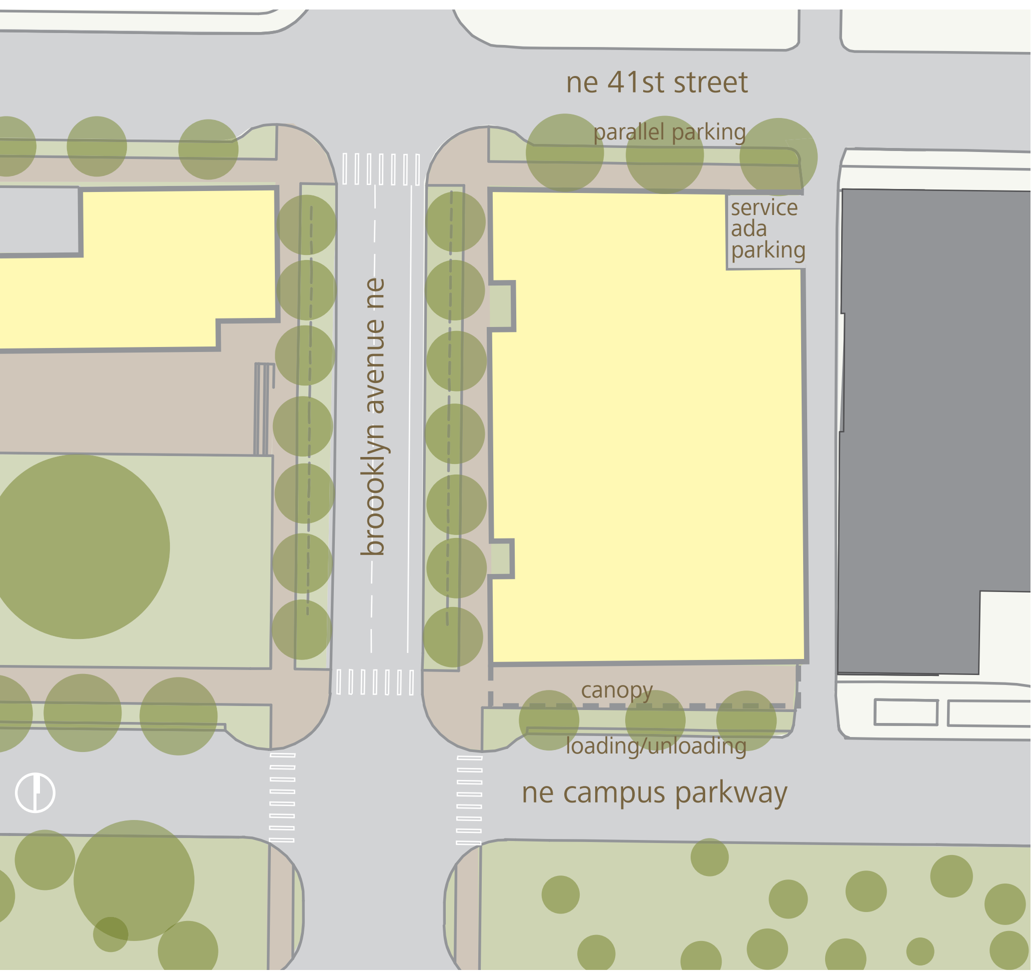


RESIDENTIAL FLOORS R1-R5

The typical residential floors are configured around the tree garden in an "L" configuration. The floors contain a mixture of double and single occupancy rooms in clusters of 14-16 residents connected across the open pedestrian way at G2 to form a single floor. The majority of rooms face outward with a portion facing south directly onto the tree garden. The main commons area for each floor faces out to the tree garden and across Brooklyn Avenue NE to the commons areas of Site 33W. In addition, a small commons area looks north out over the pedestrian walkway below. Two open stairwells flow into the main commons spaces on each floor, connecting floors to each other and providing centralized "chimneys" for natural ventilation. A roof terrace is provided at the R1 level directly above the commons, orientated to face the tree garden to the east.

SITE 33W

RIGHT
Aerial Perspective of Site 33W

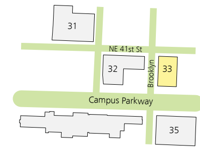


SITE 33W

Site 33W is prominently located along NE Campus Parkway at the intersection of Brooklyn Avenue NE. The site will support 237 beds, the resource center, HFS classrooms and offices.

The smallest building site in phase I, the design efficiently supports residential community sizes of approximately 45-50 students on each floor, ideal for supporting student life and community identity.

The shared commons functions for the residents are entered directly from the main entry at G1. These common areas look out to the west and benefit from the improved Brooklyn Avenue NE Green Street and the tree garden beyond. A terrace at the R1 level also orients to the west connecting both interior and exterior commons spaces to a shared focal point.

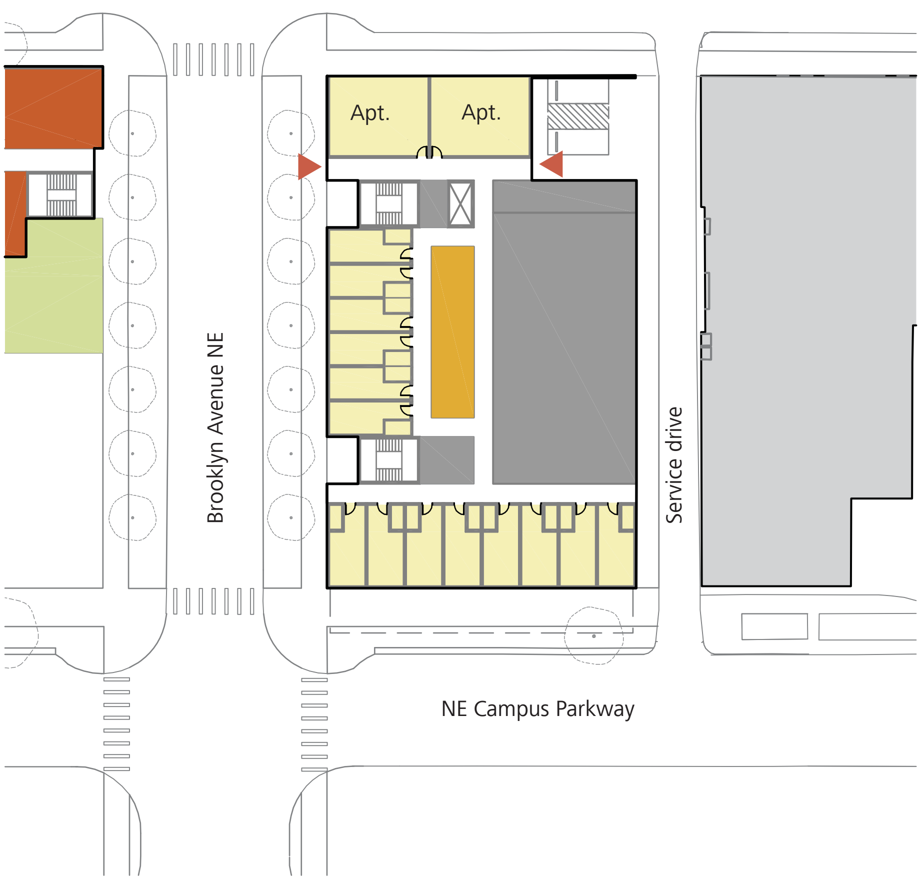


GROUND LEVEL G1

- Residential Building Community Areas
- Services/Support
- Residential Community: Live/Learn
- Residential Community: Administration
- Campus Community: Activators & Academics

GROUND LEVEL G1

The main entry to Site 33W is at the southwest corner of the site at the intersection of Brooklyn Avenue NE and NE Campus Parkway. The main entry faces Brooklyn Avenue NE and is shared between the Resource Room, the HFS classrooms, offices and the main residential commons for the entire building. Service functions of the building are located in the areas to the northeast where there is no access to daylight. A load/unload area will be provided along NE Campus Parkway providing a "front door" along the parkway similar to sites 32W and 35W.



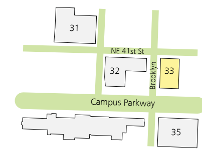
GROUND LEVEL G2

- Residences
- Residential Building Community Areas
- Services/Support
- Building Entry

GROUND LEVEL G2

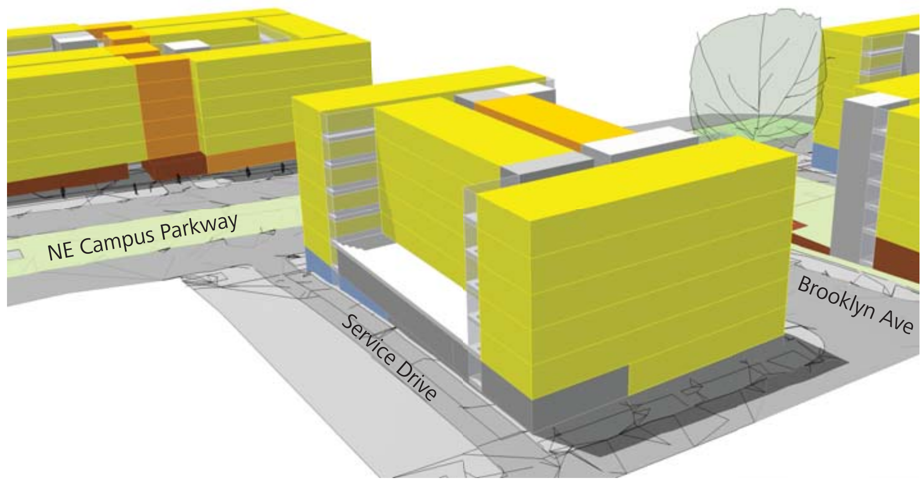
Most of level G2 is located 8' above grade. Residential units wrap the perimeter of the site, including two apartments. ADA parking for both car and van are provided from the alley with at-grade access to the G2 level.

Additional service functions of the building are located along the University-owned alley at the east side of the site. Garbage, compost and recycling will be picked up from the alley at this level. Accommodations for the loading dock of the Playhouse Theater will be made in this area.



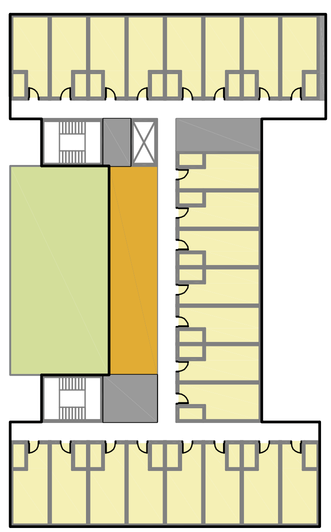
LEFT
Site 33W looking east along NE Campus Parkway

RIGHT
Aerial Perspective of 33W looking at Northeast corner



RESIDENTIAL FLOORS R1-R5

- Residences
- Residential Building Community Areas
- Services/Support
- Terrace at Floor R1



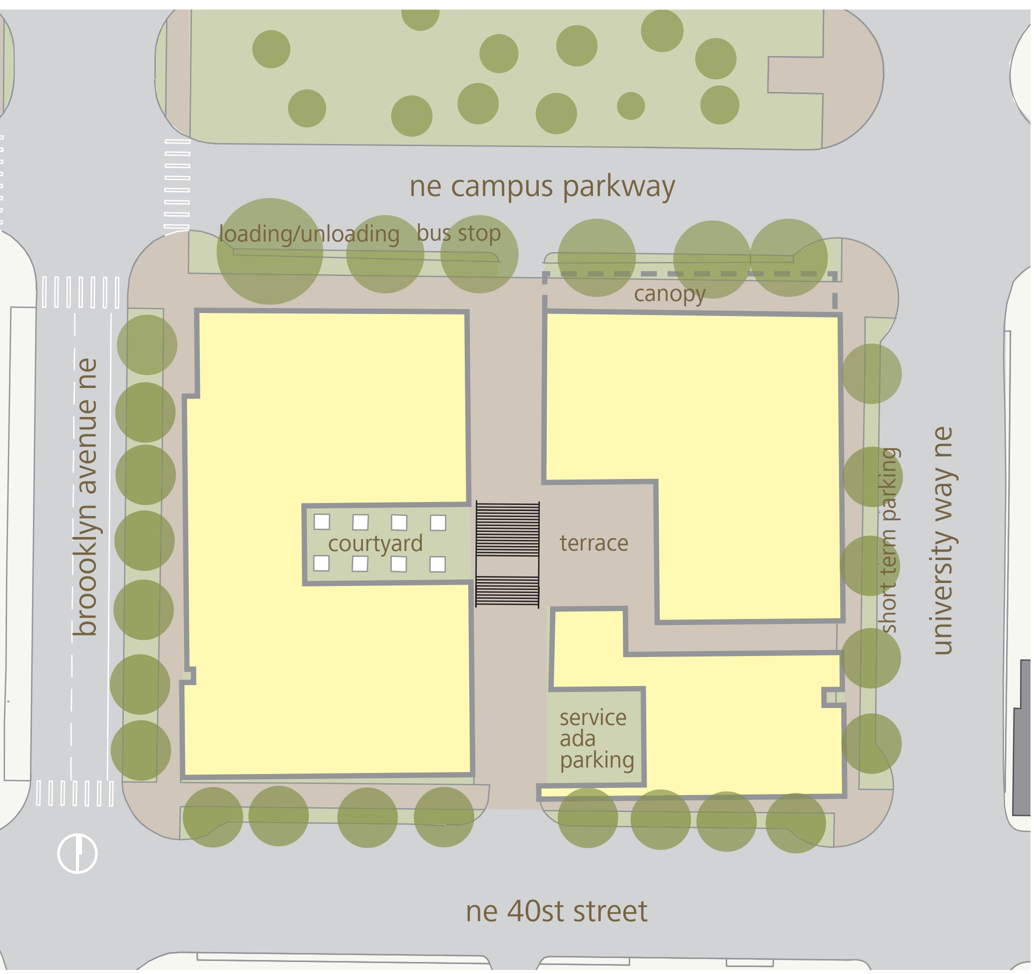
RESIDENTIAL FLOORS R1-R5

The typical residential floors are configured in an "I" configuration. The floors contain a mixture of double and single occupancy rooms in clusters of 14-16 residents per corridor. The rooms face outward with the commons area facing west across Brooklyn Avenue NE to the tree garden and the commons areas of Site 32W beyond. Two open stairwells flow into the commons spaces on each floor, connecting floors to each other and providing centralized "chimneys" for natural ventilation.

A roof terrace is provided at the R1 level facing west and the tree garden of site 32W.

SITE 35W

RIGHT
Aerial Perspective of 35W looking at Northeast corner

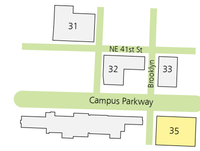


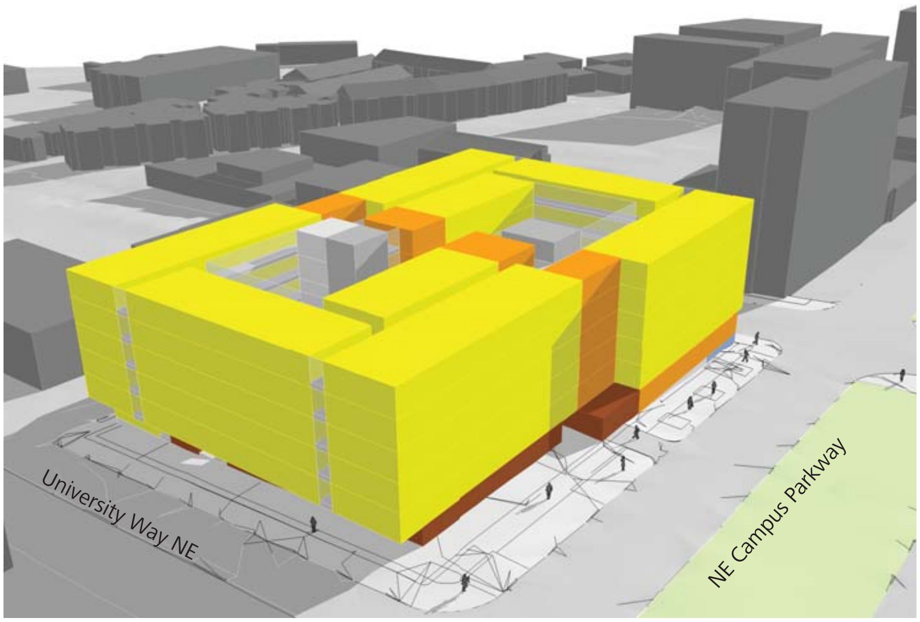
SITE 35W

Site 35W is prominently located along NE Campus Parkway at the intersection of Brooklyn Avenue NE. The site will support 580 beds, a shared use theater, HFS classrooms, administrative office space and the UW Arts Ticket Office. A small Quick Service Restaurant (QSR) will also be provided to support both the theater and the bus stop.

The ground levels of site 35W have a unique opportunity to support the pedestrian flows of students through open pedestrian passageways, connecting the west entry of the main campus at NE 40th Street to the new residence halls north and west of the site. The open walkways provide cut-throughs which connect public and private functions of the site at these levels.

Designed to focus common spaces inward, the building orients most residential units outward and draws community functions inward to a shared "open center" defined by common spaces and terraces.





GROUND LEVEL G1

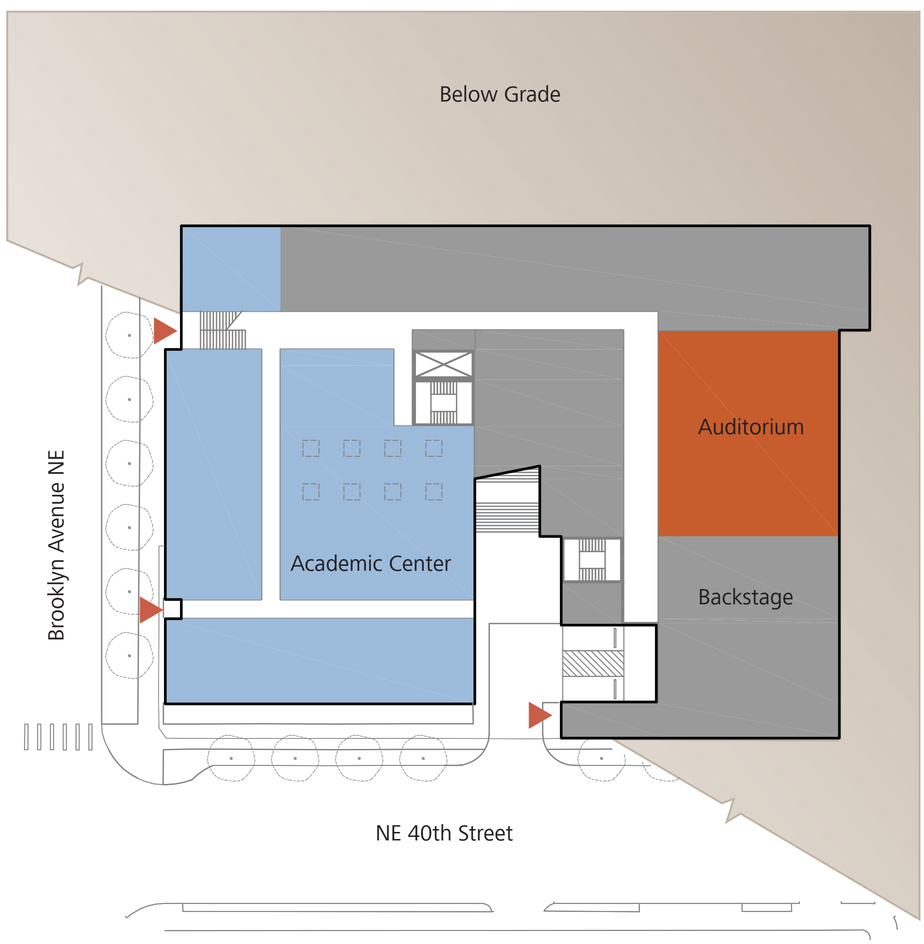
- Services/Support
- Residential Community: Live/Learn
- Campus Community: Activators & Academics
- Building Entry

GROUND LEVEL G1

Both HFS classrooms and the Academic Center classrooms and offices are located in the southwest corner of the site with both at-grade access and daylight and views. Interior classrooms derive their daylight from skylights in the roof terrace above.

A pedestrian connection from south to north is created along the original alley right-of-way, allowing pedestrians to move through the center of the block from level G1 to level G2. It is at this pedestrian walkway that a building entry is provided into level G1. This entry provides access to the main activating use on this level, administrative office space and the HFS classrooms. As a double height space, the stage and house of the theater drops to this level. Theater exiting is routed directly to the pedestrian walkway and service and delivery for the theater is accommodated from NE 40th Street.

Service functions of the building are located in the north and east portions of the site around the theater where there is no access to daylight. ADA parking for both car and van are provided from NE 40th Street, adjacent to the office entry, pedestrian walkway and elevator with convenient access to the main residential entry. Garbage, compost and recycling pick-up will be along NE 40th Street.



BELOW
West Facade of 35W looking east along 40th Street NE

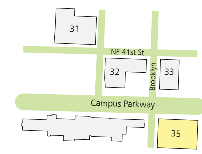
GROUND LEVEL G2

- Residences
- Residential Building Community Areas
- Services/Support
- Campus Community: Activators & Academics
- Terrace
- Building Entry

GROUND LEVEL G2

Level G2 is the main public entry level for this site and provides a prominent location for the theater which dominates the NE corner of the site. The lobby area faces NE Campus Parkway and shares the area with the QSR (coffee shop) to serve the adjacent bus stop. At this level, the building is split by an exterior pedestrian way leading diagonally from NE Campus Parkway to University Ave. NE, connecting the campus community activators (theater, QSR and UW Arts Ticket Office) with the residential community areas. The main residential common area for the building is entered from either this exterior pedestrian way or from Brooklyn Avenue NE and faces north to the Parkway. To the south of the commons, a secure exterior roof terrace provides daylight, views and privacy for the residents. Residential units wrap the perimeter of the west and south sides of the site, including two apartments.

An improved bus stop will be created by installing a canopy along NE Campus Parkway adjacent to the theater lobby. A load/unload area will be provided adjacent to this, just to the west along NE Campus Parkway providing a "front door" along the parkway similar to sites 32 and 33.



BELOW
Northwest corner of 35W looking east along NE Campus Parkway

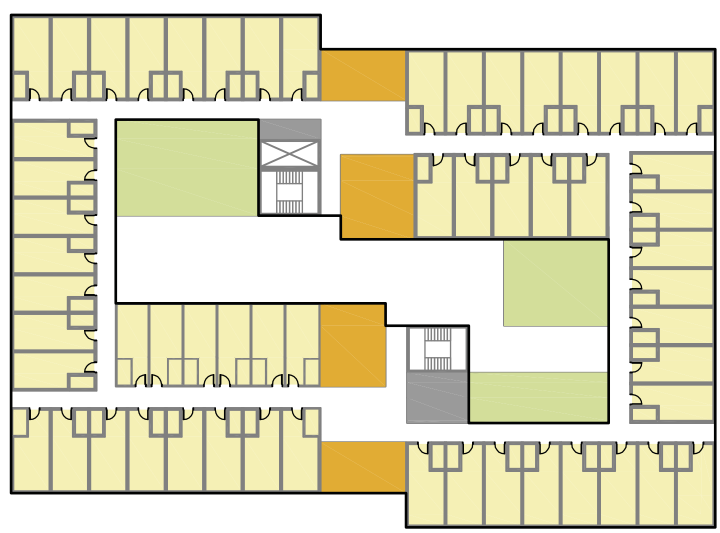
RESIDENTIAL FLOORS R1-R5

Residences

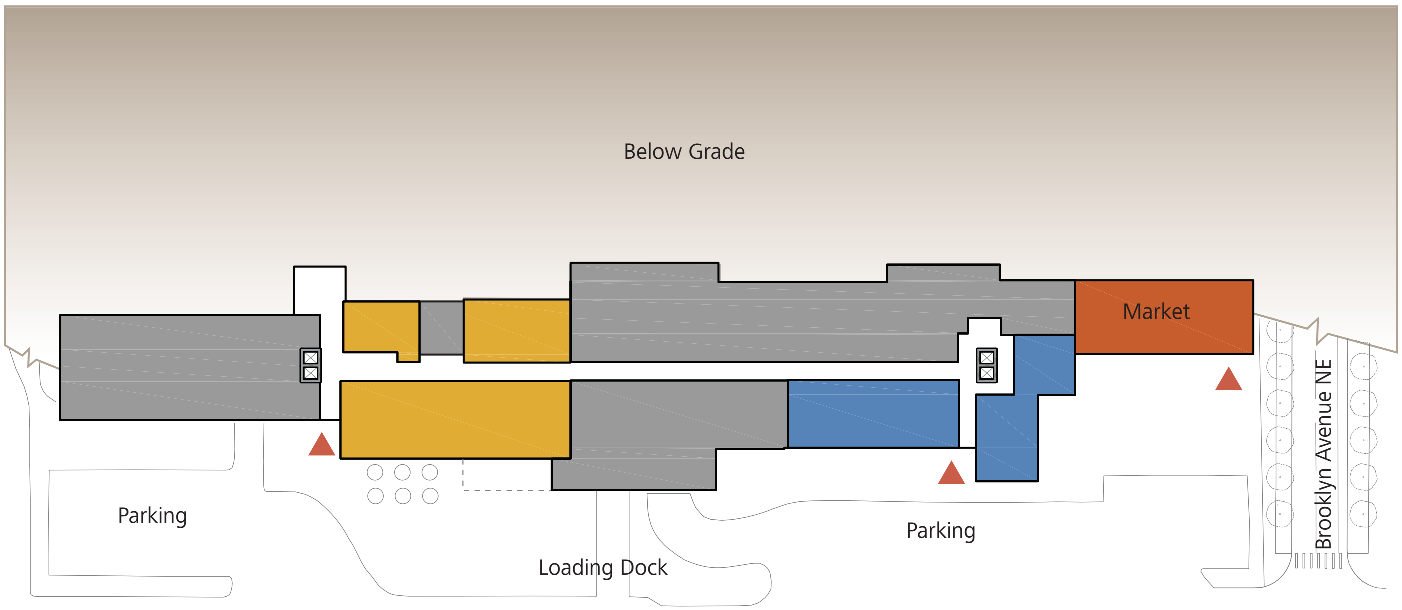
Residential Building Community Areas

Services/Support

Terrace at Floor R1



RESIDENTIAL FLOORS R1-R5
The typical residential floors are configured around a central court in a donut configuration. The floors contain a mixture of double and single occupancy rooms in clusters of 14-26 residents connected across the open pedestrian way to form a single floor. The majority of rooms face outward with a portion facing into the central court. The commons area for each floor straddles the pedestrian alley. Two open stairwells flow into these commons spaces on each floor, connecting floors to each other and providing centralized "chimneys" for natural ventilation. Roof terraces are provided at the R1 level.



TERRY LANDER HALL

As West Campus continues to develop as a vital student community, Terry Lander must develop as well; becoming integrated with the grain of future development. There is a need to break-down the scale of Terry Lander as a super-block. The renovation of Terry Lander must be sensitive to the actual pedestrian flow of students in the area, especially as West Campus becomes more dense. Great opportunities exist for improving entries, activating ground floor uses, and increasing the transparency of the building to energize the street and West Campus as a whole.

As each subsequent building phase of the West Campus housing project is completed and program spaces move out of Terry Lander, opportunities exist for the reorganization, reprogramming, renovation of and addition to the existing G1 and G2 levels. Identified needs for these levels leave unprogrammed space. Consequently, these levels can provide a buffer for program areas that may not be accommodated in the final development of sites 31W, 32W, 33W and 35W.

GROUND LEVEL G1

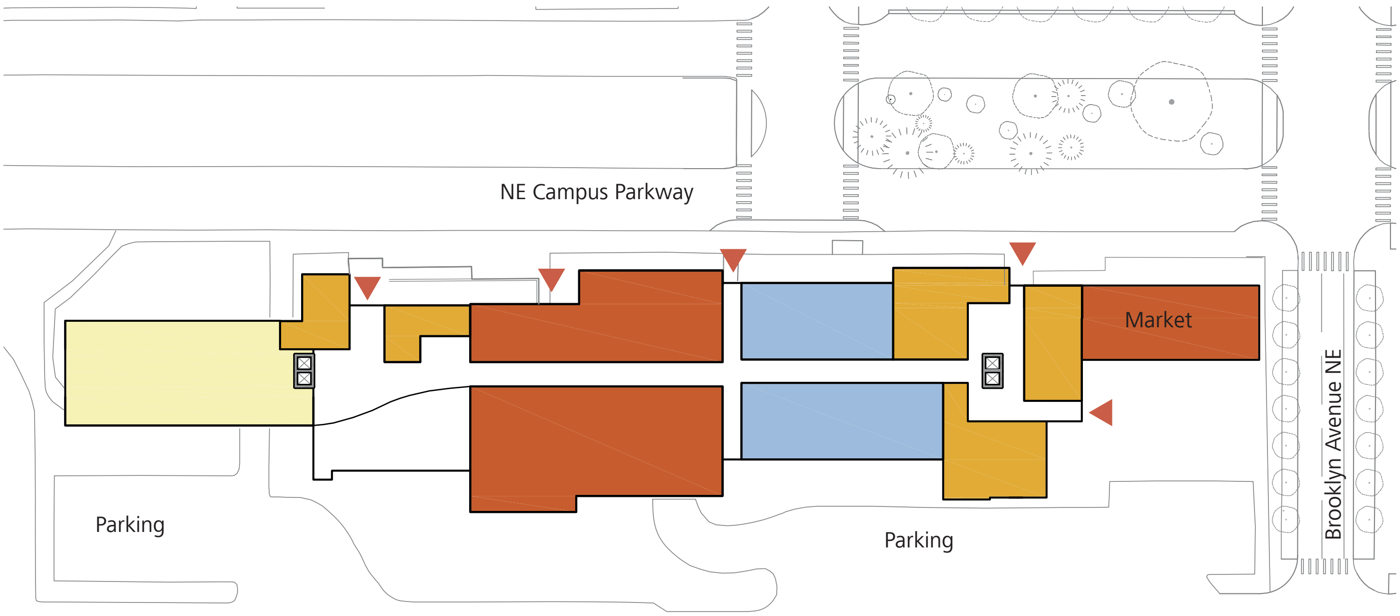
At the east end of Terry Lander, an open basketball court and bicycle storage area is transformed with infill construction into a public market. The market provides a strong campus community activating use for the southwest corner of the major NE Campus Parkway intersection and allows the base of Terry Lander to become visually and physically activated from both the open space to the south at the G1+ level and to the north at the G2 level. This new market construction provides the opportunity to remake the image and entry sequence into Terry Lander.

To the west of the new market and north of the main corridor, there is opportunity for a large service area for market storage/prep and the commissary. These areas are serviced conveniently from the main loading dock which will remain across the hallway at the center of the building. A daylight area to the south of the corridor remains available for HFS offices.

GROUND LEVEL G1

At the double height space located at the base of the Terry elevator bank, building-wide laundry, kitchen, TV and games room can be located. Activating this area will be difficult throughout the day and thought should be given to how it might be utilized as additional seating for the Eleven 01 Café (perhaps with a realigned stair), how it might be turned into an entry from the south and how the terrace area adjacent to it might be transformed into a sunny seating space.

The area currently utilized as custodial and storage at the west end of the site, serviced by a small loading dock, shall remain.



GROUND LEVEL G2

- Residences
- Residential Building Community Areas
- Campus Community: Activators & Academics
- Residential Community: Live/Learn
- Building Entry

GROUND LEVEL G2

A new main entry can be developed at the east end of the building in conjunction with the construction of the market. This new entry brings a visible and convenient entry to Terry Lander at the prominent corner of NE Campus Parkway and Brooklyn Avenue NE. Directly adjacent to this entry will be the regional desk, mailroom and a large commons area for the entire building. HFS classrooms remain in their existing location along the connecting corridor to the Eleven 01 Café and can be expanded to the south side of this corridor. Existing windows both along the corridor wall and to the outside from these spaces can be replaced to enlarge the visual connectivity to both the north and the south. A renovated Eleven 01 Café remains in the same location. A reoriented stairwell to the G1 may allow more connectivity to the area below, allowing it to serve as overflow seating as described in the G1 level.

The current entry lobby adjacent to Terry elevator will serve as a commons area for the residents above. Residential units fill out the remainder of G2 to the west.