

DETERMINANTS OF COLLEGE/UNIVERSITY DEVELOPMENT PATTERNS: A WHITE PAPER

Introduction. As they seek to fulfill their missions, institutions of higher education must be able to adapt and expand to meet both current expectations and future demands. Academic institutions seek growth for a variety of reasons, including responding to market and student demand for courses in a particular discipline, utilizing in-house expertise and leadership, and competing with other institutions to draw high-quality new students and faculty. Campus growth benefits the institutions while also contributing to the economic and cultural health of the communities they serve.

Depending on the nature of the institution, growth can take many forms. The specific needs of the campus will vary depending on whether students live on-campus or commute, whether it is publicly- or privately-funded, and its size. It is essential that the planning and policy structure in the city support the growth of academic institutions to facilitate delivery of higher education services and associated economic prosperity. To understand how to best support such expansion, it is important to first understand the factors that shape campus growth.

Influences on Campus Design. The surrounding context influences the character and personality of an institution and therefore the design of the academic campus. Many academic campuses share a core set of guiding principles, although noticeable variation can exist. Part of the variation depends of upon the nature of the academic disciplines which shape the curricula for each institution. As program functions can strongly influence the buildings appearance, there is a close association between academic focus and building design.

Program Elements

The major program components that comprise an academic campus are common to most institutions. Primary program elements that form the core of the campus and directly relate to the institutional mission are:

- instructional facilities
- research facilities
- libraries and museums
- centers of extracurricular life

Secondary program elements include:

- academic services
- housing
- sports, recreation and physical education
- physical infrastructure (pedestrian/vehicular circulation, parking, and utilities)

Program Adjacencies. Careful juxtaposition of major and supporting program elements is crucial to promote access and interaction between related uses. Respecting preferred adjacencies allows shared use of support facilities, cross-fertilization between disciplines, and efficient deployment of resources. Due to the limited time period between classes, short travel distances between academic buildings is paramount. Additionally, campus

planners must understand how exterior space often supports internal program uses to best balance and integrate open and built space.

Physical Expression. An academic campus' location, i.e., whether in an urban or suburban setting, is a major determinant of its interaction with the community. The physical character of the surrounding area provides a tangible baseline that a campus may embrace or reject.

- The particular scale of the local urban grid creates a pattern of blocks with infill buildings, determining everything from walkability and pedestrian access to daylight access for buildings and frequency of entry/connection to the interior of blocks.
- Built context provides precedent for the height and bulk of structures. Often, the scale of the surrounding neighborhood and the inherent needs of the campus are at odds, creating a transition in scale that must be mitigated with other form, site or architectural decisions.
- The vocabulary of materials on campus buildings can reflect the institution's concern with context; style and fashion; historic reference; durability and sustainability; and longevity.

Other key issues that directly relate to the transition between institutional campuses and the surrounding neighborhood are: building setbacks, location and prominence of campus gateways and building entries, inclusion or lack of retail storefront at the street edge, and landscape character.



Shops on Pacific Avenue at UW Tacoma campus establish a connection to adjacent community.

Campus Circulation. Providing efficient and appropriate circulation to and through academic campuses for pedestrians, bikes, cars and delivery trucks is vital to enable smooth operation of the campus. As a primary destination, campuses generate trips from outside of the immediate community that can contribute to unintended local neighborhood congestion. Connections to public transit are of the utmost importance to reduce demand on parking and traffic thoroughfares. Another strategy to decrease the impact of vehicle access is to support non-auto access to the campus through safe community bike lanes and pedestrian corridors.



Pacific Avenue lightrail stop at UW Tacoma

Providing on-campus housing and prioritizing access by pedestrians, bicyclists and transit riders also is essential to meet campus sustainability goals and move toward a carbon-neutral future. Even with mitigation measures, provision for automobile parking must be considered along with dedicated parking for disabled students, staff, visitors and deliveries. The challenge is to design parking areas in appropriate locations and with a character that integrates their design into the fabric of the campus to prevent parking lots from disrupting the patterns and atmosphere on campus.

Community Amenities. Academic campuses often have the potential for providing public amenities which can be shared with the surrounding community. On-campus program elements that, if present, have the potential for shared use are:

- landscaped open spaces,
- meeting, cultural and event spaces
- child care
- fitness and recreation centers
- health services
- libraries and museums
- places of worship
- parking

In addition to establishing positive relationships through welcoming the public onto campus, allowing neighborhood use of these spaces may offer additional economic support through cultural events, fitness center memberships and extension classes. With increased presence on campus, members of the public may gain a sense of ownership of the grounds, encouraging respectful treatment and careful upkeep, and can reduce institutional/neighborhood conflicts. Depending on the nature of the institution, campus facilities may not be significantly used in the evening allowing the surrounding community to activate otherwise underutilized spaces.

Campus Planning Principles. Ideally, academic campuses are located adjacent to high-capacity public transit and major arterial roads to allow easy access from throughout the region served. The importance of pedestrian links to the surrounding community cannot be understated if the goal is to physically or emotionally knit the campus into the neighborhood's fabric. This objective suggests porous edges to the campus, balanced with concerns of security and control. Strong neighborhood and on-campus way-finding are also important to enable quick and easy navigation.

Open Spaces and Connections. Central open spaces are a defining characteristic of successful campus planning. The particular organization of academic buildings around a landscaped court is an indicator of the hierarchy between buildings and program components, that is, the most important buildings are given highest visibility. This hierarchy is central to the clarity of our most cherished North American academic campuses. The use of open spaces may be event-related, but are more often reserved for informal non-programmed uses. Central open spaces provide transitions between the neighborhood and the academic environment. Secondary campus open spaces support the programs of adjacent buildings and provide circulation links through the campus. The balance between green landscape and hardscape open spaces must take into consideration service access (off-hour) and pedestrian use (daytime).



Historic core of University of Washington Seattle campus is organized around a central open green space (above).

Building Density. The requirements of academic institutions suggest mid-rise development is ideal, providing the benefits of moderate efficient stacking of program while retaining connectivity to ground plane. Depending upon context, mid-rise development may mimic or contrast with the character of the surrounding neighborhood. There is limited potential for under- or over-utilization of available floor area ratio (FAR), often the balance of mid-rise structures and significant open space yields density compatible with allowed FAR.

Adjacent off-campus commercial corridors are highly beneficial to support academic campuses, if limited on-campus retail services are provided, and enable the surrounding community to benefit economically from the university's presence. A "Main Street" adjacent to the campus may provide additional options for food and beverage, business and financial, personal and health services, clothing, and entertainment venues.

Campus and Community Utility Infrastructure. Academic campuses have significant utility infrastructures to support the functions of constituent buildings. Building mechanical, electrical, and plumbing needs vary widely based on specific program requirements. The utility infrastructure on campus must be robust enough to reliably accommodate peak building needs and allow for campus growth over time. To meet demand, campuses are typically served by a central plant for campus use only, enabling the institution to balance resources across multiple buildings connected to a single system.

This infrastructure requires considerable investment and maintenance. Central utility plants are designed to accommodate peak loading but during non-peak times there is excess capacity in the system. Few campuses have explored the larger opportunity for a district utility approach, involving surrounding neighborhood residences and commercial uses. Of primary importance to campuses today are stormwater catchment/treatment and carbon neutrality/energy efficiency. This renewed focus has enabled important conversations to occur between public agencies, campus planners and design professionals as new buildings are conceived and older buildings are renovated.

Both facility maintenance and student services rely on frequent delivery of mail, packages and supplies with corresponding need for efficient access across the campus. Centralized services on campus are a key to efficient delivery of goods and services. Meal preparation/services; extra-curricular organization offices; student and educational support services, and, to a lesser extent, campus administration can benefit from co-location or close adjacency. Program adjacencies can maximize use of multi-purpose spaces and provide flexible program space to accommodate changing needs over time.

Trends Effecting Delivery of Services. In recent years, increased enrollment and cross-generational participation in higher education has changed the atmosphere around academia significantly. Furthermore, the challenges of the national and global economy have forced many people back into higher education to improve their job skills and advance professional degrees, or perhaps "take shelter" from the current economic downturn.

In particular, this has had a dramatic impact on public two- and four-year institutions where space and budgets may be the most constrained. It is difficult to determine if this spike in enrollment is a temporary or permanent feature of the "new economy". On the other hand, there is growing demand for distance learning and consideration for three-year under-graduate degrees, which will counteract the demand for on-campus space.

Competition for Students. Growing student applications at historic institutions with fixed capacities have generated higher academic thresholds for admittance and increased competition between institutions for the "best" students. The result is a very competitive environment where the quality of the academic course offerings is not the only enticement to attract prospective students. More pressure is placed on the character and quality of the campus environment including extensive open space, high-quality housing, sports and cultural facilities.

Economic Influences. The financial landscape for academic institutions has changed. Today, there is increased reliance on faculty initiated research as an economic driver for the college or university and subsequent spin-off fundraising and coursework is seen as crucial to connect the institution to the larger economy. Additionally, there is increased reliance on private fundraising to support existing services and campus growth. To attract such funds, the institution's brand, visibility and emotional connection with alumni is of growing importance. Even with private donations and the best efforts of many institutions, the cost of attendance per student is climbing at a rate that far outpaces the Consumer Price Index (CPI). The effect is more students graduating with significant educational debt. In fact, collective student debt now exceeds total consumer debt in the

US, and, as a result, is a subject of current political debate about the cost and financing of higher education.

Evolving Pedagogy. In response to strained budgets and hiring freezes, there has been a trend toward larger course sizes in an attempt to deliver the same education to more students at one time. Even though all educational philosophies do not necessarily support the effectiveness of this trend, institutions have been forced to adopt this approach by current and projected conditions. Educational institutions are increasingly utilizing new media technologies to improve learning in the contemporary classroom in response to evolving trends outside academia and to facilitate the larger class sizes. The popularity of online courses, digital feedback devices for student participation in lectures, and remote teaching of cross-campus coursework all attest to this trend.

Expanding the Campus. The new context for higher education has caused administrations to seek new ways to stretch capacity with existing resources:

- Kalamazoo College in Michigan has expanded capacity by using a four-semester calendar, extending the school year and exploiting otherwise underutilized classroom space (Dober, p171).
- Some colleges and universities are expanding weekend and night classes to maximize utilization of existing physical capacity on campus.
- To increase participation in early morning course offerings among students, some institutions are adjusting the cost of courses to encourage full utilization of the school day, charging more tuition per credit-hour for popular, conveniently-timed, mid-day class times.
- Study abroad and work-and-learn opportunities are beneficial experiences for students while also reducing the number of people on-campus at any one time.
- Online coursework supplements physical class attendance at many institutions and increasingly replaces brick-and-mortar classrooms as campuses do not have the room or resources to expand.

Physical campus expansion can take the form of increasing density/intensity, outward expansion, satellite locations, or developing entirely new campuses of a larger university system. By replacing low-scale existing buildings with taller buildings or infilling open space, schools can expand without greatly altering the physical boundary of the campus, reducing the need to acquire additional property and reducing potential conflicts with neighbors. Though, such intensification can drastically change the campus character and reduce cherished open space.

Outward expansion of the campus is often a very attractive option, potential neighborhood opposition notwithstanding, because it allows existing programs to continue without interruption and provides an opportunity to plan for and signify the growth of the institution. When campus expansion is chosen, it is vital that planners and

architects build for longevity and understand the emotional investment that staff, students, and alumni have in the existing campus.

CASE STUDY A:
UNIVERSITY OF WASHINGTON TACOMA CAMPUS
TACOMA, WASHINGTON¹

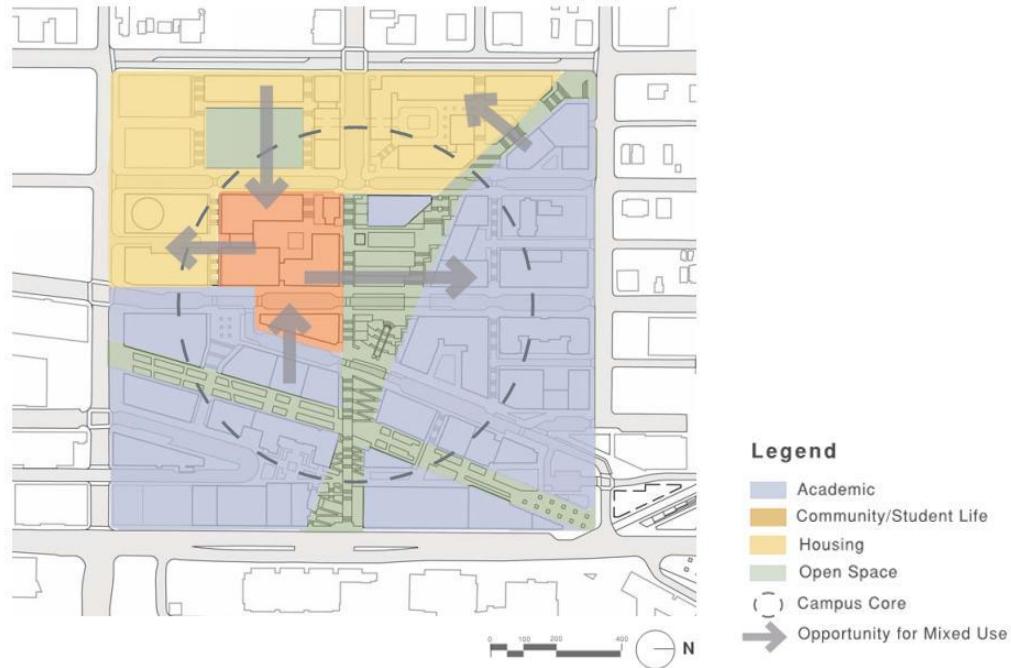
Background. The University of Washington Tacoma (UWT) was founded in 1990 when the state of Washington invested in five new two-year, upper-division and master's-level campuses throughout the state. The campuses were designed to provide the next academic step for community college transfer students and to serve time-bound, place-bound students with degree programs meeting demonstrated regional needs. These new campuses were also intended to fuel local economic development and to be responsive to the communities in which they were sited. In the fall of 2006, UW Tacoma began to enroll freshmen and sophomores and received requests from the student body to provide housing.

Site. UW Tacoma is a 46-acre urban campus which, along with the historic building fabric, establishes a unique character and sense of place and connects with the surrounding neighborhoods. The campus is nestled with the varied and culturally-rich fabric of downtown Tacoma neighborhoods. To the south is the Tacoma Dome District and the Brewery District, which through redevelopment of the historic brewery buildings and its direct adjacency with the Museum District, is becoming an active arts community. The campus connects to the Upper Tacoma Business District to the north, which is the City of Tacoma's civic and financial center. Residential neighborhoods and St. Joseph's Medical Center are located directly to the west of campus.

UW Tacoma is located within the Downtown Mixed Use (DMU) zone. This zone allows for a variety of activities to occur including educational services, retail, residential and industrial use. The maximum building height for the DMU zone is 100 feet. There are also historic and conservation overlay zones east of Market Street, for which the University will continue to respect the historic buildings and features in the area. The maximum height limit for the overlays is 85 feet.

Master Plan Proposal. The general concept for the UW Tacoma campus development plan recognizes and enhances the urban character of the existing campus by aligning development predominantly with the street grid. Opportunities were defined to strengthen a sense of community as a full four-year institution by providing a central open space, various smaller green spaces throughout the campus, pedestrian connections and integration of uses among residential, student life, and academics. This inter-relationship of on-campus uses is demonstrated in the illustration below.

¹ Based on "University of Washington Tacoma Campus Master Plan Update", Fall 2008

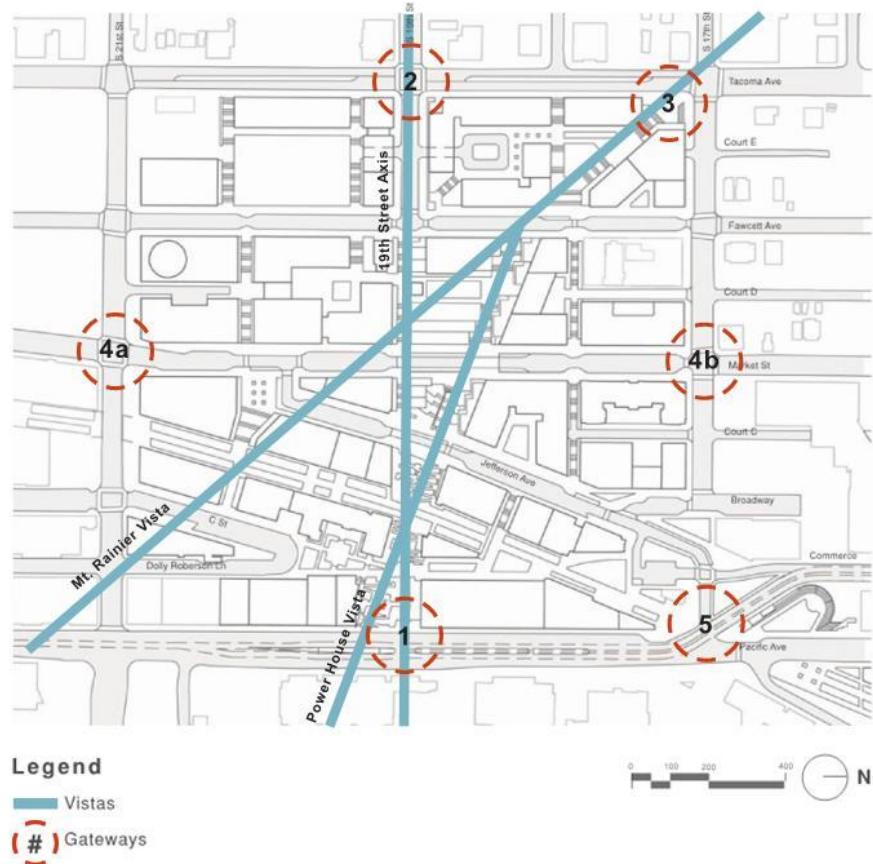


Scale. Although the actual height of new buildings will vary, it is important that the non-residential university functions be ground-related. The average height of four stories is ideal for academic uses and allows people to retain contact with the campus, neighboring buildings, and open spaces, thus, reinforcing the campus community.

Gateways and View Corridors. The UW Tacoma campus is integrated within the fabric of downtown Tacoma with campus streets following the city grid and traffic permeating the campus to provide connections to downtown and greater Tacoma. As illustrated below, there are five key gateways that provide strong entry points into the campus (1-Pacific, 2-Tacoma, 3-Takomah Grove, 4-Market and 5-Jefferson/Prairie Trail) and three important view corridors (South 19th Street axis, Mt. Rainer Vista and Power House Vista) which connect campus open space and frame distant views.



View of South 19th Street axis and the Power House Vista (above).



Adaptive Reuse. The reuse of the existing historic warehouse buildings at UW Tacoma has been a highly-valued feature of the master plan in maintaining the history, character and aesthetic quality of the site, in addition to promoting sustainability and supporting campus growth. Located along the active retail street of Pacific Avenue, these structures have been successfully renovated to provide to multi-use space for retail and academic program. Although the retail requirement is mandated by the Tacoma Municipal Code along Pacific Avenue, the retail occupancy has proven to contribute to the vitality of the UW Tacoma community.



Images of UW Tacoma historic Russell T. Joy Building renovated by THA Architecture for retail, classroom and student gathering areas along Pacific Avenue.

Parking and Transit. UWT is an urban campus with strong transit connections to the surrounding community. Bus service is supplied by Pierce Transit, Sound Transit and Intercity Transit and the Tacoma Link Light Rail runs along Pacific Avenue with a stop directly adjacent to the campus and connects with Sounder Commuter Rail at the Tacoma Dome. A limited number of parking spaces are provided for the present population but underground parking structures are proposed to support expanded FTE populations of 10,000 students.

Phasing. Enrollment projections show that in the next ten years the campus will expand by approximately 5,000 full-time-equivalent (FTE) students. Prioritizing buildings that will support the further definition of a central open space has been a critical consideration in identifying phasing opportunities. The 2008, UW Tacoma Campus Master Plan Update identified three expansion phases from 2008 through 2019, which include 300,000 gross square feet (gsf) of academic and library space; 273,00 gsf of residential and 200,000 gsf for student life to service the expanding campus population.



UW Tacoma	
Population:	Tacoma, Washington
Location Type:	198,400
Total Campus Area (acres):	Urban
Total Developable Area (gsf):	35-acre
	1,533,250

Current Development (2011):

FTE Students	3,234 FTE
Academic Building Area (gsf)	479,850
Student Housing (gsf)	112,500
Structured Parking above grade (gsf)	45,000
Structured Parking below grade (gsf)	0
Parking Area	425 spaces
Total Current FAR	0.42
Total Current Campus Coverage (%)	15%
Total Current Parking Ratio	.9 / 1,000

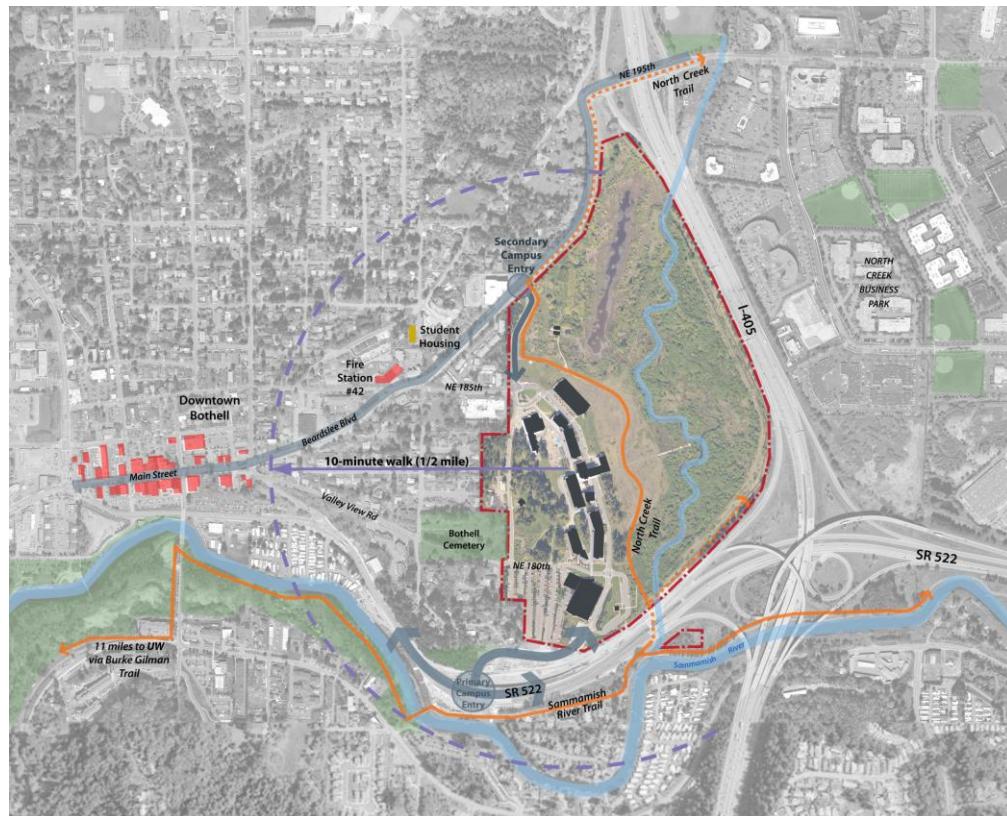
Future Additional Development:

FTE Students (target)	10,000 FTE
Building Area (gsf)	1,698,200
Student Housing (gsf)	531,200
Structured Parking above grade (gsf)	105,000
Structured Parking below grade (gsf)	907,500
Parking Area	4,050 spaces
Total Future FAR	1.52
Total Future Campus Coverage (%)	46%
Total Future Parking Ratio	1.8 / 1,000

CASE STUDY B: UNIVERSITY OF WASHINGTON BOTHELL CAMPUS TACOMA, WASHINGTON²

Background. The University of Washington Bothell (UWB) was founded in 1990 when the state of Washington invested in five new two-year, upper-division and graduate-level campuses throughout the state. The campuses were designed to provide the next academic step for community college transfer students and to serve time-bound, place-bound students with degree programs meeting demonstrated regional needs. These new campuses were also intended to fuel local economic development and to be responsive to the communities in which they were sited. In the fall of 2006, UW Bothell began to enroll freshmen and sophomores.

Site. UW Bothell is collocated with Cascadia Community College (CCC) on a 132-acre suburban campus which includes 71-acres of restored and protected wetlands and establishes a unique character and sense of place. The campus is located $\frac{1}{2}$ mile east of downtown Bothell and 11 miles northeast of the UW Seattle Campus along the Burke Gilman Trail. UWB and CCC share many resources with the neighboring City of Bothell and are connected via the Town Gown Loop, a walking trail that provides accesses with a 10-15 minute walk between the campus and community.



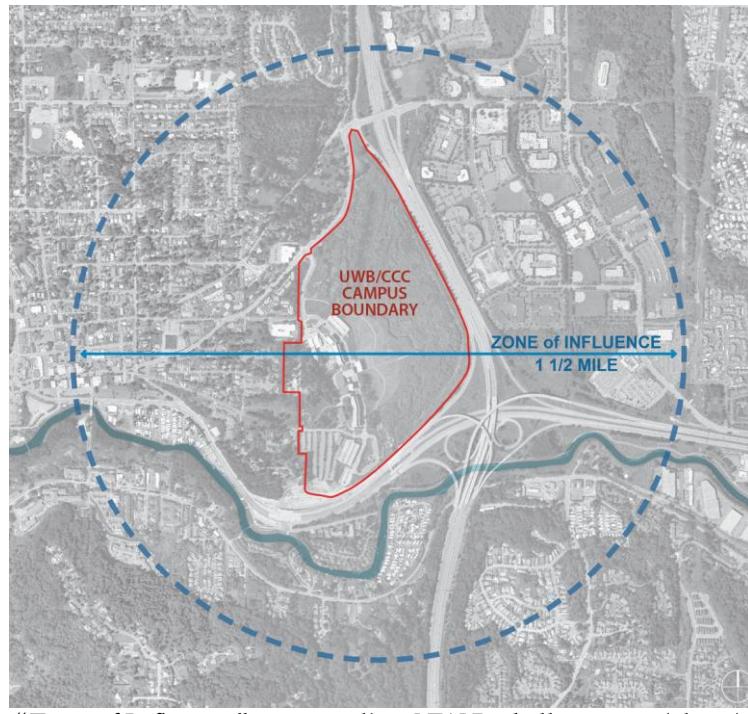
Context map showing UW Bothell connection to community (above).

² Based on "University of Washington Bothell 2010 Master Plan (Revised 2011)" by THA Architecture, Fall 2008

UWB is zoned primarily as Campus (C) with a Shoreline Master Program (SMP) designation for the wetlands and General Downtown Corridor (GDC) for recently acquired adjacent housing and professional building. UWB land use approval process is based on a Planned Unit Development (PUD) which was approved by the City of Bothell in 1996, based on a conceptual master plan. The PUD governs building placement, height, and general character, as well as controlling traffic and parking impacts. Generally the requirements are more restrictive toward the perimeter of the campus.

The PUD has been implemented over a number of phases, with Phase 5 currently in for review. In the intervening years, the Campus master plan has been revised several times, although each subsequent building is reviewed for compliance with the original master plan, which can only be changed through a new PUD. The Campus and City are in agreement that the existing PUD should be retired as soon as practical, and replaced with a simpler public approval process.

Master Plan Proposal. The UWB Master Plan establishes the vision for the future UWB/CCC campus, holistically addressing the growth required to support 10,000 FTE student body, demonstrating the opportunity for that growth on available developable land and reinforcing a collaborative, student-focused experience. The Master Framework plan accommodates the majority of the programmatic elements within the campus boundary but certain elements may be provided beyond the campus. Opportunities are being explored within an approximate 1.5 mile diameter zone surrounding the campus called the “Zone of Influence”. The Zone of Influence recognizes mutually-beneficial opportunities are gained by developing relationships and sharing resources with the surrounding community.



“Zone of Influence” surrounding UW Bothell campus (above).

Gateways and View Corridors. The restoration of the North Creek and associated 71-acre wetlands is a critical factor in any development decision for the collocated UWB and CCC campus. The wetland ranks among the largest floodplain restoration in the Pacific Northwest and is one of three distinct zones which define the campus. The other two zones are identified as Developable Uplands and Developable Lowlands. Organizational framework provides stair and view corridors that physically and visually connect the uplands to the wetlands.



View south toward the North Creek Events Center (above).

The buildings are organized along a north/south pedestrian corridors and vehicular circulation loop road that connect at select gateways to the roadway and highway system serving the City of Bothell.

Parking and Transit. UWB and CCC are located in a suburban setting with limited residential housing on-campus and functions like a commuter college. The campus is supported by bus service from Sound Transit, Community Transit and Metro Transit but a high percentage of faculty, staff and students arrive via personal vehicles. The campus developed two parking structures and on-grade parking lots with front-loaded capacity to serve approximately 5,000 FTE before additional parking will need to be provided. Due to limited opportunities for campus boundary expansion, parking structures are proposed to preserve development area for academic functions.

Organizing Concepts. Planning principles which guide the development of the campus include:

- Enhancing the campus entries
- Locating parking at the edges of the campus to maintain pedestrian environment
- Creating a heart of the campus
- Strengthening connections between buildings
- Continuing the campus commitment to sustainability
- Maintaining the feel of a small and cohesive campus
- Providing universal access
- Preserving the healthiest tree groves
- Strengthening connections and views to the wetlands

Phasing. Campus expansion will occur incrementally and each site selection will consider its impact on the incremental development of campus infrastructure including utilities, pedestrian paths, roadways, and recreation and open spaces. Enrollment projections show that in the next ten years the campus will expand by approximately 5,000 full-time-equivalent (FTE) students. The 2010 UW Bothell Master Plan identified a need for an additional 500,000 gsf of academic space; 75,000 gsf for an assembly hall; 75,000 gsf for student activity center; 2,200 additional parking spaces; 650 to 1,250 student resident beds; 40,000 gsf of student recreational spaces and an expanded 17,500 gsf campus utility plant to service the expanding campus population to serve 10,000 full-time equivalent students.



Figure 44: 2011 UWB/CCC Master Plan, with revisions

Existing and proposed campus development to accommodate 10,000 FTE (above).

Population:	UW Bothell
Location Type:	Bothell, Washington
Total Campus Area (acres):	32,950
Total Developable Area (gsf):	Suburban
	132-acre (71 acres protected)
	2,657,160

Current Development (2011):

FTE Students	3,377 FTE
Academic Building Area (gsf)	464,000
Student Housing (gsf)	244 beds
Structured Parking above grade (gsf)	318,450
Structured Parking below grade (gsf)	0
Parking Area	1,950 spaces
Total Current FAR	0.29
Total Current Campus Coverage (%)	7%
Total Current Parking Ratio	4.3 / 1,000

Future Additional Development:

FTE Students (target)	10,000 FTE
Building Area (gsf)	1,202,500
Student Housing (gsf)	1,500 beds
Structured Parking above grade (gsf)	853,776
Structured Parking below grade (gsf)	0
Parking Area	4,150 spaces
Total Future FAR	0.77
Total Future Campus Coverage (%)	22%
Total Future Parking Ratio	3.5 / 1,000