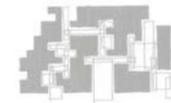


# quad



u n i v e r s i t y o f u t a h  
i n t e r d i s c i p l i n a r y q u a d r a n g l e m a s t e r p l a n

april 25, 2008

Lord•Aeck•Sargent

# intro

## 01

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## executive summary

Master planning for the Interdisciplinary Quadrangle is a key component in the development of facilities that support the growth of truly innovative research at the University of Utah. This plan is an outgrowth of master plan for the entire campus that is currently scheduled to be completed by the end of 2008. This 11 acre site was identified for several reasons: to provide a linkage between the Main and Upper campuses, to begin to build a bridge, literally and figuratively, between the Health Sciences Center and the Main Campus to promote collaboration, and to create a specific precinct with a focus on interdisciplinary research. In addition, the Master Plan establishes a strong framework that will help guide the first USTAR project as it enters the design phase.

The Vision and the Goals that are identified for this master plan are key drivers as well as the metrics used to determine the success of the plan. The planning concepts, building density studies, design guidelines, open space criteria and other information contained herein are intended to give guidance and starting points for the University and for Architects as they engage the design of each building that will eventually create the Interdisciplinary Quadrangle. One key component of this plan is that the first building will set many of the architectural design criteria, including character and building material, that will be implemented as the Quadrangle develops. The Master Plan also allows for components that are likely to evolve as the site continues to develop.

The planning process identified several primary issues that will have a significant impact on the development of the Quadrangle. One example is the coordination of the campus wide parking strategy and the individual building parking required at the time. Temporary parking strategies have been developed to meet the needs of the first phase. The Quadrangle Master Plan eventually incorporates a 300 car, underground parking structure to be developed in future phases. The funding and timing of the parking solution will have a major impact on both the first and subsequent projects to be built on the site.

The development of public space was another primary issue identified. The type, size and location of these shared public spaces are generally described in this plan, however, the exact programmatic requirements and the funding opportunities for these public spaces have not been determined. The development of a complete underground area is included in this plan. It includes core areas that were identified as

requirements for the USTAR project, the ability to expand those cores, add new core areas, include the underground parking and service docks as well as support areas that will serve all of the facilities to be constructed within the Quadrangle. The staging and phasing of this underground development will add complexity to each individual phase of the project. This plan also addresses a unifying "pedestrian corridor" that will physically link the pedestrian path that currently terminates at the engineering complex on the west, to the TRAX station adjacent to the Health Sciences Center on the east. Concept designs are included, however, the funding and phasing of this unifying corridor have not been identified. The creation of this corridor is critical to the overall success of the Interdisciplinary Quadrangle.

An overall open space plan is included, as well as the open space criteria for each phase of development. It will be critical to the success of the overall Quadrangle that these open spaces be funded with each project, as independent open space funding is difficult to obtain. As with the physical amenities, the infrastructure planning required to support the overall development of not only the Interdisciplinary Quadrangle, but also of additional development planned for the east side of Wasatch Drive, is included in this Master Plan. The first phase of infrastructure development will require a large investment and will include a new, expandable chilled water plant and extensions and rerouting of most of the major utilities required for the development of this section of campus. The infrastructure planning has studied the best long term solutions while attempting to minimize the impact on the earliest facility. Due to the "greenfield" nature of this site, however, large infrastructure costs will be incurred at the onset of the first project.

The planning concepts, architectural guidelines, open space typologies and organizations, along with the infrastructure plan will all provide the University with a tool that will help create the Interdisciplinary Quadrangle, a new collaboration research section of campus that promotes new discoveries. As with all master plans, this is a living document that requires reviews and updates as conditions evolve. National focus, funding opportunities and economic development needs can all have significant impacts on the plan, its contents, and implementation priorities. This master plan offers a flexible framework into which the University can grow and provide national leadership in scientific research.



# intro

## 01

### INTRODUCTION

The concept of the Interdisciplinary Quadrangle has grown out of the development of the Campus Master Plan for the University of Utah and is intended to provide a distinct precinct within the campus for the development of interdisciplinary research. The approximately 11 acre site is located between Wasatch Drive on the east, and Central Campus Drive on the west and includes land on both the north and south sides of Federal Way. The primary goal for the Quadrangle is to provide over 1,000,000 GSF for the development of interdisciplinary research in the areas of Biomedicine, Bioengineering and Information Technologies. The Quadrangle Master Plan provides site planning, architectural and infrastructure guidelines for the development of the complex as a whole and for the individual buildings that will be constructed on the site. The guidelines are general in nature and the first building to be constructed, the USTAR building, will be a key determining factor for guiding the subsequent development. This plan includes a macro-program of potential uses, an existing site analysis, planning concepts and guidelines, an infrastructure plan, a phased development plan with a conceptual budget and graphic tests of the guidelines. The appendix will include the exemplar renderings and other supporting materials.

#### 1.1 vision

The Interdisciplinary Quadrangle will provide an environment in which science from a broad variety of disciplines can be supported in a highly collaborative, integrated model. One of the highest goals of the project is to create public and shared spaces which promote collaboration and informal interaction among the residents of the Quadrangle. Buildings in the Quadrangle will adhere to design guidelines which ensure a high aesthetic standard as well as an identifiable architectural signature and sense of unity, while allowing each building to express its individual identity.

The Quadrangle Master Plan will conform to overall guidelines and standards established by the Campus Master Plan. The Quadrangle complex will be part of an integrated connection between the Main and Health Sciences Campuses. Entries, pedestrian traffic and flow will be a key element of the Quadrangle Master Plan. Appropriate parking and access for occupants and visitors is identified as part of the Plan. Joint core facilities and infrastructure are planned in such a way as to maximize use by all the Quadrangle buildings and occupants. The Plan identifies a potential sequence for development of the buildings.



## 1.2 goals

In order to meet and deliver the vision for the Quadrangle, the following goals have been developed to guide the growth of the Interdisciplinary Quadrangle:

- To create a Quadrangle complex for interdisciplinary research that will support the development of 800,000 square feet to 1,200,000 square feet of research, teaching and support facilities.
- This complex of facilities must be designed to encourage collaboration and interaction among users, students and visitors.
- The Quadrangle should be part of an integrated connection between Health Sciences Campus and Main Campus.
- The Quadrangle should be planned so that each building can be designed and constructed individually, while creating a sense of unity for the entire complex.
- The identification of major and minor entries into and through the Quadrangle must be key components of the Master Plan.
- The public spaces should be shared within the Quadrangle and planned to promote collaboration and interaction among the users and be a destination space for visitors.
- The Quadrangle must provide for a variety of outdoor environments from quiet interaction areas to active recreational spaces.
- The architectural character of the Quadrangle must support the concept of a unified complex with individuality for each building.
- The Quadrangle should maximize the use of below grade areas to support the development of additional core areas, expansion of existing core areas, the creation of a 300 car parking area and a complex wide loading dock and support system.
- The utility infrastructure should be planned to support the entire complex without overburdening the costs of each individual building.
- The Quadrangle development should push the boundaries of sustainable site development including the following strategies: a storm water management plan, prudent utility routings, appropriate landscape design and plant selections, maximized solar orientation of the buildings, shading and open spaces to maximize the use of the existing micro-climate, the maximizing of public transportation and the encouragement of pedestrian movement.



## 1.3 master planning process

**Design Process:** The design process began with aligning the many stakeholders into an appropriate working structure which included the following: an advisory committee, a building and design committee, an open-spaces committee, and an infrastructure committee. The advisory committee was established

to review, discuss and present the findings of the other committees to the University senior leadership for approval. The building and design committee was responsible for discussing, testing and forming the planning concepts, site densities, design concepts and architectural guidelines. The open-spaces committee was responsible for developing the open spaces criteria, the development of a descriptive typology of open-spaces, and developmental guidelines for the various open spaces in each phase of the complex's development. The infrastructure committee was responsible for developing the overall utility needs for the Interdisciplinary Quadrangle and an additional planned development for a total of over 2,000,000 GSF of new construction. This committee also designed the routing plan for the central utilities to minimize the total length of utility tunnels and piped systems. This committee also led the way in location of a new central chilled water plant that will be designed to expand as this part of the campus continues to develop.

The process began with a kickoff meeting, with all stakeholders attending and given the opportunity to discuss their individual visions for this project. At this session, the scope of the work was discussed, the establishment of the committees and their working schedules were established, and an overall planning process was put into play. After the kickoff session, the working committees met every other week for nearly 3 months to develop concepts, and continually refine guidelines for the buildings, open-spaces, and the supporting infrastructure. During this planning interim process presentations were made to the senior management to help facilitate the review and approval process. In addition, there were regular meetings held between the planners of the Interdisciplinary Quadrangle and those preparing the Campus Master Plan. These meetings were held to make sure that the Quadrangle planning was conforming to the Guidelines of the overall master plan and that overlapping areas could be coordinated.

**Coordination with the Campus Master Plan:** As the Quadrangle master plan is a component of the Campus Master Plan, several of the design criteria of the Quadrangle plan are carried over from the Campus Master Plan. These include standard streetscape plans and requirements, overall landscape concepts, planting materials and hardscape features. Security and night lighting planning, traffic planning, and parking strategies will all be developed and implemented in the Campus Master Plan. The infrastructure that feeds the Interdisciplinary Quadrangle must be part of the larger utility infrastructure planned for the entire campus.

# program

02

requirements



PROGRAM

The Master Planning of the Interdisciplinary Quadrangle foresees four research buildings on the site with a continuous shared core level below. There is also the possibility of a fifth central building dedicated to shared public facilities on the site. This section includes the allowable buildable square footage for the site; see the summary below. The site is separated into the lower level core programs (2.1) and building area above the core that includes the interdisciplinary research programs and public space (2.2).

2.0	TOTAL DEVELOPMENT POTENTIAL	GSF
2.1	lower level core programs	328,482
2.2	interdisciplinary research programs and public space	821,205
<b>TOTAL GSF</b>		<b>1,149,687</b>
<b>Total not including parking</b>		<b>1,059,687</b>

\*total allowable area is equal to 70% of the 469,260 SF site and is 328,482 SF.

2.1 lower level core program

The Lower Level Core Program should include the connected core facilities, loading docks, service, and parking. The allowable area for this level is 70% of the 469,260 SF site area. This program calls for 280 parking spaces at one level, which leaves a 238,482 SF for potential program and service.

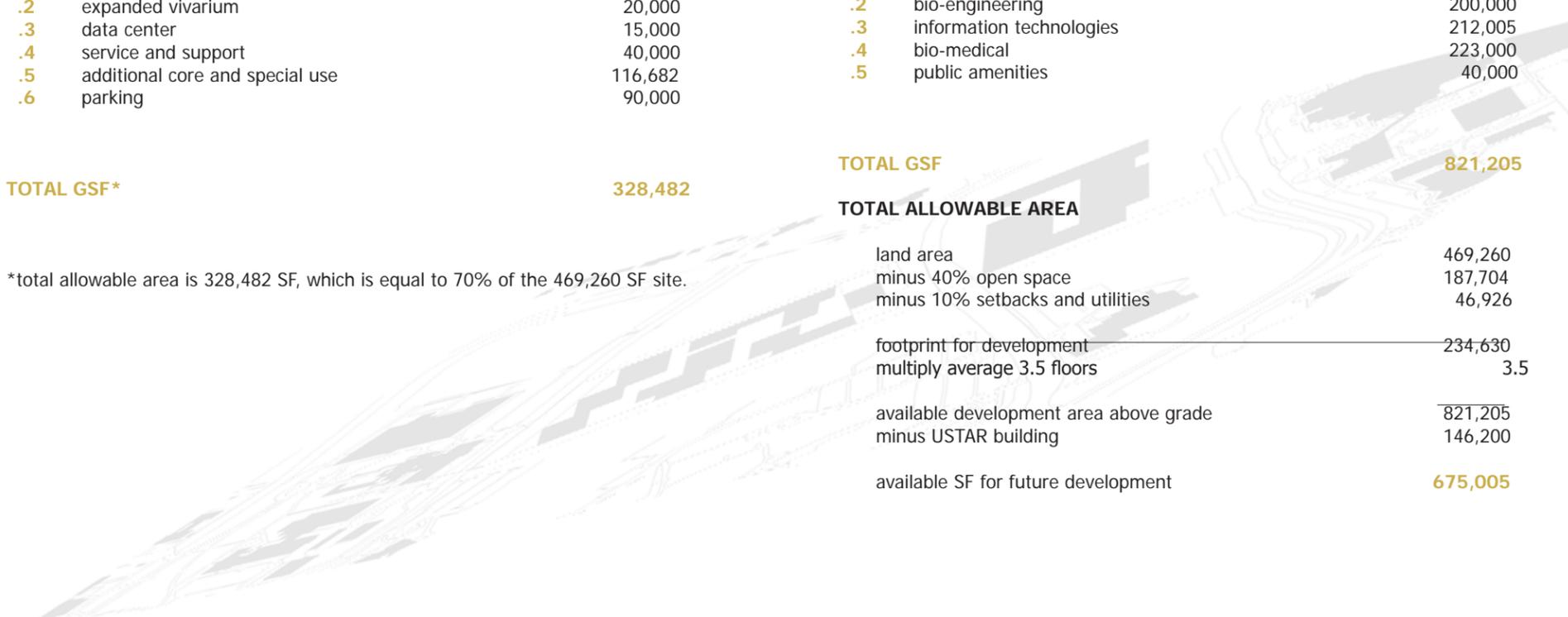
	LOWER LEVEL CORE DEVELOPMENT POTENTIAL	GSF
.1	USTAR	46,800
.2	expanded vivarium	20,000
.3	data center	15,000
.4	service and support	40,000
.5	additional core and special use	116,682
.6	parking	90,000
<b>TOTAL GSF*</b>		<b>328,482</b>

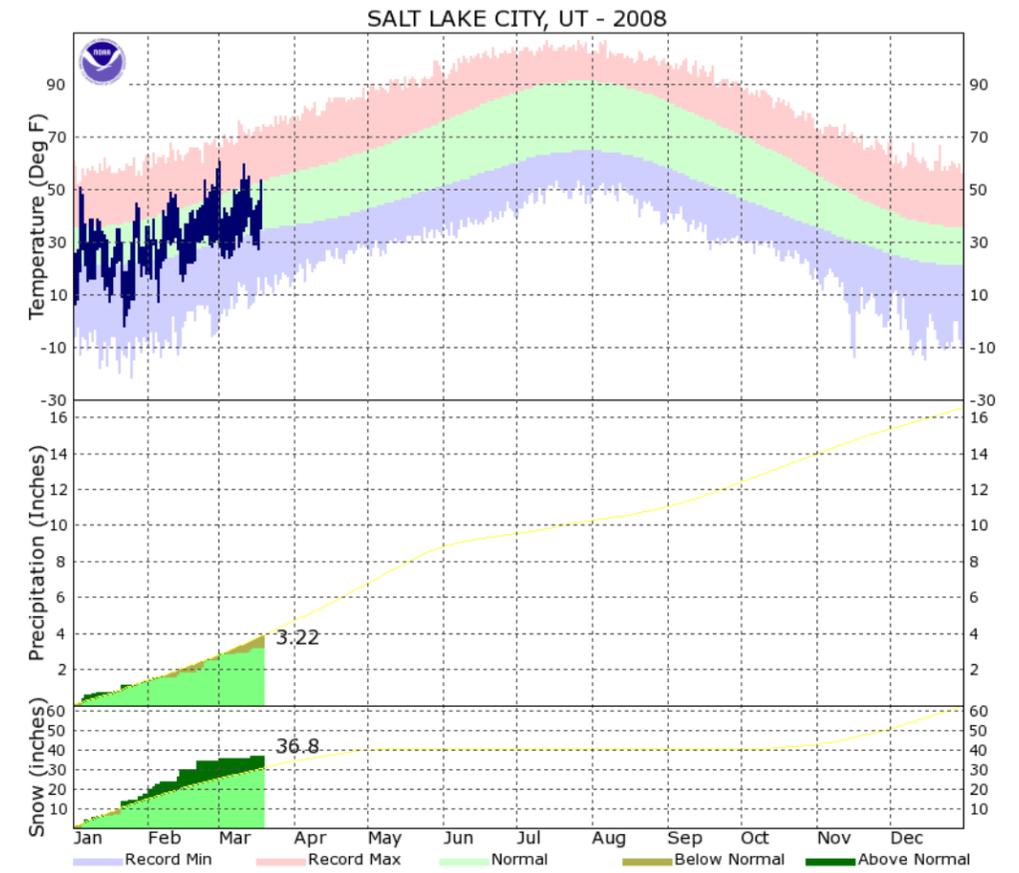
\*total allowable area is 328,482 SF, which is equal to 70% of the 469,260 SF site.

2.2 interdisciplinary research programs and public space

50% of the site above the core level can be used for building footprint. This restriction is to allow for setbacks and open space for the courtyards. 50% of the area allows 234,630 SF for building footprints. The four or five buildings on the upper levels are estimated to be an average of three and a half stories each. This would allow for 821,205 SF of allowable development above grade for the buildings. Please see the potential development numbers for each building below.

	INTERDISCIPLINARY RESEARCH DEVELOPMENT POTENTIAL	GSF
.1	USTAR	146,200
.2	bio-engineering	200,000
.3	information technologies	212,005
.4	bio-medical	223,000
.5	public amenities	40,000
<b>TOTAL GSF</b>		<b>821,205</b>
<b>TOTAL ALLOWABLE AREA</b>		
	land area	469,260
	minus 40% open space	187,704
	minus 10% setbacks and utilities	46,926
	footprint for development	234,630
	multiply average 3.5 floors	3.5
	available development area above grade	821,205
	minus USTAR building	146,200
	available SF for future development	<b>675,005</b>



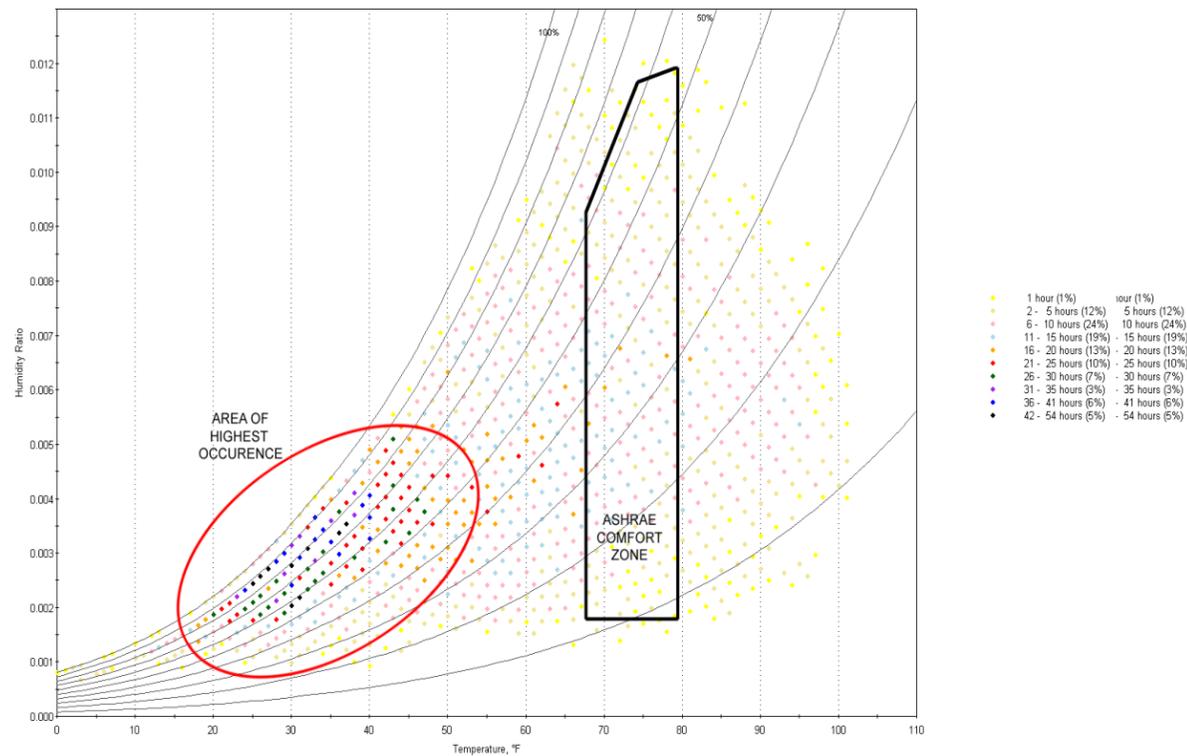


## EXISTING SITE ANALYSIS

### 3.1 climate

A general analysis based on the 30 year annual averages of Salt Lake City is summarized herein for reference. All temperatures given are in degrees Fahrenheit and are based on data from NOAA. The climate of Salt Lake City is semi-arid and offers an average of 226 days per annum of sunny or partially sunny sky. All building and site development should be sensitive to this semi-arid condition typified by low annual rainfall, dry hot summers and cold mountain winters. As each of the parts of the site is developed, a thorough climatic analysis should be performed to optimize the sustainable climatic response strategies available to each site.

Psychrometric Chart (Hourly Frequency)  
Salt Lake City, Utah



## Weather

Weather in Salt Lake is highly variable, with large temperature swings possible diurnally and annually. Winter average highs are in the 30's with average lows around 20. However, this can vary widely with highs in the 50's and even 60's possible and with lows potentially dipping to -20. Because of this variability and the dry air, temperatures plotted on a psychrometric chart during winter reveal that increasing dry bulb temperature (via passive solar in a building or direct access to the sun) in conjunction with thermal mass to store this energy during the cold nights, will increase comfort and reduce energy consumption. Summer average highs are around 90, with average lows in the 60's. Extreme conditions can push the highs over 105 and down as low as the 40's. When viewed on a psychrometric chart, we find time with temperatures in the comfort zone, as well as above and below it (on the dry bulb scale). Hence, solar orientation is very important in the Quadrangle development to avoid overheating of buildings. Proper solar control is also important to help regulate sun when and where it is wanted.

While relatively little rain falls in Salt Lake City with an annual average of 16 inches, it can fall in heavy downpours, especially during thunderstorms in summer. This water should be collected and used to both reduce potable water use in this dry climate as well as to reduce or eliminate storm water runoff that can cause excessive erosion and overburden the city storm sewer which is already nearing current capacity. Refer to open space infrastructure in section 4 for additional discussion of storm water.

## Wind

Wind harvesting will likely not be a primary strategy for energy use reduction in Salt Lake City, as the wind is neither consistently strong nor uniform in direction. The abundance of sun offers daylighting with proper controls as another energy savings strategy.

Building orientation to maximize the advantage of sun in the winter and control it during the summer is important. As the site does not allow for optimized orientation for all of the development (some building will end up on the west edge), attention should be paid to secondary strategies to address the climate and take advantage of its opportunities for energy use reduction. Building orientation and other energy saving strategies are discussed further in the sustainability section of part 4.

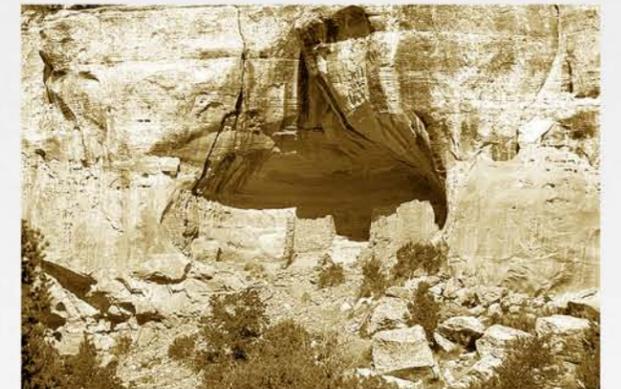
## THE ANASAZI, THE UTE, THE SETTLERS

### 3.2 architectural history

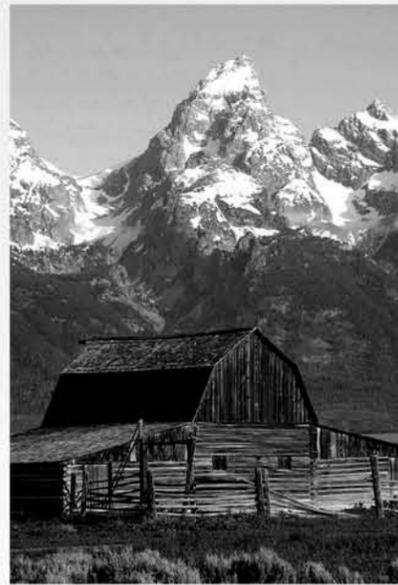
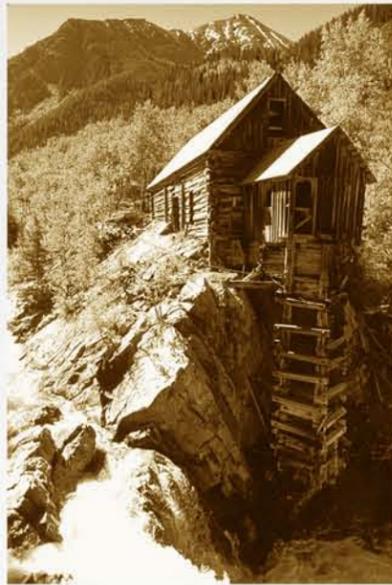
While a full survey of the history of building and design in Utah and the inner-mountain west would constitute its own dedicated study and is thus beyond the scope of this Master Plan, below are several examples of building in this region that are responsive to the climate, sun and site, as well as offering possible suggestions for local feel and materials.

The ancient Anasazi peoples lived throughout the desert southwest. Of great interest are the cliff dwellings they left behind. Masonry buildings built directly into openings in the sides of canyon walls, these villages were built deep into the southern facades of cliffs. Here, they were protected from the harsh summer sun and exposed to the warmth of the winter sun when it was needed. Also of note is the variable use of geometry in the buildings, frequently using circles as the basis for ceremonial spaces. The Anasazi disappeared around 1000AD.

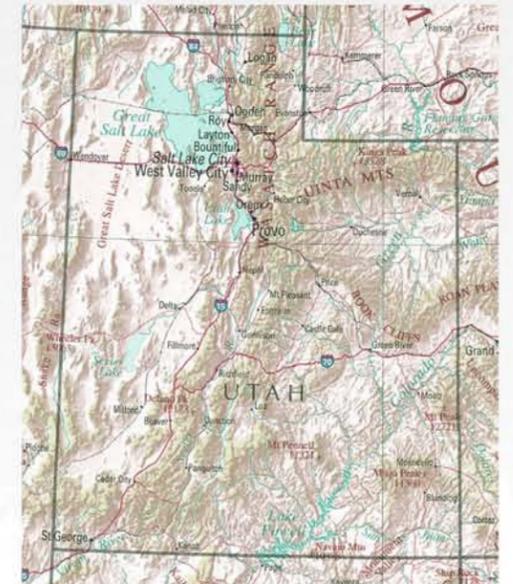
Utah was the home to many nomadic tribes who did not build permanent settlements, but lived off of the land following game throughout what is now the western United States. Primary of these tribes in Utah were the Ute, for whom the state is named.



As the United States expanded westward and precious metals were discovered throughout the west in the nineteenth century, mines and ranches were established. These buildings were utilitarian, but frequently yielded to unusual or extreme site conditions resulting in unique and responsive building.



In addition to those seeking fortune, many people fled to Utah to avoid religious persecution. The Church of Jesus Christ of Latter-day Saints and its leaders established Salt Lake City and constructed Temple Square in the nineteenth century, offering a new look to the built environment that survives today. These structures relied heavily on the use of highly skilled stone mason immigrants, establishing this tradition in Utah.



### EXISTING CONDITIONS

#### 3.3 slope

The site generally slopes from north-east to south-west. The cross-slopes on the site are relatively flat. The slopes along the pedestrian corridor vary, but when averaged along the its length the slope along the southern portion of the corridor adjacent to the site is between 5%-6%, and the northern portion is between 6%-8%.



existing slopes

3.4 existing trees

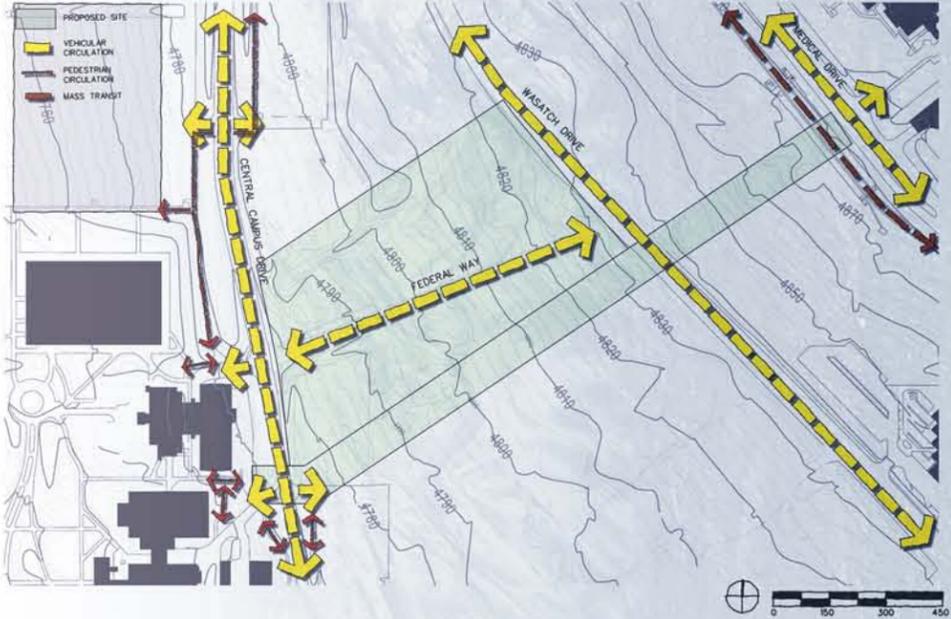
The site has existing trees along the roadways on the western and eastern boundaries, and through the middle of the site. There are also significant existing trees in what will be the pedestrian corridor that should be preserved as much as possible in the design of this feature.

3.5 pedestrian and vehicular circulation

The site is bounded on the west by Central Campus Drive, on the east by Wasatch Drive, and is transected by Federal Way. Pedestrian circulation is currently limited to a few walkways from parking areas to adjacent buildings. Mass transportation to the site is provided at the TRAX station at the eastern end of the pedestrian corridor.



existing trees

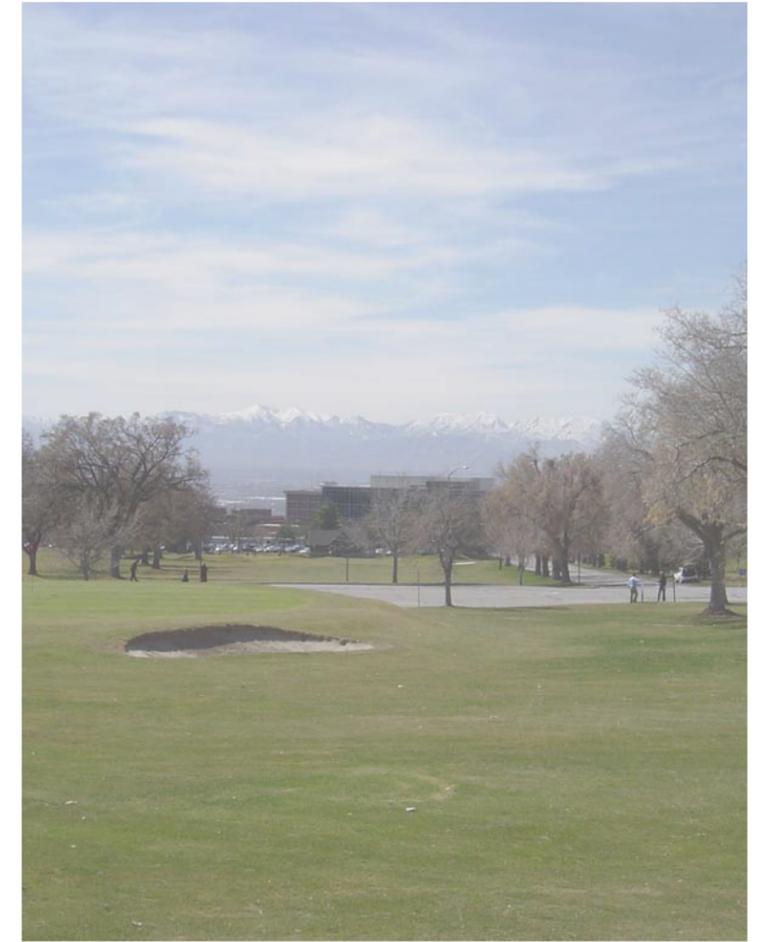


existing circulation

# .quad

## 04

c o n c e p t s



## QUADRANGLE MANIFESTATION

### 4.1 **concepts**

The Interdisciplinary Quadrangle will create a setting in which researchers from a broad range of disciplines will collaborate. To accomplish this goal, this master plan conceives the Quadrangle as a set of interlocking buildings that form a series of overlapping exterior courtyards serving as a connecting pathway through the site. The courtyards will vary in size, elevation and landscape treatment offering a variety of experiences and opportunities for exchange between researchers while the buildings will maintain a consistency of scale and detail to provide overall unity.

## 4.2 intent

Reinforcing this overall concept of the Quadrangle is a set of guiding themes that should always be at work. These themes include: sensitivity to context, the encouragement of resident interaction, the maintenance of a sense of unity, an attention to the human scale, a naturalistic or informal articulation of space and form, a sensitivity and reflection of the local character, the provision for functional flexibility and the framing of views to the surrounding landscape. Each of these themes should be considered in the design of the Quadrangle and are discussed further below.

### sensitivity to context

The Interdisciplinary Quadrangle will be set within the context of the University of Utah campus, the City of Salt Lake and the State of Utah. The complexity of this situation should be considered in making decisions and the overriding intention should be to develop continuity between existing and new conditions. The initial phase of development, the USTAR Building, should acknowledge the existing buildings and landscape while each following phase should take into consideration the precedents set by the preceding phase. Building massing, spatial organization, architectural detailing, building materials, site and building circulation and landscape development, while offering variety, should continue or relate to the preceding phases.

### interaction

One of the most distinguishing characteristics of the Quadrangle is its interdisciplinary nature. It is intended that researchers from a wide range of disciplines will be brought together to share their work and collaborate. Every effort should be made to create buildings and exterior spaces that support researcher interaction and thereby the exchange of ideas. One possible way to accomplish this is by including strategically located areas of transparency in the buildings allowing residents to connect with each other visually to see how each other work and possibly to invite conversation. Additionally, all buildings should be inviting with the intent of encouraging occupants from adjacent buildings to enter and interact with their colleagues. The buildings should also be welcoming to the public.

### sense of unity

While the Interdisciplinary Quadrangle will be composed of a variety of buildings constructed over an extended period of time with similar but distinct purposes, it is essential that they are understood as belonging to one unified complex. Each building could have its own identity, but there should still be an overall identity to the Quadrangle. One required method to accomplish this is a continuous covered walkway to connect all buildings thus giving a recognizable identity to the quad without overly restricting the buildings in the future.

### human scale

The buildings and open spaces in the Interdisciplinary Quadrangle should have a scale appropriate to the people

inhabiting them. This is particularly important at the ground level and at the entries: the areas where the residents are most likely to experience the buildings at close range. This sense of scale could be accomplished with the manipulation of building massing, the size and proportion of spaces, the articulation of the ground plane, the selection of materials and the choice of details.

### informal configuration

The researchers working in the Quadrangle typically carry out their research through a rigorous and highly structured working process. The forms of the landscape and buildings should help to provide a break from this rigor and a place to escape to relax between tasks. To provide this change of environment the design of exterior open space should include informal and casual settings.

### local character

The City of Salt Lake, the University of Utah campus and the Interdisciplinary Quadrangle site are located in a beautiful landscape characterized by the surrounding mountains and extended valley. Out of this particular landscape and the people who have inhabited it, a local character has developed. It should be the intent of the Quadrangle designers to discover this character and to reflect it in the Quadrangle's development. This character should include the use of local building materials and construction techniques, attention to climatic conditions, the use of plant types naturally found in the area or consistent with the conditions of the area, as well as formal solutions reflecting the character of the place. The Quadrangle should utilize cultural and indigenous reference to create an environment specific to this region and its history.

### flexibility

It is intended that the Interdisciplinary Quadrangle will likely be made up of four research buildings. The programs for these proposed buildings are generally stated in the program section of this document but they are likely to change over time as the University's needs change. Likewise, even after the buildings are constructed, researcher's needs continue to develop. Flexibility should always be kept in mind to allow buildings and exterior spaces to evolve to match changing research and University requirements.

### views to landscape

The Interdisciplinary Quadrangle is set in an environment of exceptional manmade and natural beauty. To the east, north and south are the mountains, while to the west is a view of the valley and downtown Salt Lake City. Beyond the city, in the distance, lies another mountain range. These views are one of the most striking features of this site and the buildings and the open spaces should take advantage of these unique views out to the landscape and the city. These views will symbolize the particular character of life as a researcher at the University of Utah and offer a unique tool for recruitment of world class researchers.

### 4.3 guidelines

#### site coverage

The area covered by buildings is one of the main factors in determining the overall density of a site. The greater the amount of site coverage allowed, the greater the potential building mass or density. One of the primary considerations for determining the allowable density on this site is the quantity of square footage envisioned for the Interdisciplinary Quadrangle. Developing a density related to the planned density of neighboring sites is important. Also of concern is the desire to maintain a density that is scaled for the residents. Taking these requirements into consideration the site coverage of the buildings should not exceed 50% of the total site. This allowance is consistent with the Campus Master Plan.

#### building setbacks

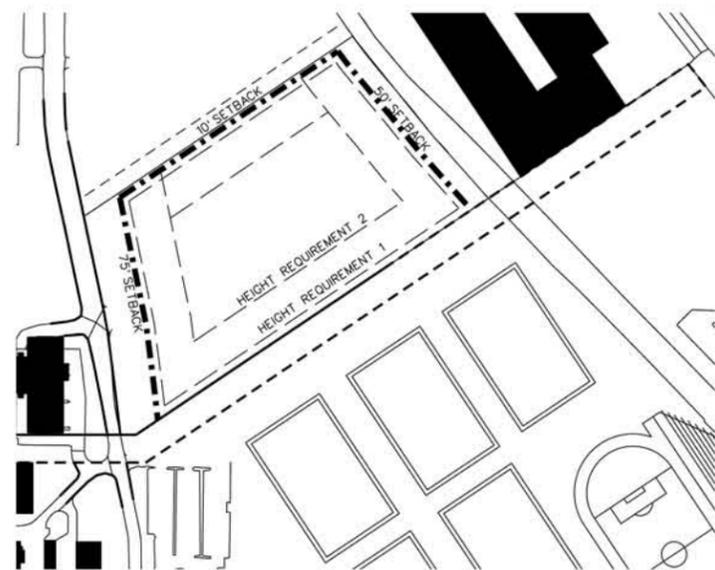
Setbacks play an important role in the character of a site and the buildings that may be built along them. One of the starting points for determining these setbacks is the Campus Master Plan which outlines several general intentions along with specific requirements for the Interdisciplinary Quadrangle site. The Campus Master Plan foresees the creation of a pedestrian corridor along the southern border of the site which would connect the Interdisciplinary Quadrangle to the Health Sciences Campus and Main Campus. To define this pedestrian walkway the Campus Master Plan requires that the southern boundary of the site have a significant continuity of building. Likewise, the eastern edge of the site along Wasatch Drive is identified as a pedestrian zone with similar definition. Along the western border a setback is required to allow for a bioswale, while the northern side is set appropriately for site service entries. The following setbacks are meant to be consistent with these Campus Master Plan guidelines while taking into consideration the goals generated internally by the Interdisciplinary Quadrangle.

Setbacks along the south edge of the site along the pedestrian corridor shall encourage pedestrian passage into the interior courtyards of the Quadrangle while maintaining a well defined edge to form a clear pedestrian pathway. To accomplish this, at least 50% of the length of the southern site boundary should have no building setback.

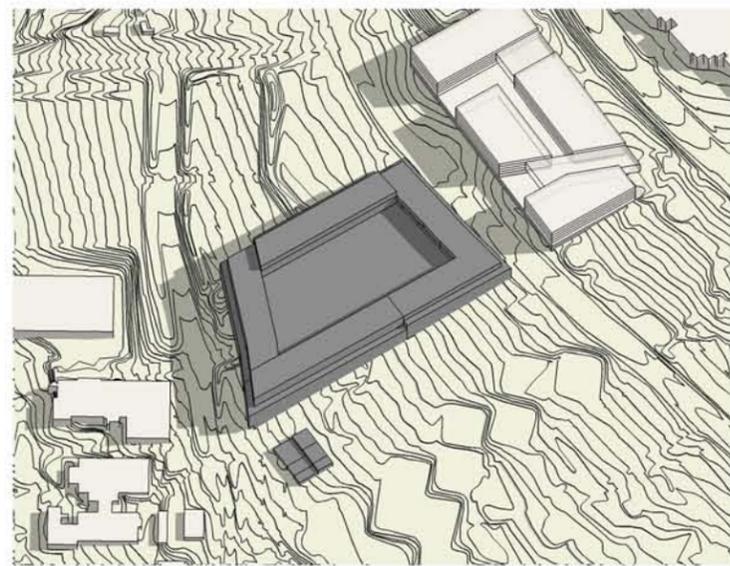
Setbacks along the western edge of the site shall provide space for a bioswale to collect runoff from this site as well as to allow runoff from the green space to the north to be transmitted to collection areas south of the Quadrangle. A building overhang should be allowed within this setback to provide shade on the western building edge, while allowing the bioswale at the ground level. At the ground level a setback of 75 feet should be observed along this western boundary. However, 20 feet above the grade, the setback should be reduce to 55 feet.

Setbacks along the northern edge of the site shall allow pedestrian traffic along the service street and encourage pedestrian passage into the interior courtyards of the Quadangle while maintaining service accessibility. To accomplish this, a 10 foot setback should be established. The setback shall include a 5 foot wide street tree planting zone adjacent to the street and a 5 foot wide sidewalk. At least 60 percent of this setback edge should be defined by building.

Setbacks along the eastern edge shall encourage pedestrian traffic along Wasatch Drive. A 50 foot setback should be observed. This setback should include a 5 foot wide street tree planting zone adjacent to the street and a 10 foot wide sidewalk.



building setback diagram



zoning block diagram

### building height

Building heights have been set considering the overall developed area proposed for the site, the requirement that the mass of the Quadrangle buildings be compatible with existing and proposed adjacent buildings and the goal of maintaining human scaled buildings.

Buildings along the southern boundary and within 110 feet of the southern boundary will be divided into a western section (1/2 to 2/3 of the boundary) and an eastern section (1/2 to 1/3 of the boundary) for height maximums. Consideration for the human scale as the site slopes down is the driver for the height shift. The eastern section of the southern boundary should not exceed 80 feet above the mean courtyard elevation. Buildings within this zone and 20 feet north of the southern boundary may increase their height by a maximum of 25 additional feet. The western section of the southern boundary should not exceed 60 feet above the mean courtyard elevation. 20 feet east from the western site boundary buildings may increase their height maximum by 45 feet.

Buildings between the western site setback and within 110 feet of the western setback should not exceed 60 feet above the mean courtyard elevation. Building within this zone and 20 feet east from the western site setback may increase their height an additional by 45 feet.

Buildings between the northern site boundary and within 110 feet of the northern boundary should not exceed 95 feet above the mean courtyard elevation. Buildings within this zone and 20 feet south of the northern boundary may increase their height an additional of 25 feet.

Buildings between the eastern site setback and within 160 feet of the eastern setback should not exceed 65 feet above the mean courtyard elevation. Buildings within this zone and 20 feet west of the eastern site setback may increase their height an additional of 25 feet.

Buildings located 110 feet north of the southern boundary, 110 feet south of the northern boundary, 110 feet east of the western setback and west of the middle of the site should not exceed 60 feet above the mean courtyard elevation.

# quad

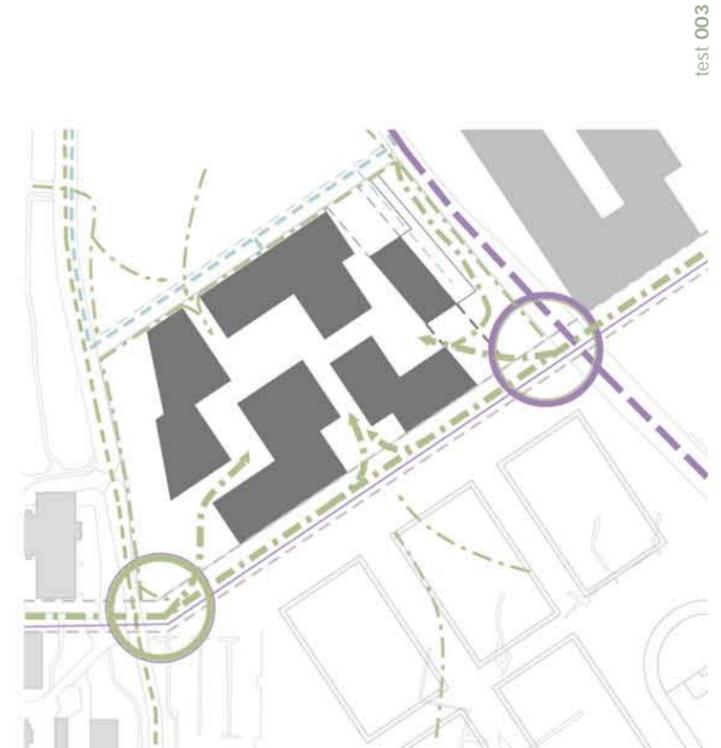
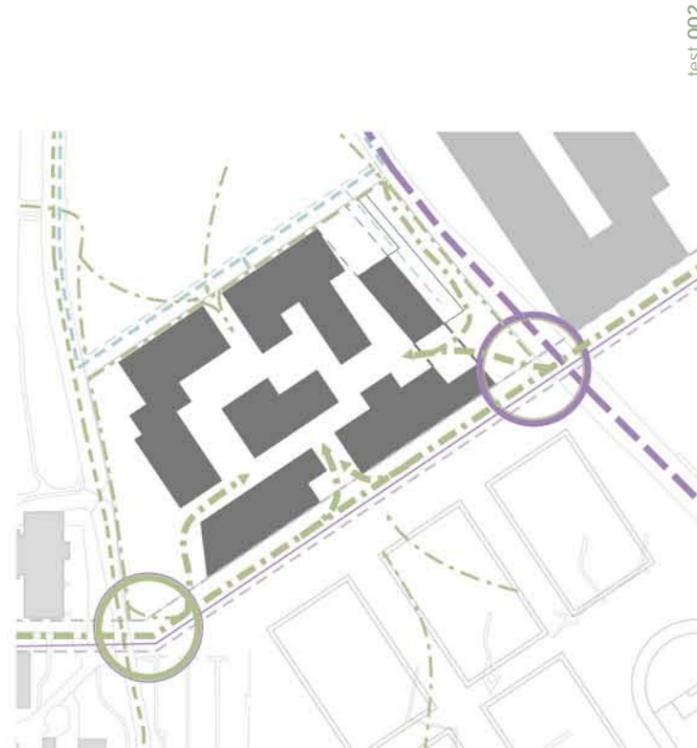
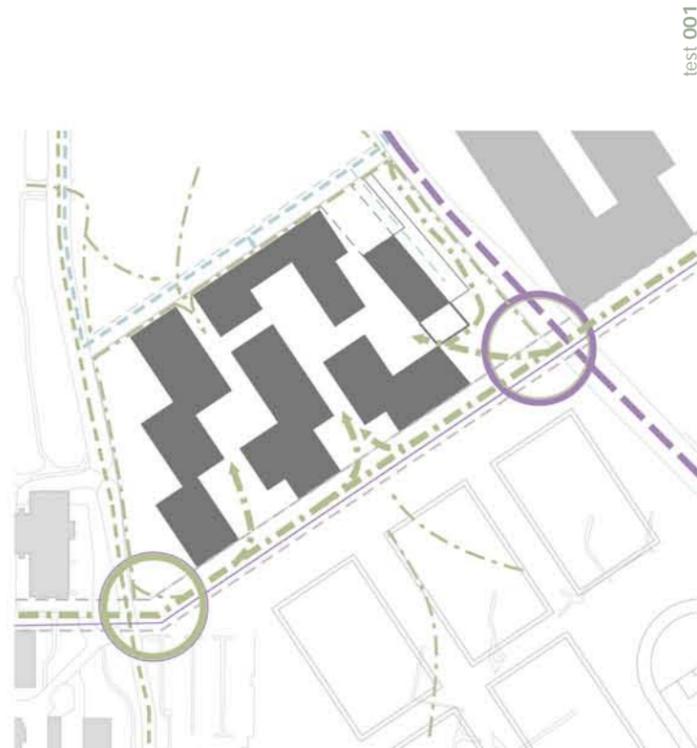
04

### site entries

The development of entries to the site should take into consideration vehicular access, pedestrian movement, service requirements and parking provisions. The Campus Master Plan sets the framework for these requirements creating a pedestrian corridor along the entire southern edge of the site and a service road at the northern boundary. It is acknowledged that Wasatch Drive is the main public street bordering the site with connections to other major arteries of the city, while Central Campus Drive allows access to the internal parts of the campus. Both of these streets would give vehicular access to the site. The guidelines below were developed within this context.

The corner of Wasatch Drive and the pedestrian corridor should be defined as one of the primary entries into the Quadrangle. The corner should be designed to invite pedestrians from the Health Sciences Campus and the TRAX station as well as visitors arriving to the Quadrangle by car who might park along Wasatch Drive. This entry should be no more that 200' from the southeast corner of the site and should be provided in the form of entry courtyard of at least 5,000 square feet.

The corner of Central Campus Drive and the pedestrian corridor should be defined as another primary entry into the Quadrangle. The corner should be designed to invite pedestrians from Main Campus to the west or visitors who could park in lots along Central Campus Drive. This entry should be no more that 200' from the southwest corner of the site and should be provided in the form of entry courtyard of at least 5,000 square feet.



Between the primary entries at the southwest and southeast corners, a third entry from the pedestrian corridor into the Quadrangle should be provided. The entry should be provided in the form of entry courtyard of at least 5,000 square feet.

A minimum of one entry into the Quadrangle should be maintained along the northern boundary. It should accommodate pedestrian traffic from the green fields to the north as well as pedestrians arriving from Main Campus to the west and from the Health Sciences Campus to the east.

Two service entries into the Quadrangle are anticipated. One service entry would be located at the northeast edge of the site to accommodate the Nanofabrication building's above grade service requirement. In addition, a general Quadrangle service entry would be located along the north boundary providing access to the underground service level.

Parking will be located under the main courtyard at the service level. Entry to this parking should be located on the north boundary. Consult section 4.3.14 Parking for further parking entry requirements.

#### building entries

Entries to buildings should be integrated with site entries creating a smooth transition from outside the site to inside the buildings. When considering this integration, special consideration should be given to orienting primary entries so that they relate to the pedestrian corridor. Entries should be inviting, easily accessed and located to activate the courtyards. Likewise, the position of building entries should also facilitate

movement between buildings.

Buildings located on the corner of Wasatch Drive and the pedestrian corridor should either have their primary entry on this corner or provide an entry into an interior courtyard of the Quadrangle from which the buildings would be entered.

Buildings located on the corner of Central Campus Drive and the pedestrian corridor should either have their primary entry on this corner or provide an entry into an interior courtyard of the Quadrangle from which the buildings would be entered.

Buildings located on the northern edge of the site should have their primary entries on courtyards interior to the Quadrangle.

To encourage activity within the Quadrangle's courtyards, buildings should have their secondary entries on courtyards interior to the Quadrangle.

Building's entries should be located adjacent to each other to allow easy passage between buildings.

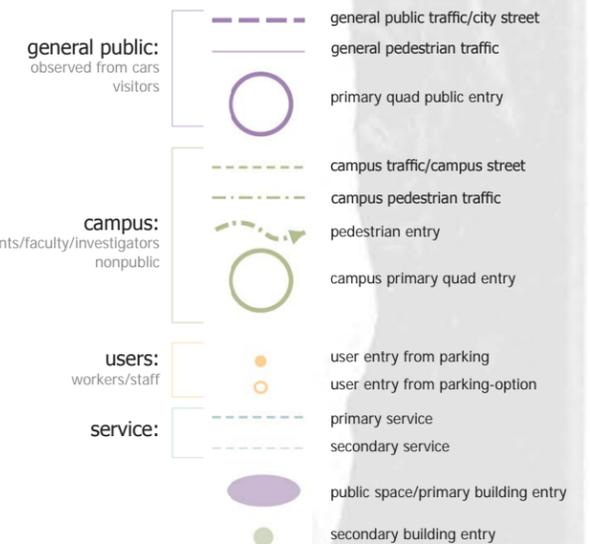
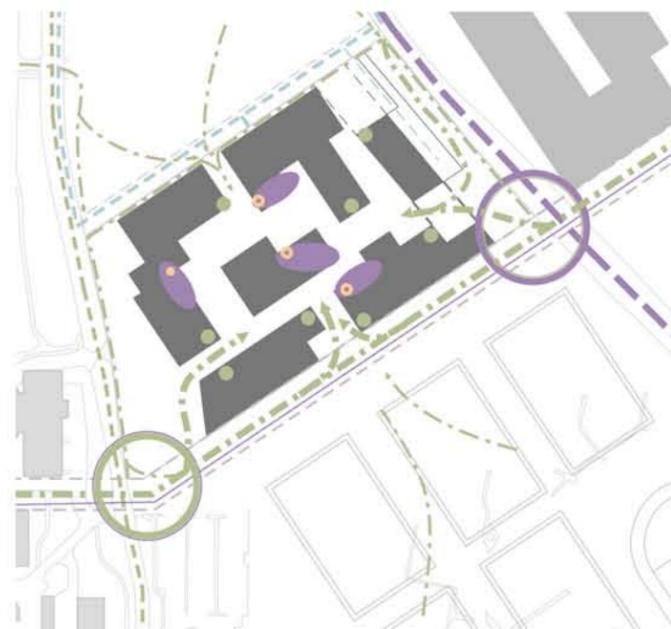
Each major building should have its own separate entry from the parking level. While these entries should be located inside the building they should be adjacent to exterior courtyards allowing for easy access to these spaces.

One of the goals of the Quadrangle is to encourage interaction between users in the buildings. This should be encouraged by having the entrances to the buildings clearly located and inviting. The entrances should be recognizable from multiple locations in the courtyards or the pedestrian corridor. The detail around the entrances should relate to the human scale.

test 001

test 002

test 003



# Quadrangle

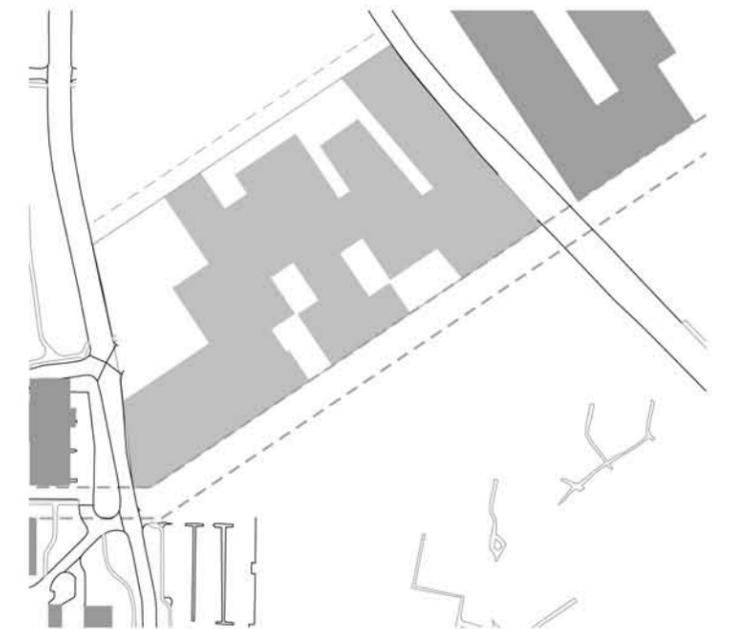
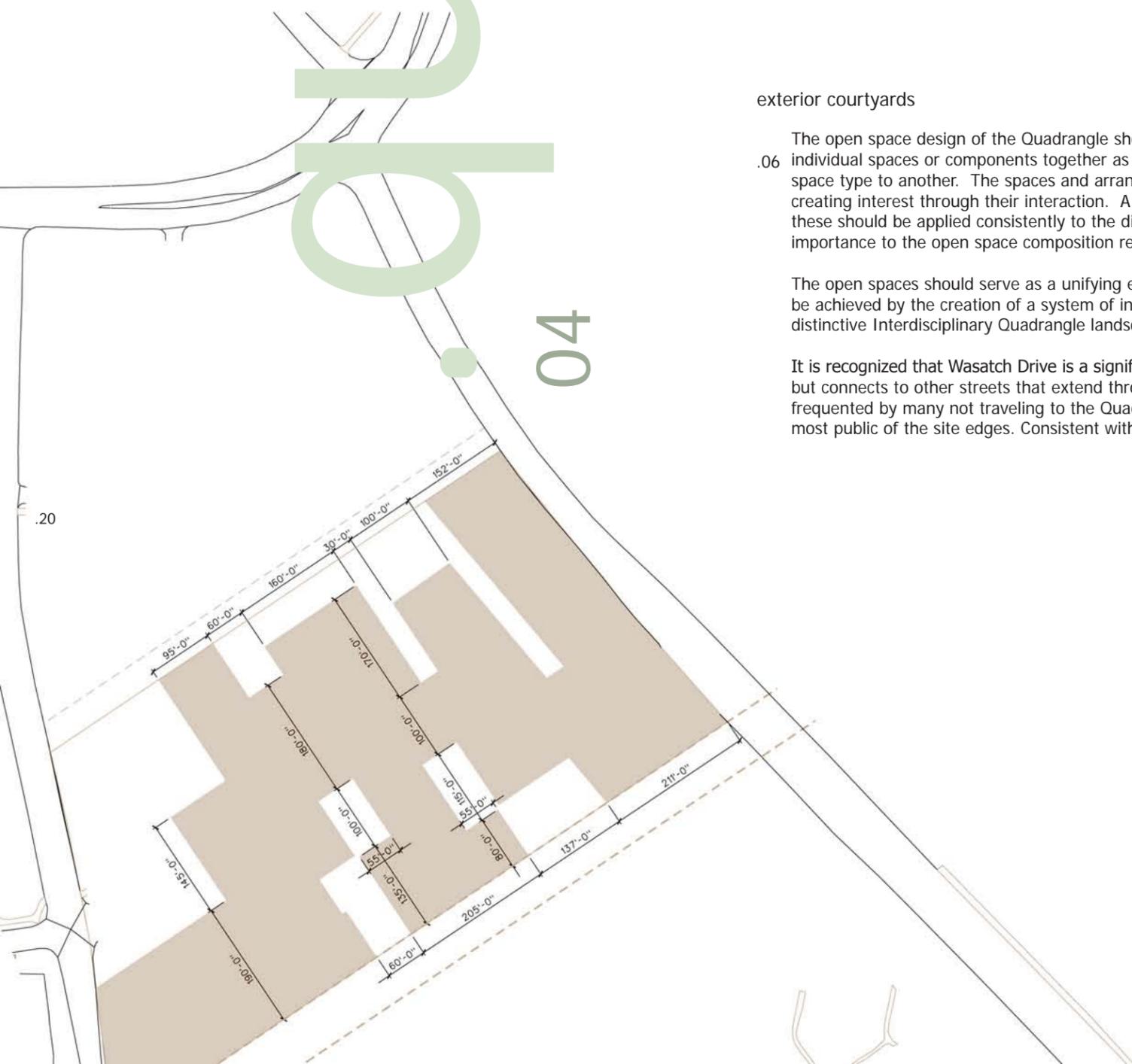
04

## exterior courtyards

.06 The open space design of the Quadrangle should be considered as an overall system or network, and should have characteristics that link the individual spaces or components together as a whole. Spaces should be interconnected, where there is a clear overlap and connection from one space type to another. The spaces and arrangement of program within the open space system should be layered one upon the next, thereby creating interest through their interaction. A diversity of scales and characters should be employed, corresponding to the use of the space, and these should be applied consistently to the different space types. The sequencing of spaces and their movement through the site is of primary importance to the open space composition reading as a whole.

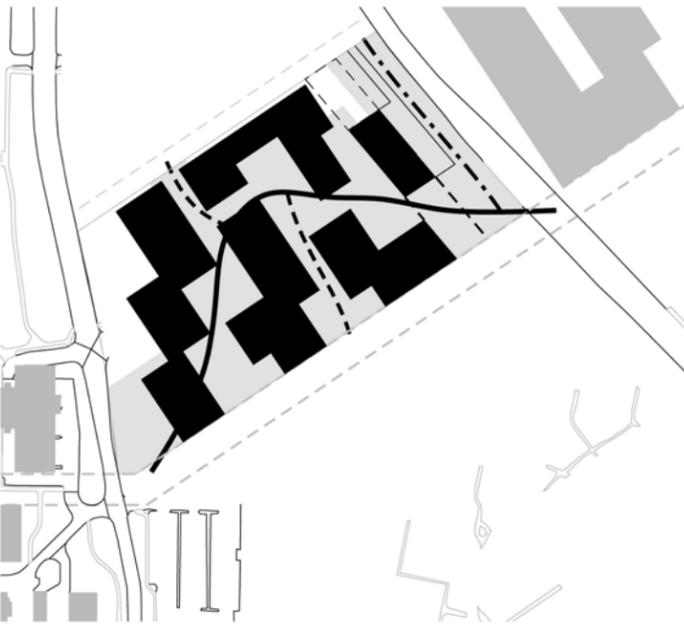
The open spaces should serve as a unifying element that integrates the University's Main Campus with the Health Sciences Campus. This unity can be achieved by the creation of a system of interconnected landscapes that references both environments while simultaneously creating a new and distinctive Interdisciplinary Quadrangle landscape.

It is recognized that Wasatch Drive is a significant street within the University Campus because it not only connects various parts of the campus but connects to other streets that extend throughout Salt Lake City. It is the street by which most people will reach the Quadrangle and will be frequented by many not traveling to the Quadrangle. As such, the eastern side of the site bordered by Wasatch Drive may be considered as the most public of the site edges. Consistent with this observation, it is recommended that a signature exterior court be developed within the 50 foot

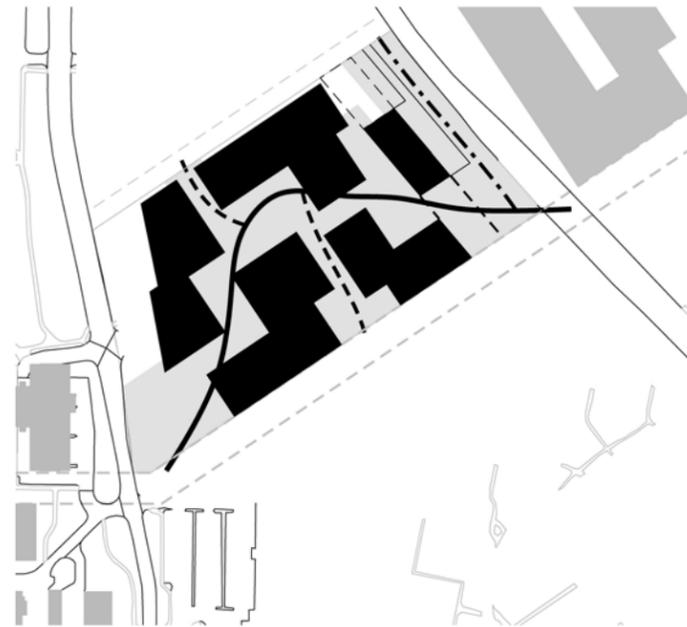




002 open space connection intent diagram



003 test 1



004 test 2

setback required along Wasatch Drive. This signature entry court should use landscaping and site artwork to establish an identifiable image to create the public face of the Interdisciplinary Quadrangle.

Exterior space not reserved for the bioswale along the western site edge or allocated for building service courts should be developed as exterior courtyards set aside for the occupants of the buildings and visitors.

A mean elevation for all courtyards should be established by identifying the existing mean site elevation along the southern buildable site boundary. Courtyards throughout the site should vary but only by 4 feet plus or minus from the mean courtyard elevation.

Courtyards should be configured and linked such that a pedestrian may pass from one courtyard to the next moving from a primary Quadrangle entry courtyard at the southeast corner of the site to a second primary entry courtyard at the southwest corner of the site. There shall be at least three linking courtyards, all of which will be a minimum of 7500 square feet.

Courtyards should be organized such that no direct line of sight is provided between the green space to the north of the Quadrangle and the green space to the south of the

Quadrangle. However, the arrangement of the courtyards should provide a path of access through the Quadrangle to these adjacent green spaces.

No courtyard defined by buildings should be larger than 220 feet in width in one direction or 110 feet in the opposite width.

Exterior courtyards and surrounding buildings should be configured such that ten percent of the courtyard floor receives sunlight at midday on the winter solstice.

Within the open spaces, deciduous trees should constitute the majority of canopy trees. This will allow for shade in summer while allowing sunlight to reach the ground in winter, as well as giving the Quadrangle the expected "campus" look. Evergreen trees should be used much more sparingly, so that openness and transparency throughout the Quadrangle are maintained for wayfinding as well as security purposes. Unique microclimates of each area should be considered carefully in specific planting designs. For example, adjusting plant palettes in areas near glass building walls because they may reflect more heat to the landscape.

Open space hardscape materials should be representative of the cultural context of this area and the intermountain west region in general. When appropriate and possible, preference should be given to materials that are locally available or manufactured. The intent of the hardscape character is to invoke a sense of place appropriate to the intermountain west and its history.

# .quad

04

t y p o l o g i e s

## open space typologies

.07 **Intent:** The largest component of the open space program is the public space. These areas are intended as major gathering areas for building users and visitors, and as spaces for civic events and activities associated with the Interdisciplinary quadrangle. These areas may be signature plazas, areas for the celebration of events, or quadrangle identification.

Exterior spaces located at major quadrangle access points should be treated as public space.

Public spaces should have a grand, open feel. In general, people perceive spaces with a dimension of seventy to eighty feet in one direction as public in scale. Thus, all spaces that are to be used as large, public gathering and celebration spaces should have a minimum dimension of seventy feet at their narrowest location.

Public spaces are intended to handle larger crowds and events and to provide easy access for those uses. Thus, all hardscape and landscape in public spaces should be simple and direct. The ground plane should be kept open for safety concerns as well as to allow easy access. In public





spaces no planting should be allowed from three feet above relative grade to the tree canopy.

Canopy trees and formal landscape components should be used to frame spaces and views, as well as to provide wayfinding and circulation direction in public spaces.

Public spaces should provide for a range of activities and uses, including a mix of hard paved areas, soft paved areas, and low landscape areas. Although the intent is for public spaces to be larger, in no case should an entire public space area be treated with one ground plane material.

Public spaces should be iconic, and should have site elements that provide branding for the Interdisciplinary Quadrangle and the University. Art pieces, towers, water features, lighting, signature grade change components such as walls and stairs, and gateway elements should be used to create the character of the Quadrangle.

Public spaces should provide room for outdoor gatherings even when the weather may be inclement. Thus, there should be an area in each public space large enough to accommodate a tent. Typically this size is 40 feet by 60 feet with a surrounding ten foot clear zone.

Planting in public spaces should be simple and iconic. Deciduous, tall canopy trees that will provide shade in spring and summer and will allow the warming sun to come through in late fall and winter should be used as well as trees that are large enough at planting to have a clear canopy of ten to twelve feet to maintain openness should be used. Ground plane planting should be kept low so that views across the public space are maintained. They should consist of native or Utah-friendly low shrubs and groundcovers or turf areas.



# .quad

04

t y p o l o g i e s

## sanctuary

.08 Sanctuary spaces are intended to be the more private, intimately scaled spaces that offer a place for individuals and small groups to meet and interact. These spaces should be smaller in scale than public spaces, and are intended for more informal use. Sanctuary spaces may take the form of courtyards, gardens, or outdoor break-out space.

Sanctuary spaces are intended to be smaller in scale than public spaces, to promote a more intimate feeling of space. In general, people perceive spaces with a dimension of 40 feet or less as intimate in scale. Therefore, all sanctuary spaces should have a maximum dimension of 40 feet in any direction.

Sanctuary spaces are intended to be places that users will gather and linger in for longer periods of time, as well as being spaces for contemplation. Thus, sanctuary spaces should have a rich palette of materials and finishes that can be appreciated in a more intimate setting.

Sanctuary spaces should have a rich variety and intricate layout of plant material. This includes specimen flowering and small evergreen trees and greater development of shrub and groundcover plantings than other spaces in the Quadrangle.

Sanctuary spaces should be garden-like in character. These spaces should be considered primary locations for memorials, donor recognition, or special acknowledgements.

Sanctuary spaces should be located throughout the Quadrangle, as well as at secondary building entries. These spaces should take design cues from the architecture of the adjacent buildings. Paving, walls, lighting, and furnishings should be consistent with and relocate to the adjacent buildings.

Sanctuary spaces are a good area to bring together indoor and outdoor spaces, especially where they can be adjacent to small gathering spaces within the buildings. To foster a feeling of connectedness with nature, wherever sanctuary spaces are located near an internal gathering area in the building, the building wall should include transparent areas and the ground plane material should be allowed to flow between the two spaces.

Sanctuary spaces should have low level lighting and accent lighting only.





## greenways and pedestrian corridor

.09 Greenways and the pedestrian corridor are areas for movement, connection and impromptu gathering spots. These spaces are symbolic of the collegiate journey and should have a variety of scales of experiences.

Greenways and the pedestrian corridor should provide for the movement of people and vehicles but should not be bare streets without detail. These spaces should have a level of detail appropriate to the walking speed of pedestrians and should allow for the separate expression of the individual uses.

All circulation corridors should be designed with universal accessibility as a goal, and must have at least one accessible route per corridor.

The pedestrian corridor should have many experiences and spaces along its length to add interest and establish waypoints along the journey.

Where appropriate, individual uses within the pedestrian corridors should be separated into different routes and intertwined with each other to establish hierarchies and create spaces for people in the interstitial areas. The accessible route within the pedestrian corridor should be maintained separately from the wheeled vehicle access to allow for minimal slope on these routes and to reduce the chance of conflicts. The accessible route should be arranged such that no slopes along the route are greater than 4.9%

The courtyards of the Quadrangle should be inviting and open to users of the pedestrian corridor. Thus, any line of separation between the courtyards and the corridor should be setback from the face of building a minimum distance equal to the distance from the face of building to the general edge of pavement along the pedestrian mall. All retaining walls between courtyards and the pedestrian mall should have a maximum height of three feet above grade along their mall frontage. If elevation differences greater than three feet exist at a connection point, a series of retaining walls should step up the slope so that openness and connectivity between courtyards and the pedestrian corridor are maximized.



# .quad

## 04

### open space infrastructure

.10 The open space infrastructure areas are intended to be highly functional in addition to their possible pedestrian enjoyment. These are areas such as bioswales and other stormwater recharge and reuse areas.

The control and treatment of storm water are issues facing most development in urban areas across the country. Storm sewers are being filled beyond capacity, creating floods, erosion and disseminating pollution every time it rains. Control and on site treatment of this water can minimize impact of new development on city infrastructure and the environment.

The open space infrastructure should be treated as an amenity. These spaces should be integrated into the overall design, and should be allowed to function efficiently and naturally in a beautiful and engaging way.

A Bioswale will be used to remove pollutants and provide flood control. Biofiltration swales and strips are vegetated areas that remove pollutants from storm water runoff as it flows through the vegetation. The bio-swale designs are to average 10 to 20 feet wide by 100 feet long. A typical bio-swale provides 30-80% pollutant removal, including decreases in total suspended solids, total phosphorous, total nitrogen, floating trash, heavy metals, biological oxygen demand, bacteria, greases, oils, and turbidity.

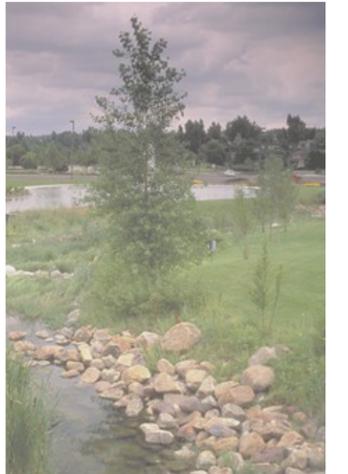
Storm water volumes are to be calculated for 10-year and 100-year storm rates. The volume of water generated for a 10-year storm event is to be retained in bio-swales located at the west edge of the Quadrangle or captured in cisterns at the buildings. Storm water generated from the 100-year event is to have a safe path of travel through the site.

The stormwater treatment and bioswale areas should be designed as landscape features which have interest during both wet and dry periods.

Stormwater runoff that is not directed to a cistern, or water that overflows once the cistern fills, should be directed to a natural recharge system or bioswale. This bioswale can take many forms, but it should serve to clean the water and allow the water to be absorbed into the ground or move to a large infiltration area. The goal is for all water that falls on the Quadrangle site to infiltrate naturally or to be stored for reuse and later infiltration. This system should tie into the overall campus aquifer recharge system or bioswale.

Stormwater should be collected in cisterns for irrigation and other use at each building site. Cistern overflow should be directed to the bioswale.

The bioswale along Central Campus drive should have a mix of natural forms as well as architectural fountain forms where it interacts with the buildings and courtyards of the Quadrangle. The bioswale within the pedestrian corridor should have a natural aesthetic.



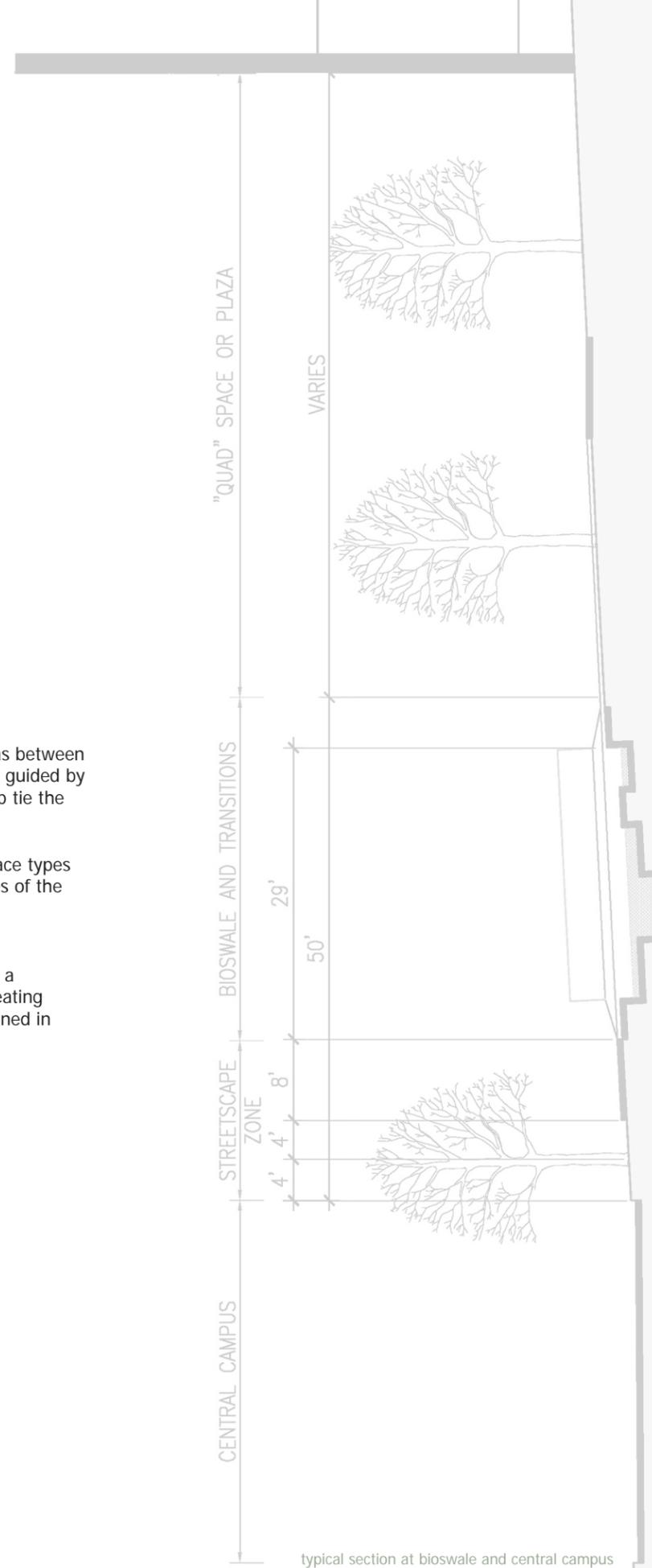


interstitial areas

.11 These areas are the connecting landscapes and areas between spatial types. The creation of these areas should be guided by the Campus Master Plan landscape guidelines to help tie the Quadrangle into the campus as a whole.

Interstitial areas should help connect the various space types in the Quadrangle, following the landscape guidelines of the Campus Master Plan.

The streetscapes adjacent to the Quadrangle should be pedestrian friendly, incorporating wide sidewalks, a regular pattern of trees and lights, and occasional seating opportunities. All of these elements should be designed in compliance with the Campus Master Plan.



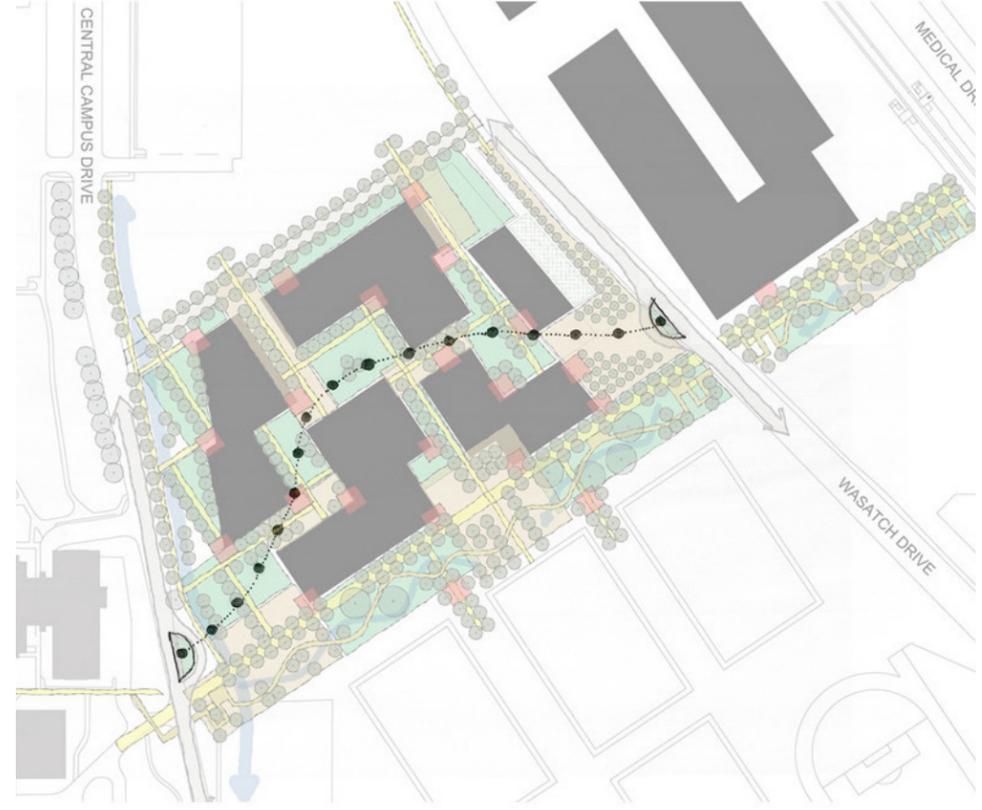
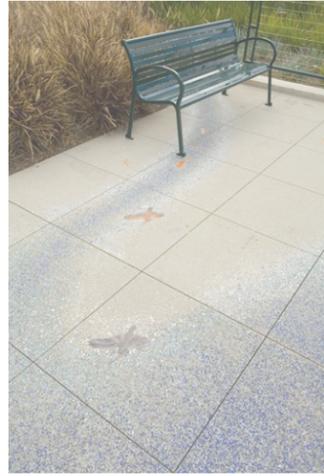
# .quad

## 04

### connecting paths

- .12 Similar to the covered walkways, a delineated path connecting adjacent open spaces will offer orientation as well as unifying character to the Quadrangle. The path will take a physical form and give the Interdisciplinary Quadrangle a unique identity. This concept could take the shape of a line that loosely runs from the southeastern entrance to the Interdisciplinary Quadrangle, weaving through the site's open spaces, and ending at the southwestern entrance to the Interdisciplinary Quadrangle. This line could be interpreted in a variety of forms, with the goal of providing a, unifying site element that connects all of the spatial types within the Interdisciplinary Quadrangle. The path's physical form could materialize in many ways, such as a continuous unique paving element or a series of vertical elements along a line through the Interdisciplinary Quadrangle.

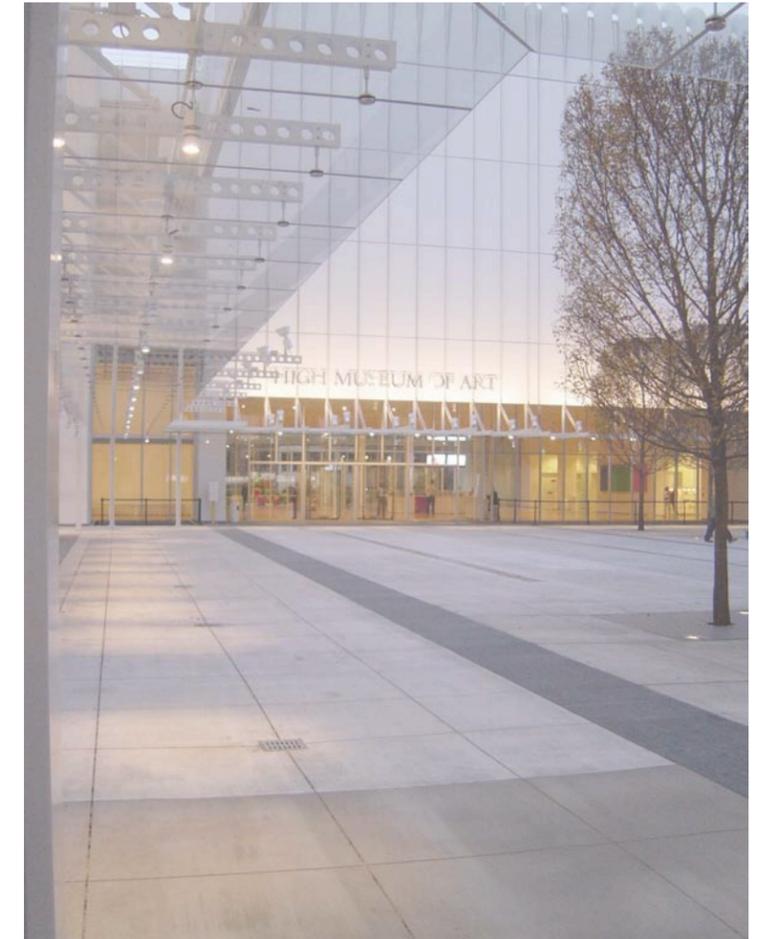
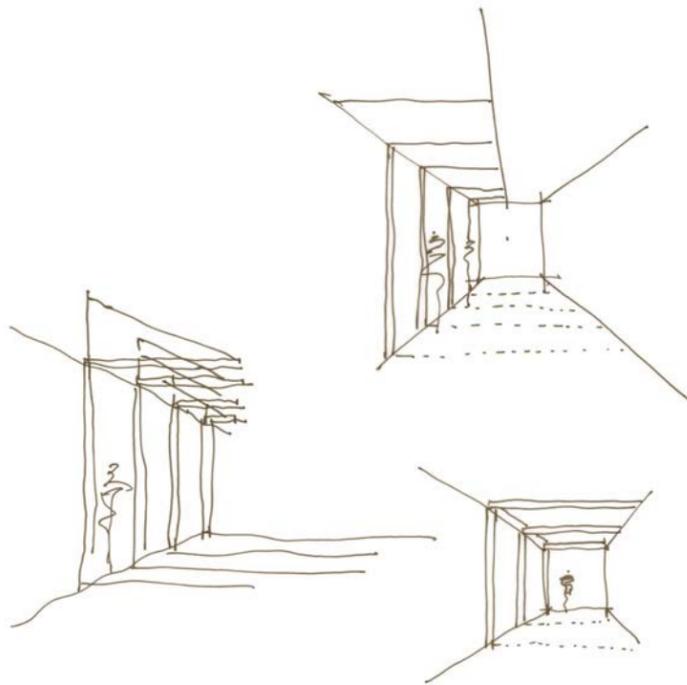




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04

connections



## building connections

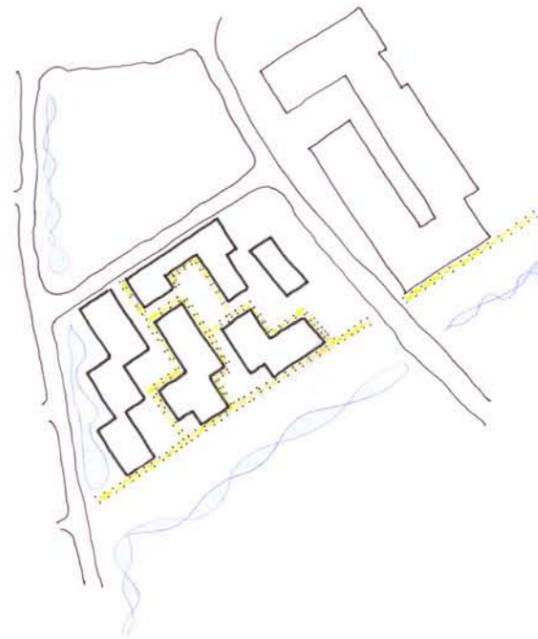
.13 To encourage interaction between the researchers in the Quadrangle, it is important to consider how they might move between the various buildings and throughout the site. A physical structure that connects all the buildings, providing protected movement, could be an invitation for interaction by allowing easy movement among buildings and by offering a common space for casual encounters. As well as providing access and common space, the walkway should be designed to visually unify the various buildings which it connects, and to thereby become one of the elements that will establish the identity of the Quadrangle.

A covered walkway shall be provided at building and courtyard edges such that a pedestrian may move within the walkway from one courtyard to the next from the primary Quadrangle entry courtyard at the southeast corner of the site to the second primary entry courtyard at the southwest corner of the site without leaving the walkway. This covered walkway is one requirement to give unity to the Interdisciplinary Quadrangle.

A Building's internal circulation should be configured to encourage movement between separate buildings. Thus internal circulation should connect primary and secondary entrances while the entrances of separate buildings should be located adjacent to one another.

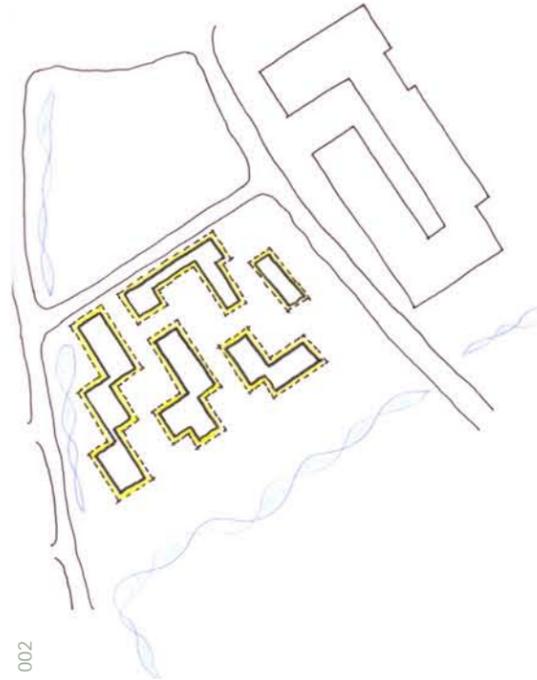
options

The covered walkway structure could be designed and constructed primarily of wood. Connection details could be made of stainless steel. A protecting roof surface could be made of glass. The structural elements could be fully exposed and their placement should create a rhythm consistent with the wall articulation of the adjacent buildings.



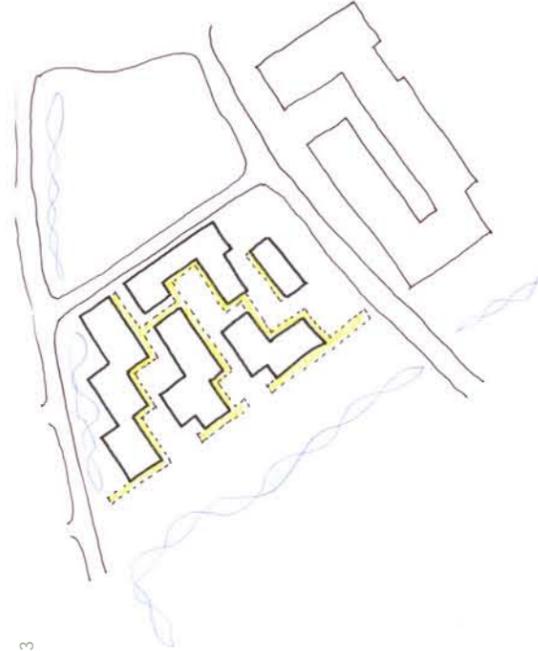
001

The covered walkway could be created by the cantilever of the upper floors of each building. This cantilever might not be necessary at all building edges but could maintain a continuous covered walkway through the Quadrangle.



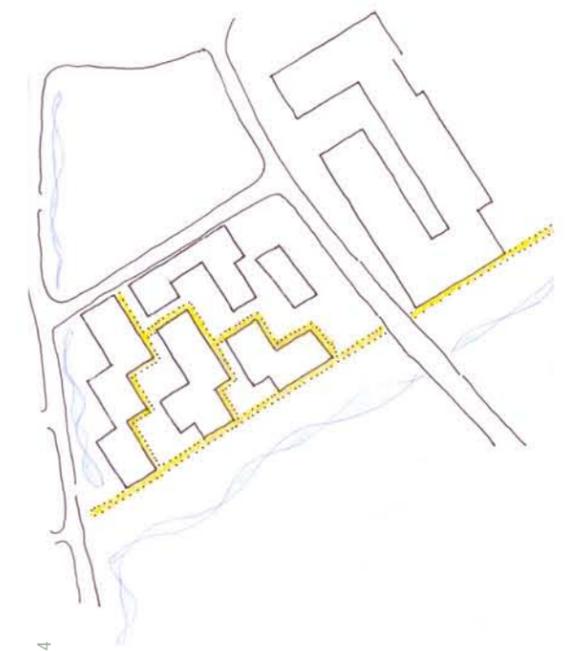
002

The covered walkway could be designed and constructed primarily of brick with structural elements evenly spaced on the side of the walkway opposite to the building edge. This exterior wall of the walkway should be at least 70 percent open.



003

The covered walkway could be designed and constructed as a canopy supported off the adjacent building's wall structure. The structure of the canopy could be fully exposed and be made of steel. The structure's placement could create a rhythm consistent with the wall articulation of the adjacent buildings. A protecting roof surface should be made of glass.



004



# .quad

## 04

### building wall conditions

Consistent with the goals of creating interaction and collaboration between the residents of the Quadrangle, creating human scaled buildings and allowing views from the site, building's exterior walls should give careful consideration to the treatment and placement of openings in exterior walls.

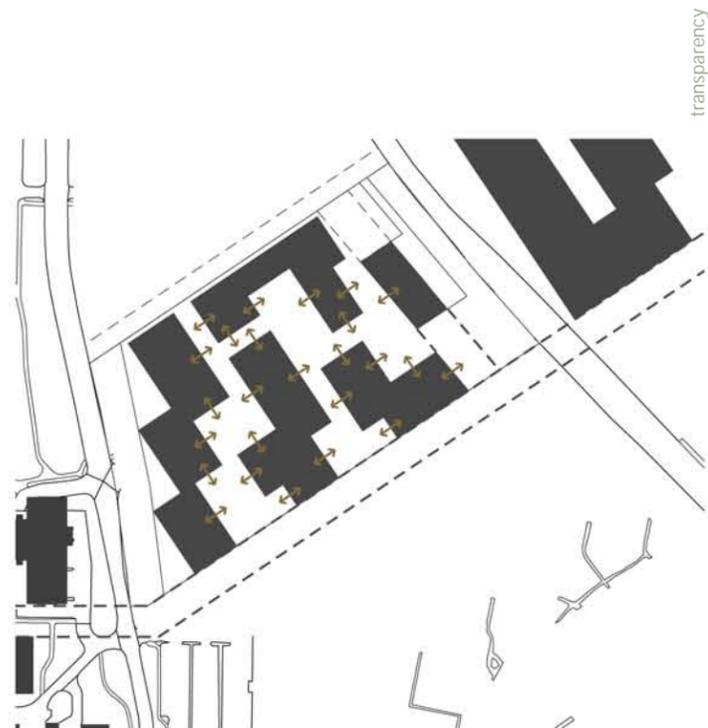
To encourage interaction between occupants of internal and external spaces, transparency should be encouraged at all courtyard, bioswale or pedestrian corridor level spaces.

To encourage visual connections between occupants of internal and external spaces and to allow for views to the exterior, significant portions of the exterior wall at upper levels should be transparent.

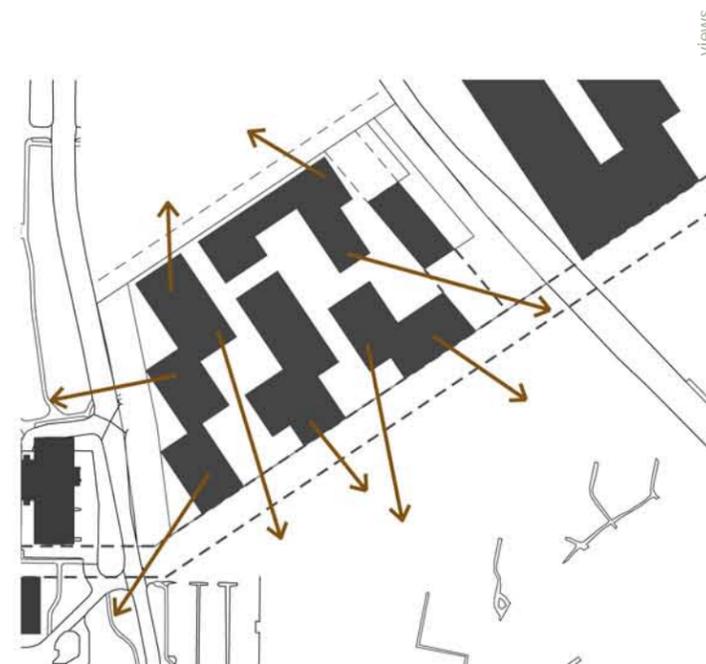
In areas where exterior walls use glass, viable shading devices should be required to control glare and heat gain.

Buildings that utilize similar proportioning systems for wall articulation should be encouraged.

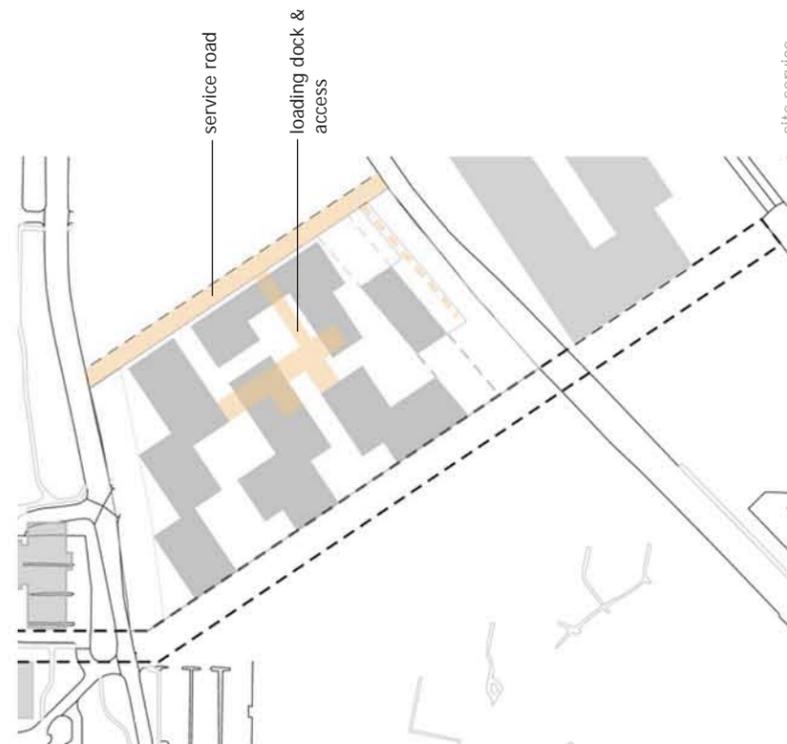




transparency



views



site service

## site service

- .15 To support the daily activities of the researchers of the Interdisciplinary Quadrangle, there is a need for delivery of supplies, removal of trash, and other service needs. To accommodate these activities, loading docks and related vehicular circulation must be provided. The Campus Master Plan provides the point of departure for accommodating these activities by designating a service drive along the northern edge of the Quadrangle site. Service to the site should be provided from this street with the majority of the service related space provided at a level below the courtyard. Horizontal distribution from the loading dock area should be provided by maintaining a continuous service level throughout the site. Vertical distribution should be provided to each building by means of service elevators.

To accomplish convenient movement of materials and personnel between various buildings to be located within the Quadrangle, a below-courtyard service level should be provided throughout the buildable area of the site. All floors at the service level should be at the same elevation.

All deliveries to the Quadrangle should be made by way of the service road along the northern boundary of the site.

Unless required by local code or specific functionality, no loading dock or service activities should be located at or above the main courtyard level but should be located below with a ramped driveway connection to the northern service drive.

# .quad

04

## core level development

The program for the underground development is stated in the program section of this report. The Core level is required to be continuous and at the same level for service as stated in the site service section. The Core level will contain the shared service access and loading docks for all buildings, parking, and core facilities for each building. The core facilities should take advantage of this continuous level and not unnecessarily replicate facilities. For example, by allowing for expansion of a vivarium adjacent to an existing one, certain efficiencies, such as shared cagewash facilities, can be found. This is only possible when connections are carefully designed to allow for this.

The roof of the core level forms the courtyards for the open spaces above. The site slope exposes the core level on the western edge of the site. These portions of the service level that are exposed above grade should not be programmed to include parking as stated in the parking section. The core level area that is exposed is encouraged to be used for program that can take advantage of the natural daylight and interaction with the courtyards and bioswale.

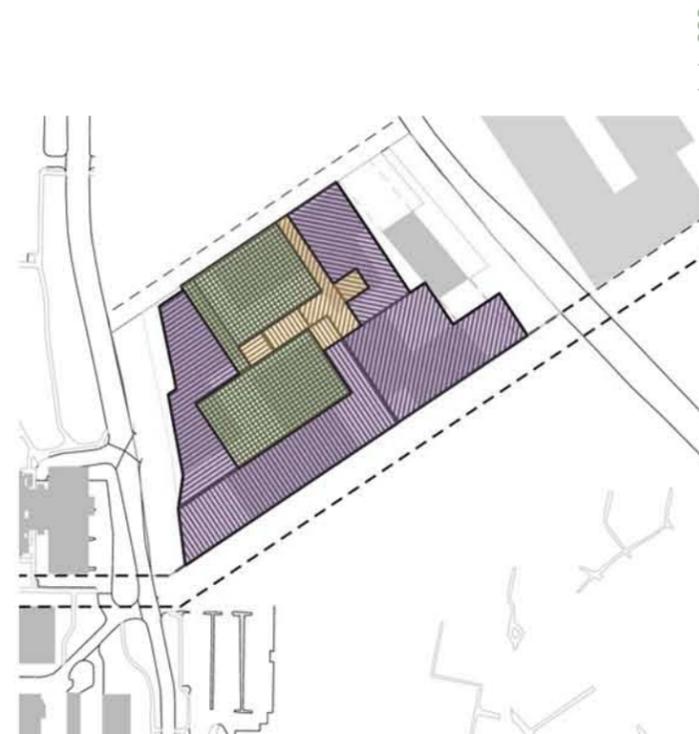
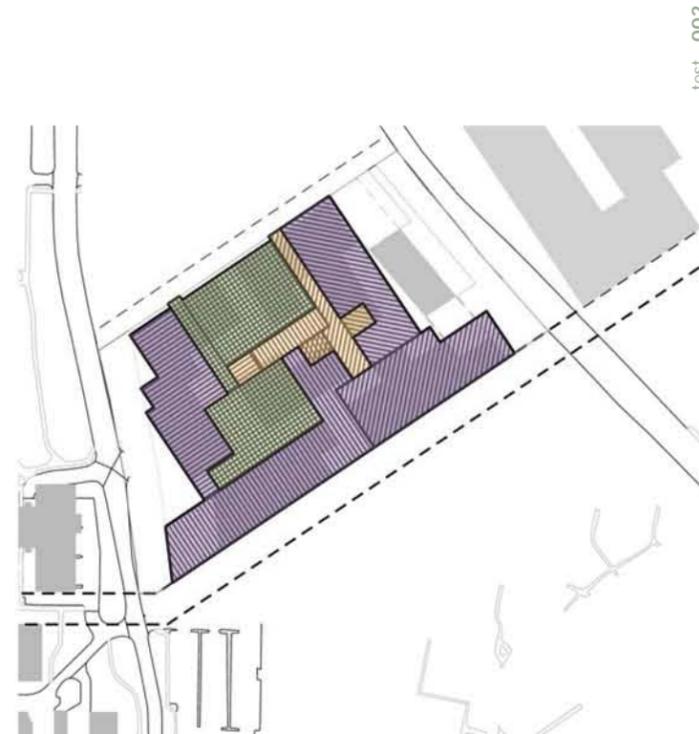
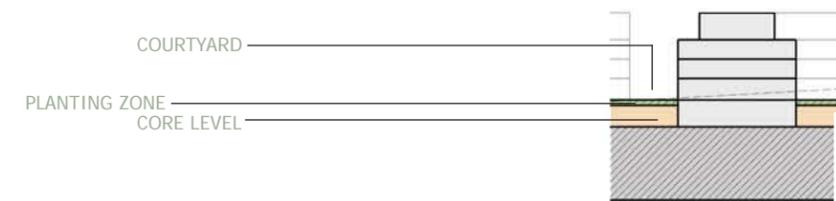
t y p o l o g i e s





planting zone

.17 To allow for the development of landscaped courtyards, a 4 feet deep planting zone is required above the structure of the core level. The courtyards are discussed further in the exterior courtyards section.



- CORE PROGRAM
- SERVICE/LOADING
- PARKING

# quadrangle

## 04

### parking

.18 A significant number of people who will arrive at the Interdisciplinary Quadrangle will use vehicular transportation. Parking must be an integrated part of the overall Quadrangle and provided at all phases of development. Consistent with the Campus Master Plan is envisioned for the Quadrangle with entrances from the service drive along the north of the site.

Below-grade or below-courtyard parking should be provided at the service level or at additional floors below the service level.

Entry into the underground parking should be provided at the northwestern corner of the site no closer than 110 feet from the western set back but no further than 300 feet from the western setback.

It is recommended that portions of the service level that are exposed above grade should not be programmed to include parking. Programming should encourage occupied spaces in these areas offering residents access to exterior spaces and views.

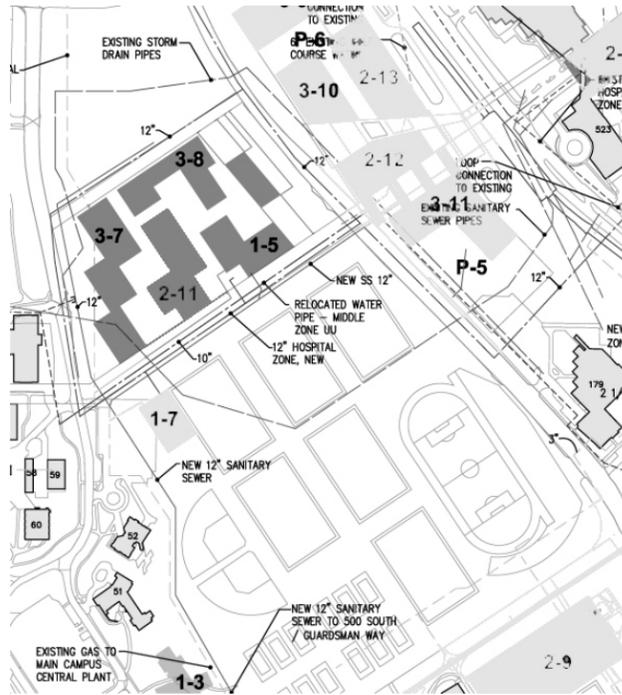
Temporary parking must be provided for phase one. This is shown in the phasing diagrams in section 5 of this document.



recommended

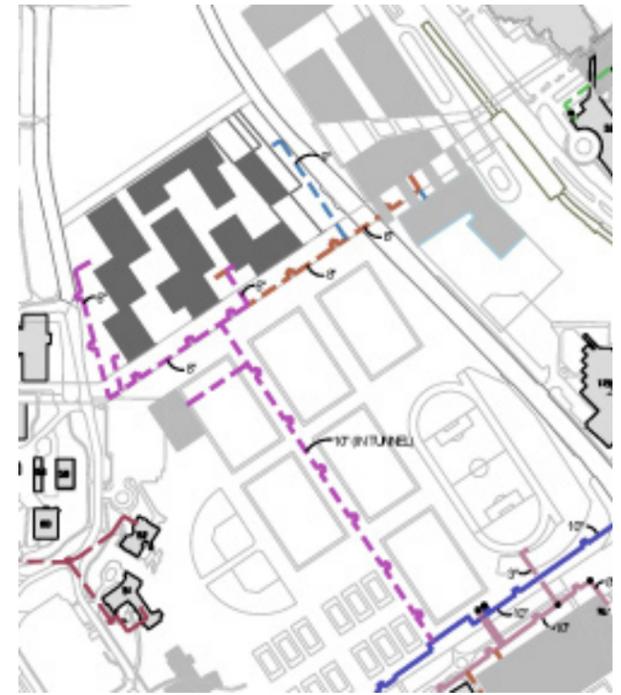
- CORE PROGRAM
- SERVICE/LOADING
- PARKING





site utilities

ULEGEND	
	EXISTING HIGH TEMP WATER
	EXISTING STORM DRAIN
	EXISTING SANITARY SEWER
	EXISTING NATURAL GAS
	EXISTING SLC WATER
	EXISTING HOSPITAL ZONE - UU WATER
	EXISTING MIDDLE ZONE - UU WATER
	EXISTING GOLF COURSE ZONE - UU WATER
	NEW HIGH TEMP WATER
	NEW SANITARY SEWER
	NEW NATURAL GAS
	NEW SLC WATER
	NEW HOSPITAL ZONE - UU WATER
	NEW MIDDLE ZONE - UU WATER
	NEW GOLF COURSE ZONE - UU WATER
	NEW CHILLED WATER



high temperature water

LEGEND	
	EXISTING HTW ZONE 1
	EXISTING HTW ZONE 2
	EXISTING HTW ZONE 3
	EXISTING HTW ZONE 4
	EXISTING HTW ZONE 5A
	EXISTING HTW ZONE 5B
	STEAM LINE
	PROPOSED HTW PHASE 1
	PROPOSED HTW PHASE 2
	PROPOSED HTW PHASE 3

site utilities

.19 The Master Planning process investigated numerous iterations of buildings and site, utility services to the site, service access and location of the proposed Central Chilled Water Plant. Projections of future buildings, sizes and potential site locations were given to the team for incorporation into the Master Plan. After much discussion with all stakeholders involved with the Master planning, it was concluded that the utilities should circumvent the site rather than run through the middle of the site. This conclusion was based on the premise that future development of the Quadrangle would be seriously compromised if there were restrictions related to utilities running through the site. The following discussions for each utility relate to the concept of utilities ringing the site and feeding future buildings from the ring.

**Pedestrian Corridor:** As noted on the accompanying drawings, there is to be a new pedestrian corridor that will run along the south edge of the Quadrangle. This mall will be the connection between the Health Sciences Campus and the Main Campus. All utilities serving the Quadrangle will be installed under this corridor and it is proposed that they be installed in a concrete tunnel. This tunnel will be an extension of the High Temperature Water Tunnel which will carry HTW from existing HTW Zone 4 in the HPER Mall to the Quadrangle. The tunnel is proposed to extend from Wasatch Drive to Central Campus Drive.

**High Temperature Water:** High Temperature Water will come from HTW Zone 4 in the HPER Mall and will be extended in a concrete tunnel to the Quadrangle where it will run in the concrete tunnel under the Pedestrian Corridor. The piping will be extended to the first building in the Quadrangle, the USTAR Building. The piping serving the future buildings in the Quadrangle will be direct buried from the tunnel.

**Domestic Water:** The domestic and fire water serving the site will ring the site the same as the other utilities. The water main in Federal Way is to be relocated into the tunnel under the Pedestrian Corridor and the extension around the Quadrangle will be buried pipe.

**Natural Gas:** There is a natural gas main east of Central Campus Drive running from North Campus Drive to the Cogeneration Plant. This main was installed before the development of the Quadrangle and consequently portions of the main interfere with the development of the site. It was determined that the University should investigate, with Questar, the rerouting of the portion of this main that interferes with the development of the Quadrangle. It appears that there is a potential route for this main in Central Campus Drive from North Campus Drive to a point just south of the pedestrian corridor where the line could be tied back to the existing main. The timing of this relocation will depend on the timing of future buildings in the Quadrangle.



chilled water

LEGEND	
	EXISTING CW
	PROPOSED CW PHASE 1
	PROPOSED CW PHASE 2
	PROPOSED CW PHASE 3

### Electrical

.20 **BACKGROUND:** Rocky Mountain Power provides electricity to the University through three substations, "University" (otherwise known as "Stadium"), "Medical" and "Research" (otherwise known as "Red Butte"). A 2003 Study identified spare capacity on the Medical and Red Butte substations but this capacity was limited, and expansion was recommended in 2-5 years for the Red Butte substation. The Medical substation is difficult to access, as the duct banks are full. The program for USTAR, the first building at the Interdisciplinary Quadrangle, has included money for a partial upgrade of the Red Butte substation and a power line extending more than one mile from the Red Butte substation to the Interdisciplinary Quadrangle and the chiller plant phase one building.

**REROUTING OF POWER AT FEDERAL WAY:** There are two major feeders running east/west down Federal Way that must be relocated prior to construction of the first building. One feeder is the only tie from the Medical substation to the Stadium substation, and allows some transfer of power from Main Campus to Health Sciences Campus during a failure on either side. This feeder was installed in 1979. The second feeder was recently installed from Moran Eye II to the Warnock Engineering building, and currently feeds power to the Warnock building. Both of these feeders are important to the campus power system.

Additionally, the Stadium substation is almost full. Upgrade projects will be performed on Health Sciences Campus in the next two years, during the construction of the first building in the Quadrangle. It is preferred to keep the power running down the Interdisciplinary Quadrangle area at all times. Therefore, the relocation of these utilities to the pedestrian corridor must be complete prior to beginning the excavation for the first Quadrangle building.

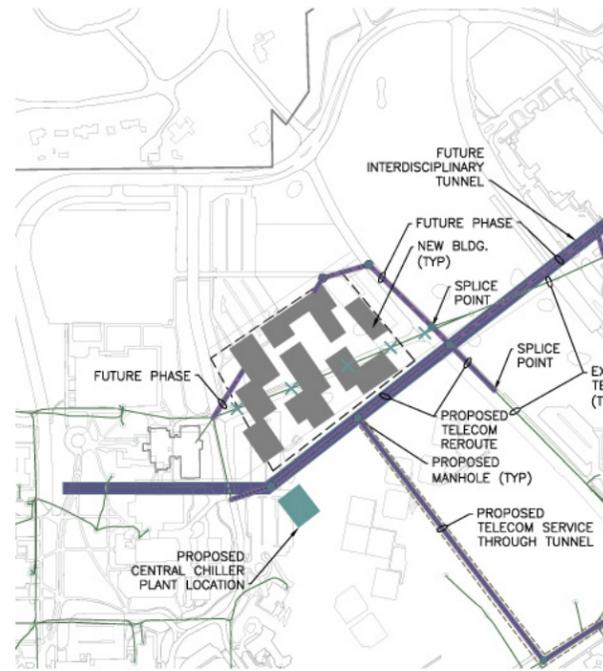
**ROUTING OF POWER:** The Red Butte Substation needs additional bays of 12470 volt metal clad switchgear installed prior to running a new feeder. There are some spare conduits available to the north along Fort Douglas Blvd that may be used for a new feeder. Once the feeder passes the guesthouse, there is one remaining conduit heading west to near Eccles Broadcast Center. From there, the path crosses Wasatch Drive west across the road to the HPER mall.

Prior to continuing the feeder west along HPER, a tunnel must be constructed for HTW and telecommunications along the east part of HPER, then north from HPER to the Interdisciplinary Quadrangle. This tunnel excavation could be shared for a parallel duct bank construction for power.

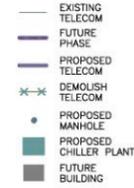
The power must not be installed within the tunnel system, but can be located adjacent to it. There are safety concerns about a HTW leak and how it may affect the high voltage cabling. However, manholes may be accessed through the tunnel, to allow ease of maintenance and access to the electrical manholes.



master power plan

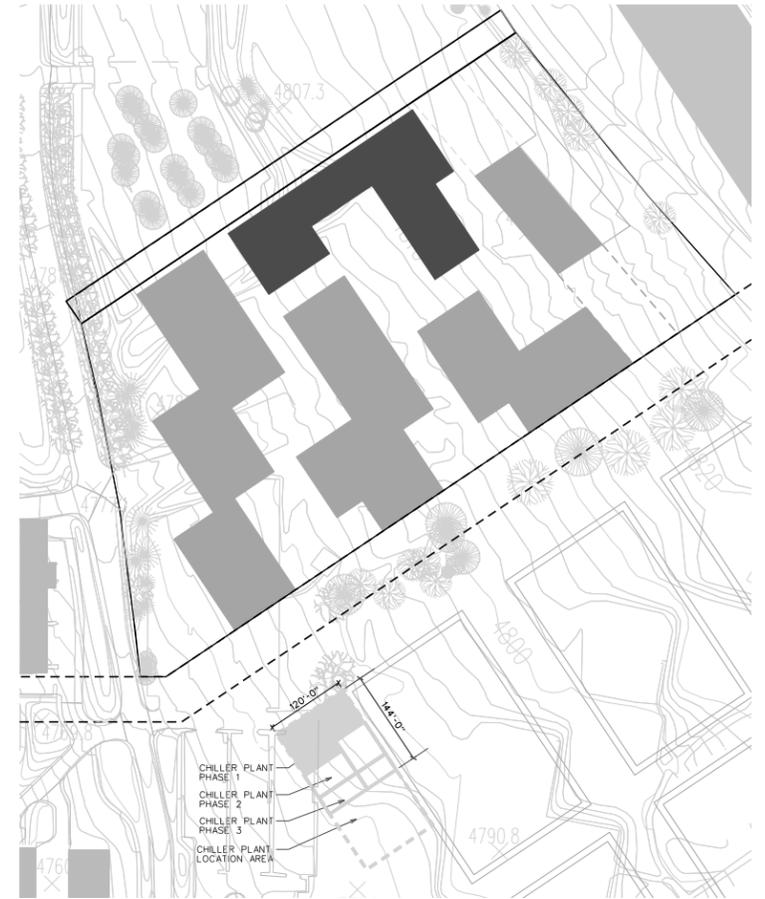


master telecom plan



**ELECTRICAL UPGRADE PRIORITY:** Recommendations are outlined as nine tasks in order of priority. All nine tasks are to be completed prior to construction of the first Quadrangle building:

- one: Build the tunnel for the HTW line and Telecommunications cabling along the new Interdisciplinary tunnel and construct the electrical duct bank at the same time parallel to the tunnel.
- two: Reroute power feeders from Federal Way to the new duct bank paralleling the Interdisciplinary tunnel.
- three: Abandon and/or demolish power feeders in Federal Way.
- four: Upgrade the switch gear at the Red Butte Substation.
- five: Build the tunnel from HPER mall north to the Interdisciplinary Corridor for HTW line and telecommunications fiber and construct the electrical duct bank at the same time parallel to the tunnel.
- six: Install feeder from the Red Butte Substation to the first building at the Interdisciplinary Quadrangle and to the Chiller Plant.
- seven: Build the first building power service connection.
- eight: Build the Chiller plant Power service connection
- nine: The future expansion of the chiller plant will require a dedicated feeder. The preferred source of this dedicated feeder is the Medical Substation as a backup to the feeder installed first from the Red Butte Substation.



### chilled water plant & distribution

**PLANT LOCATION:** The location of the Central Chilled Water Plant was reviewed to consider how best to serve the Interdisciplinary Quadrangle and the other buildings in the central zone of the campus that will be connected to the plant. The appearance of the plant was of concern because it is a mechanical building. Proximity to the existing Alumni House and its site lines was another concern. Additional concerns were expressed about the moisture plume that rises from the cooling towers during colder weather. The problem with the plume strongly suggests that the plant be located some distance away from the buildings so that vision wouldn't be blurred and staining of surrounding buildings would be minimized or avoided.

It was concluded that the plant should be located as shown on the adjacent diagram. The shown location is approximated, allowing the designer to determine exact placement. The location is east of the Warnock Engineering Building, just south of the pedestrian corridor, north of the Alumni House and just west of the playing fields. This location does not interfere with the existing gas main. It is also far enough away from existing and future buildings to negate the plume problem. It is also far enough away from existing buildings so that noise from the plant should not be problematic. This site should allow the plant to be constructed partially in the hillside, helping formalize the visual impact of the building. In addition, this site is centrally located with respect to the buildings it serves.

The chiller plant building will be visual from the pedestrian corridor and should be designed accordingly. The building should be buried into the topography as much as possible. Putting engineering on display could be explored in the design of the building to create additional interest.

**PIPING DISTRIBUTION:** The chilled water piping from the plant is as shown on the preceding drawings. The mains will exit the plant on the north and extend east and west up and down the pedestrian corridor. The first phase of the piping will serve the first building in the Interdisciplinary Quadrangle, the USTAR Building, and several other existing buildings along Central Campus Drive. Piping for future buildings in the Quadrangle will ring around the Interdisciplinary Quadrangle site and feed into each building. The piping in the pedestrian corridor will be in a concrete tunnel and piping ringing the site from the corridor will be buried.

## sustainability

.22 Every effort should be made to develop the Interdisciplinary Quadrangle in a sustainable manner. The key to future success of research buildings is to ensure that they are using only the energy they need so that future generations will be able to meet their own energy needs. All buildings in the Quadrangle shall be constructed to meet, at a minimum, current LEED Gold standards. Additionally, if state funds are included in project funding, then design and construction must comply with the state's High Performance Building Standards.

Particular attention should be paid to the following areas, all of concern in Salt Lake City: Sensitive and appropriate orientation and siting, reducing potable and process water use, reducing overall building energy consumption especially in the area of building heating and cooling and embodied energy of building materials.

Building orientation should attempt to take advantage of southern sun exposure for heat gain in the winter and daylight harvesting. This goal suggests that east/west oriented buildings should be preferred over predominately north/south oriented buildings. These south facing buildings should incorporate shading or other devices to reduce heat gain in the summer while maintaining daylight harvesting. Possible incorporation of passive solar strategies (as programs allow) are greatly affected by building orientation, thus care should be taken to allow for these energy saving strategies.

To reduce heat gain and glare from harsh late-day sunlight, western building exposure should be limited, and where required by the site, programs that require minimal light should be considered on western facades. If these conditions cannot be met, proper sunshade devices shall be designed to allow for comfortable occupation of these spaces.

Storm water runoff is a primary consideration and the inclusion of a bioswale in the Interdisciplinary Quadrangle demonstrates its importance. One hundred percent of precipitation falling on the site during a 10 year storm event shall be captured and either reused or allowed to filter back into the ground without leaving the site. For further information, see open space infrastructure section on storm water.

While full lighting design is beyond the scope of this document, all exterior lights, both site lights and building lights, shall be full cut off to prevent excess light from brightening the night sky.

Given the semi-arid climate, and the booming population of Salt Lake City, reduction of water use shall be a primary goal of all development in the Quadrangle. This applies to potable water, water used for irrigation and water used in scientific processes in the buildings. Strategies should be developed during building design to significantly reduce potable water used for domestic purposes and for irrigation. These strategies could include using captured water from multiple sources (grey, rain, condensate) for sewage conveyance, irrigation, evaporative cooling, and for decorative uses. Strategies should also be developed by the design teams working with the building occupants to reduce process water to the greatest extent possible.

Active energy use in buildings in the Quadrangle should be reduced to the greatest extent possible. Energy savings should come from strategies developed by each design team based on the orientation and program of a particular building. All buildings on the site shall aim to adhere to the energy reduction goals as set forth by Architecture 2030 and the 2030 Challenge which mandates energy use reduction in new construction on a curve such that by the year 2030, new construction is producing 0 net tons of carbon dioxide (carbon neutral). Meeting this goal could be accomplished with a combination of on-site electricity production as well as energy load reductions in the buildings.

Energy use in the harvesting, manufacture, and transportation of the materials used to construct the buildings should be minimized. Possible options for this type of reduction include using locally harvested and/or manufactured materials, such as local stone or other materials. Reducing the use of virgin materials and substituting reused or recycled material is also a good strategy for reducing the embodied energy of building materials. One example would be the use of recycled aluminum in curtain walls systems. In addition, certain lower embodied energy materials can be substituted for higher ones, such as using fly ash (a waste product) in lieu of Portland cement in concrete.



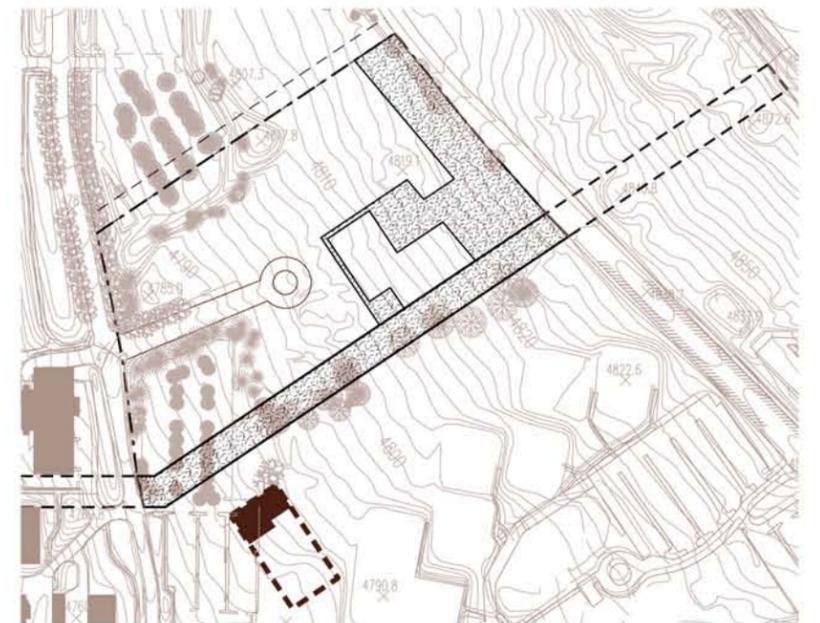
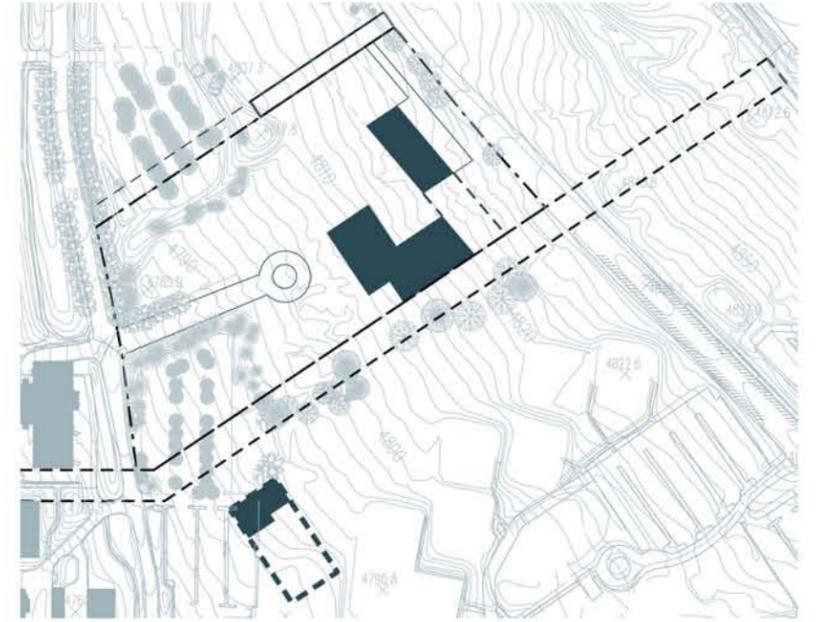
# phasing

05

## PHASED DEVELOPMENT

### 5.1 building phasing

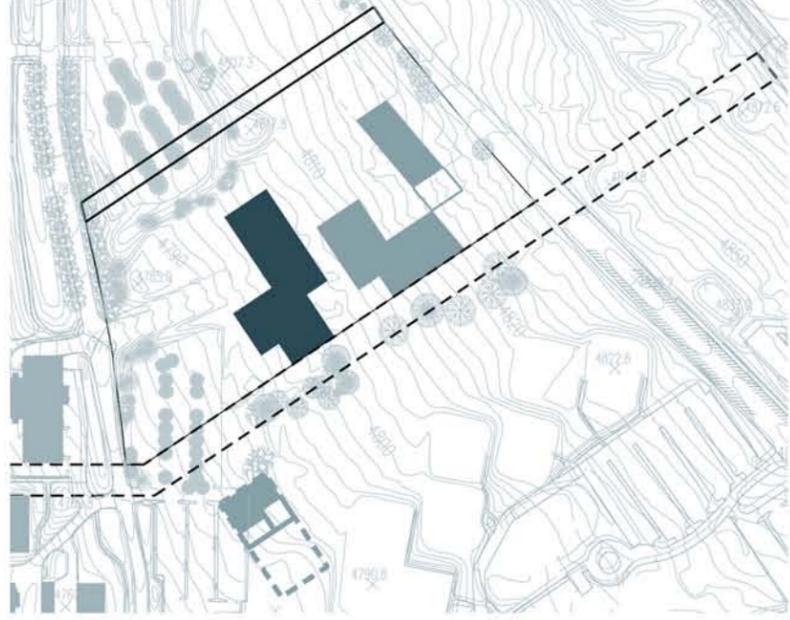
The building phasing is foreseen to develop in the order shown in these diagrams. This order is subject to change based on funding and program development. Each building phase should follow the guidelines in this document and should be designed and constructed such that one phase does not preclude development of future phases.



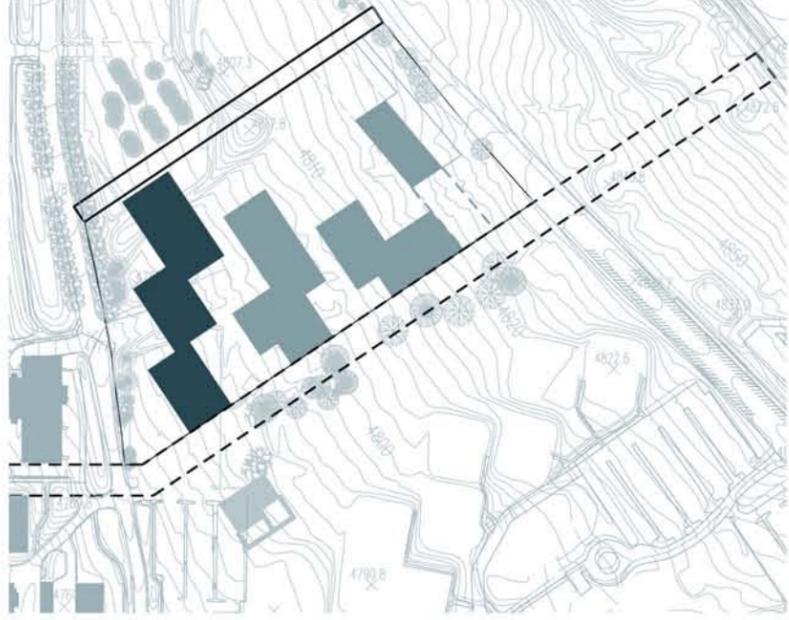
### open space phasing

The open spaces should be constructed with each building. This development will be driven by the core level below that forms the base for the courtyards above.

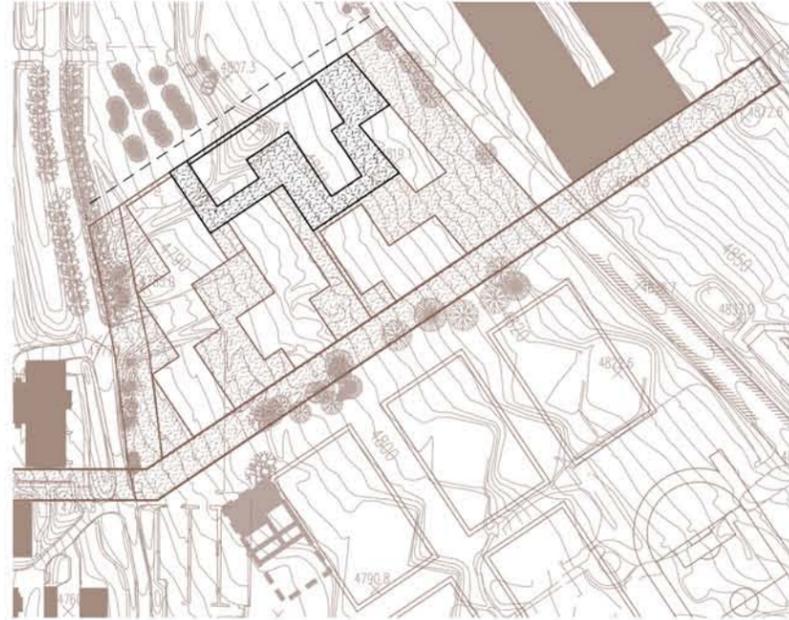
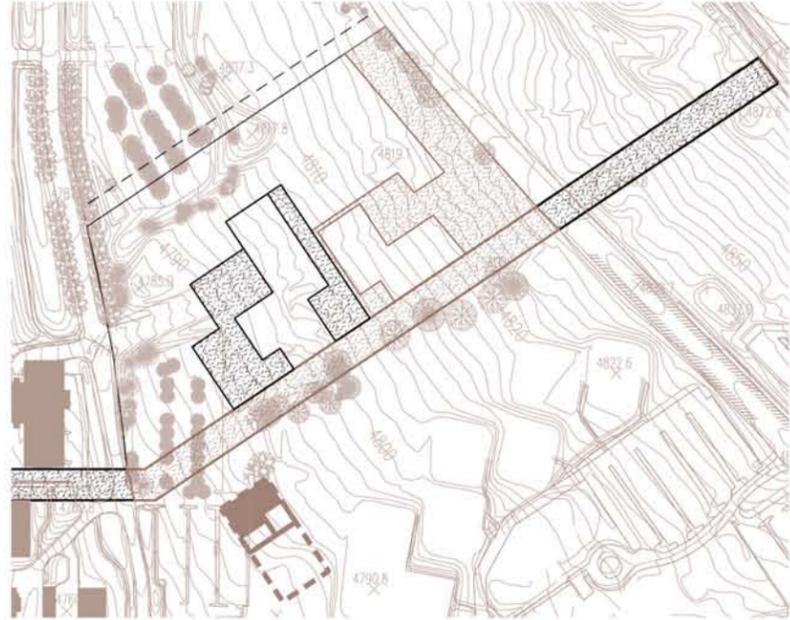
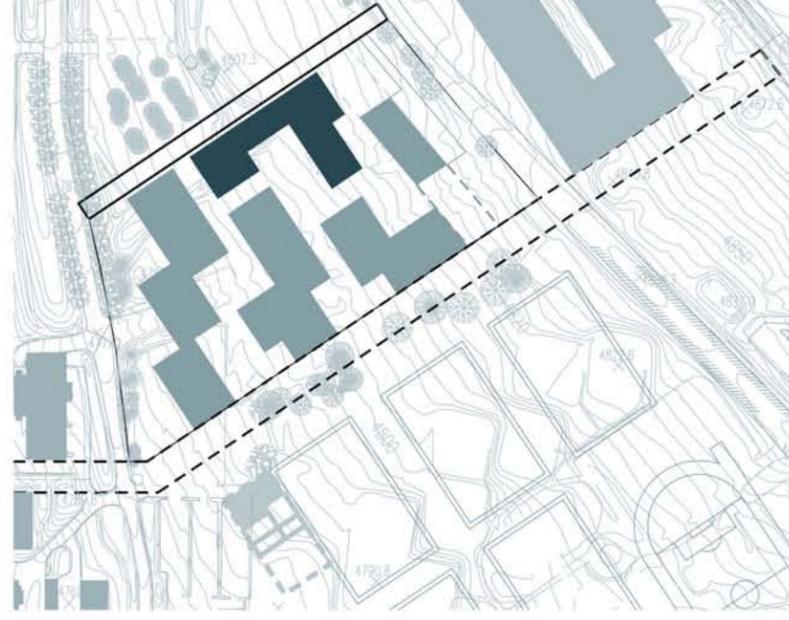
phase 002



phase 003



phase 004



# phasing

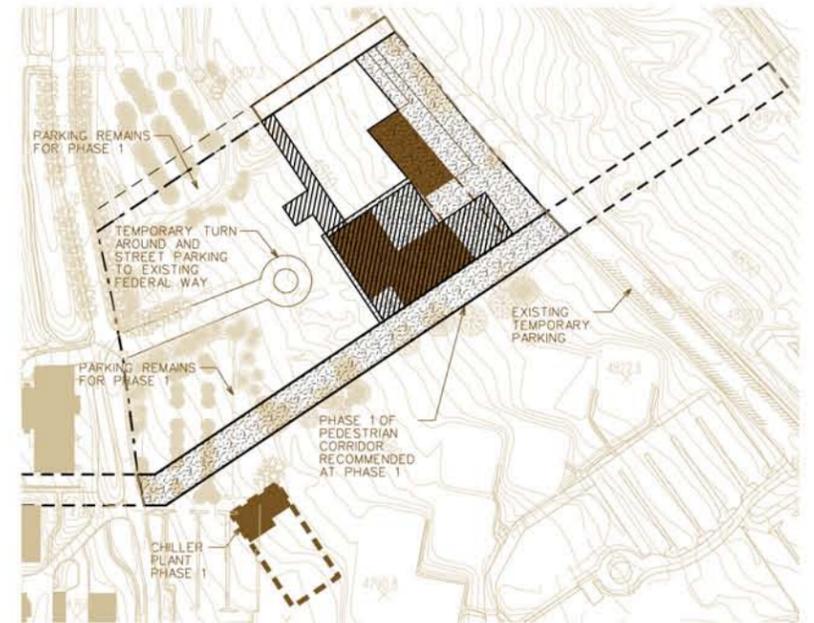
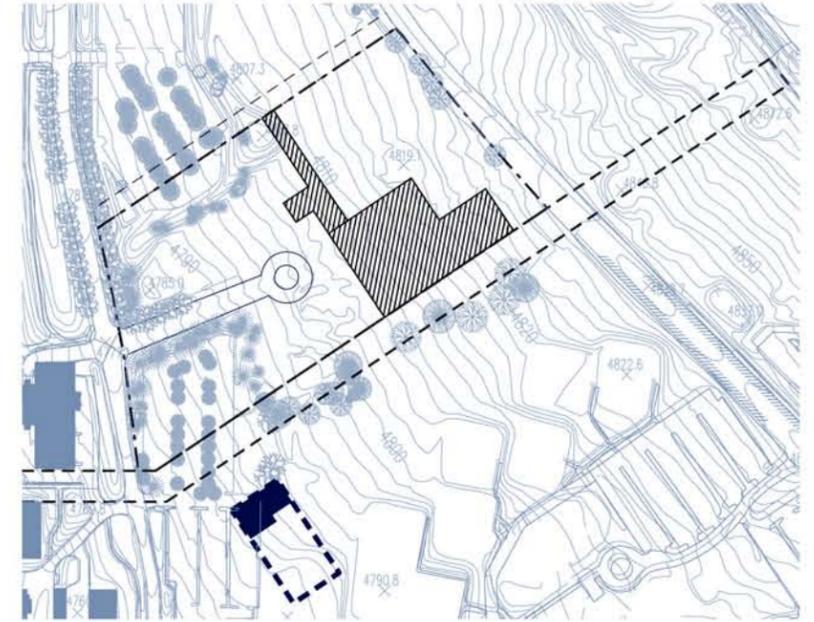
05

## core level phasing

The core level should be developed below each building during each phase. The core level includes loading docks, parking, and shared core facilities. Each phase should plan this development to allow future phases to connect to the central loading dock and access drive. Core facilities on this level should all be continuously connected. Parking is planned for this level in phases two and three. Development of this level should not preclude future building footprints. The core level must be developed before or with the building above it.

## 5.2 anticipated phasing

It is anticipated that the Interdisciplinary Quadrangle will develop in four phases, starting with the southeast corner for the first building. This phasing is intended to populate the pedestrian corridor with the first two buildings which would then allow for the development of the site to the southwest, northwest, and finally northeast. Please see the following diagram for the overall anticipated phased development. The order is subject to change subject to funding availability. Please note that the pedestrian corridor and western bioswale zone are recommended with particular phases on the diagrams. This information is separated into core area, building and open space layers on the following diagrams.





# tests

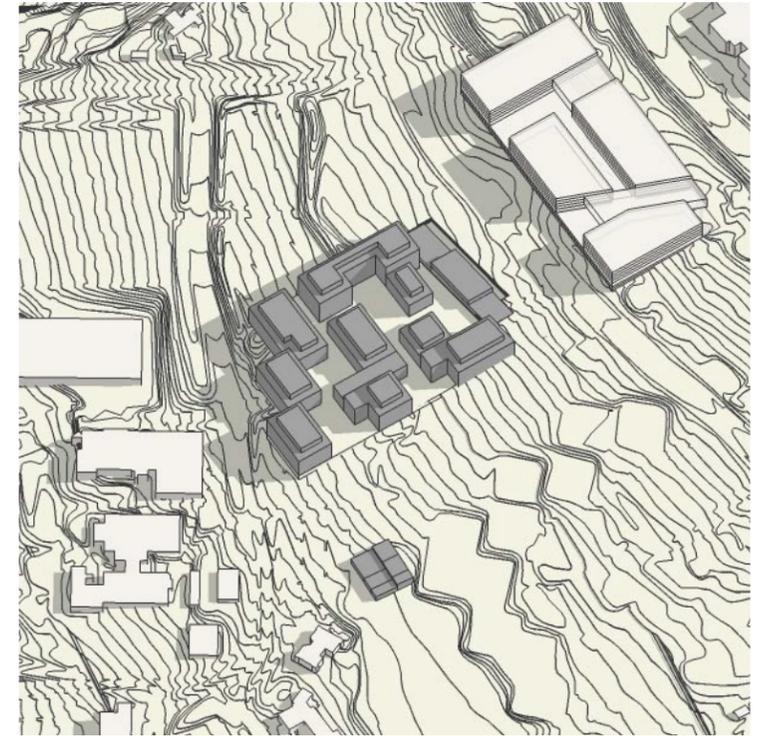
## 06

### PROGRAM TEST

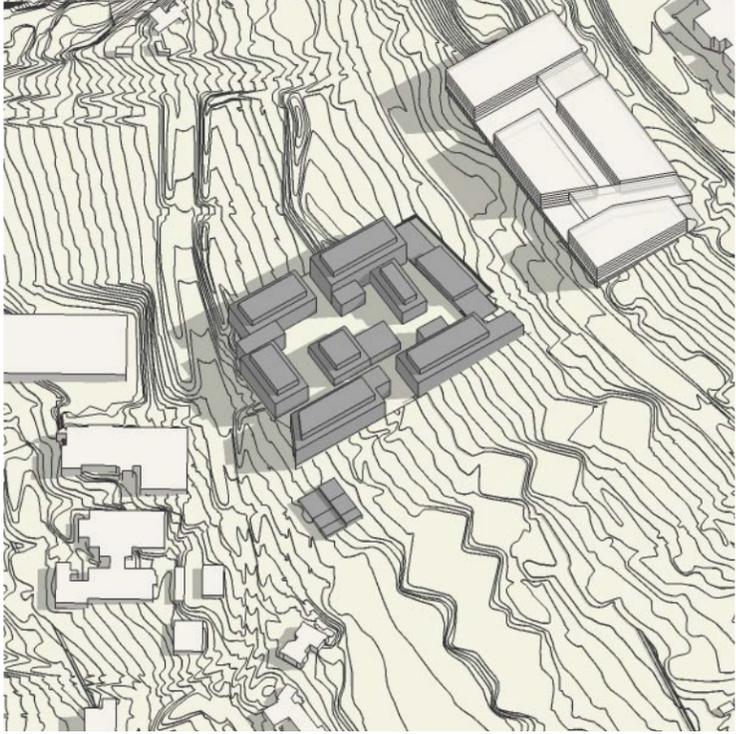
#### test massing

Test massing designs were used throughout the Quadrangle Master Plan process to help visualize the guidelines set forth in section four. Three of these final tests are included on the following pages as examples of how these guidelines could develop. These are not required designs, nor are they schemes. They have been used as a study and graphic communication tool in the process.

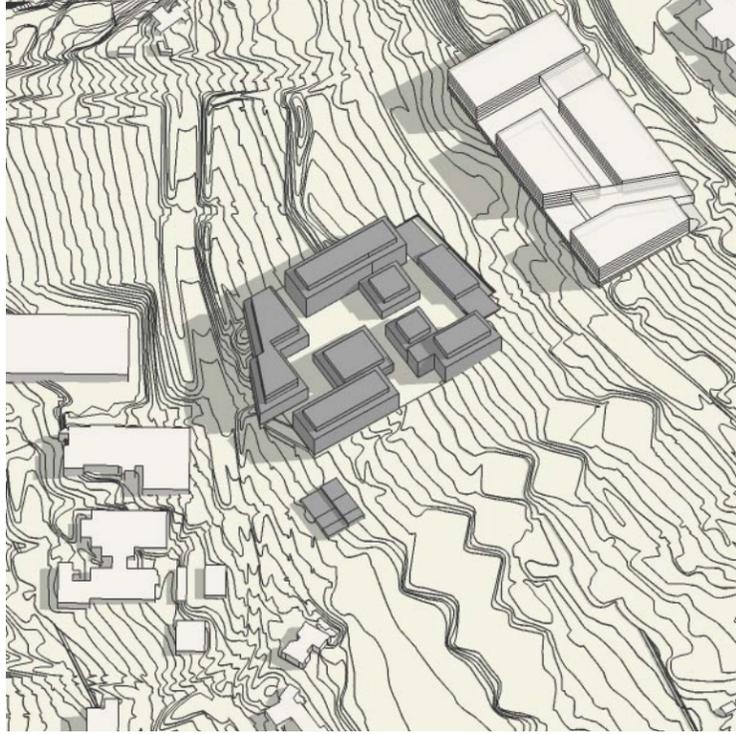
e x a m p l e s



test 001



test 002

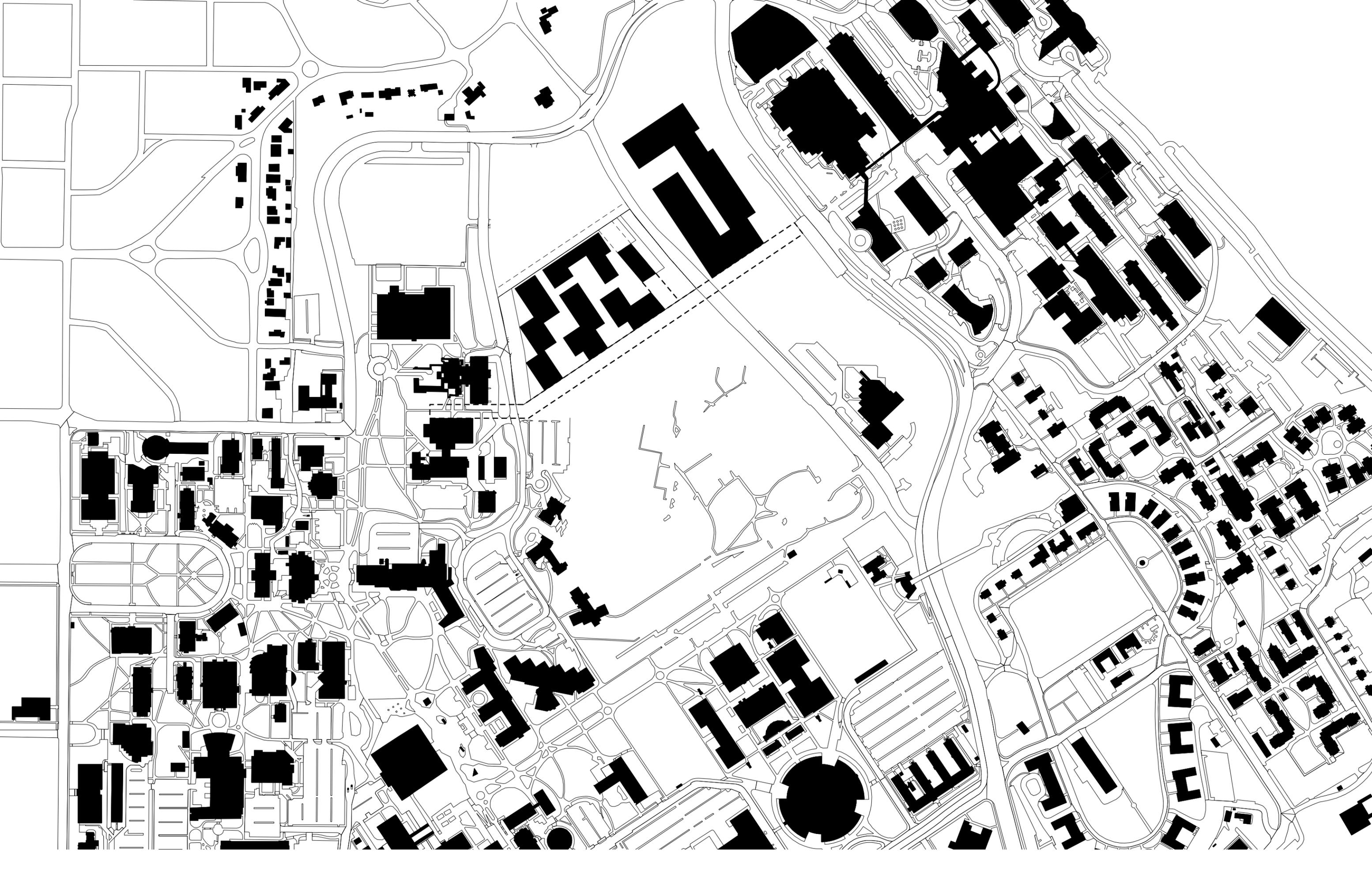


test 003

# .tests

06

t e s t o n e



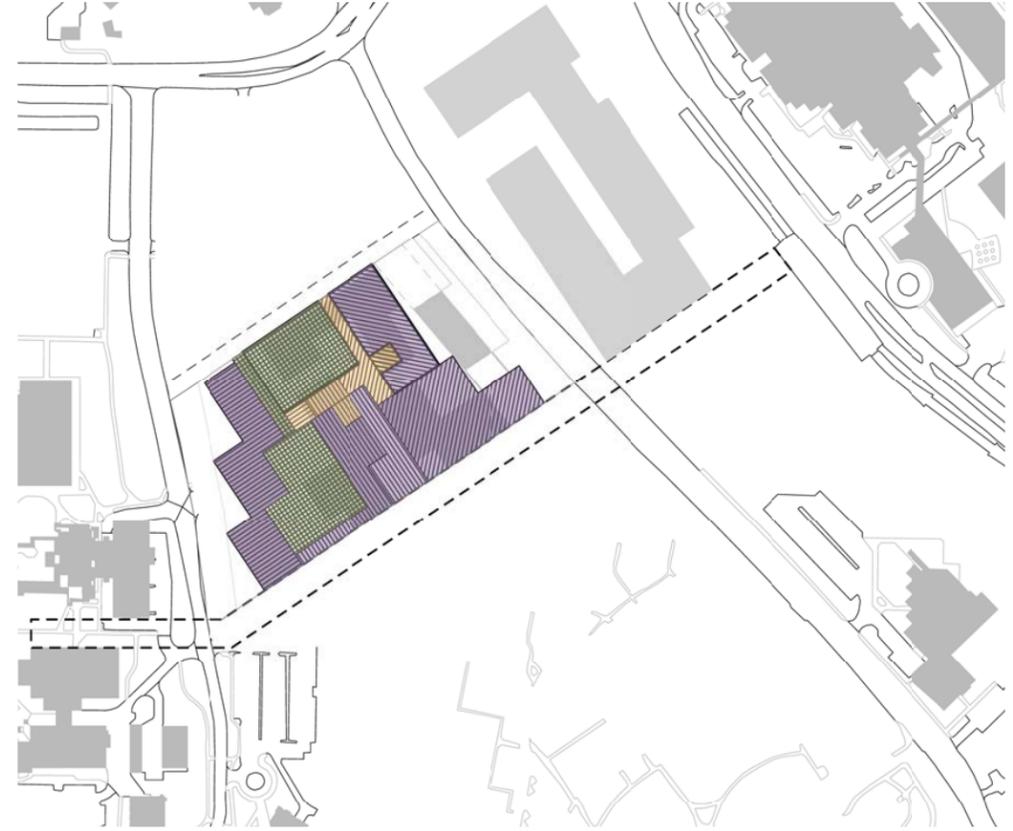
# .tests

06

t e s t o n e

- core program
- service / loading
- parking

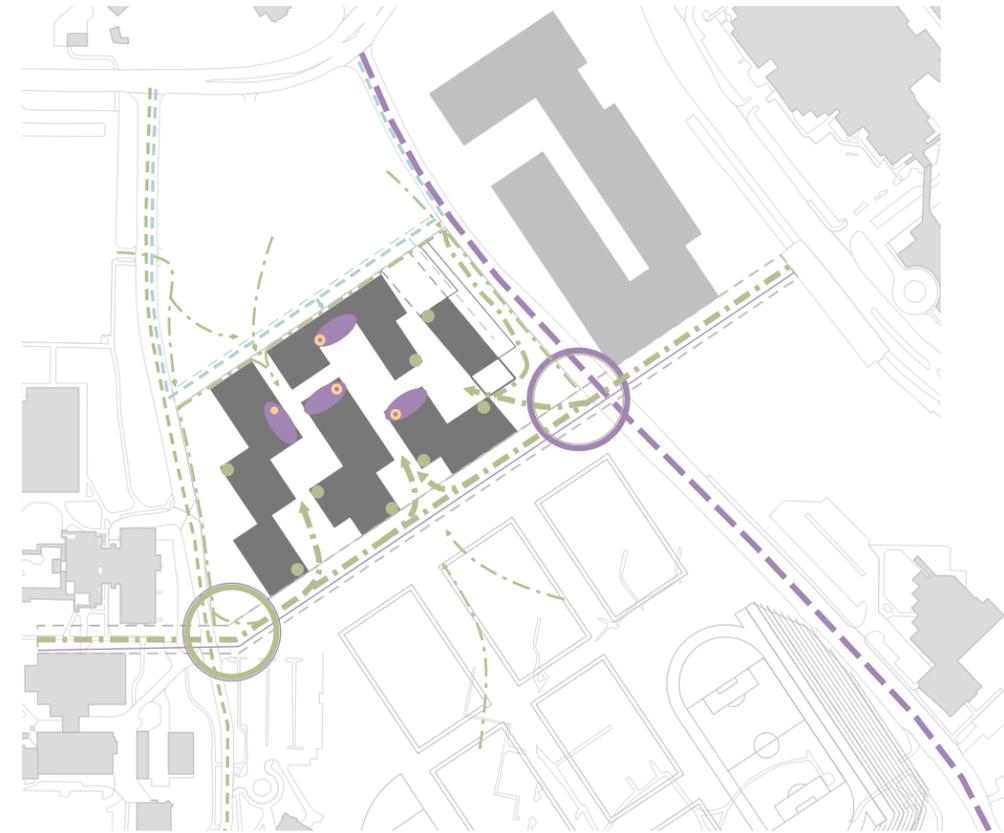
001 building lower level



001 site entries



001 building entries

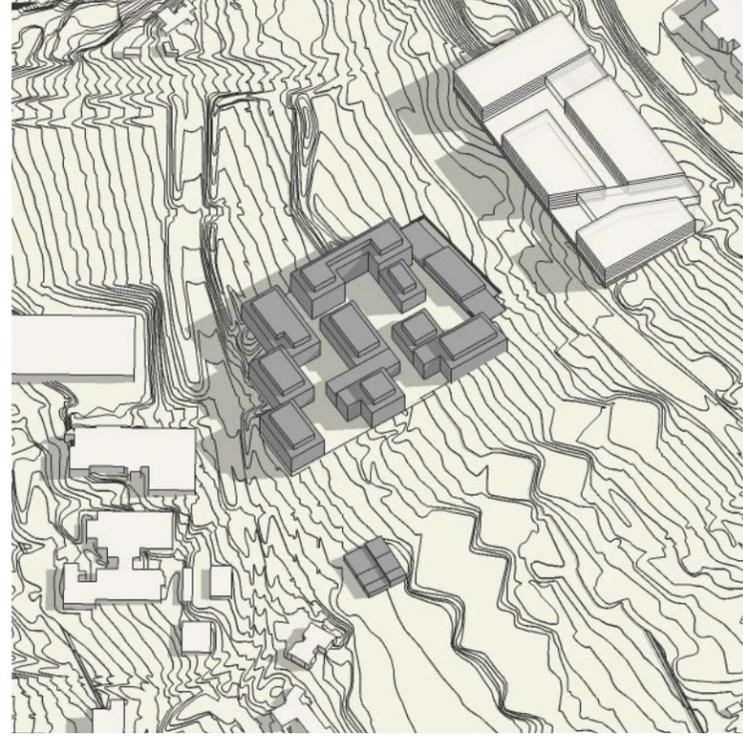


- general public:**  
observed from cars  
visitors
  - campus:**  
students/faculty  
nonpublic
  - users:**  
workers/staff
  - service:**
- general public traffic/city street
  - general pedestrian traffic
  - primary quad public entry
  - campus traffic/campus street
  - campus pedestrian traffic
  - pedestrian entry
  - campus primary quad entry
  - user entry from parking
  - user entry from parking-option
  - primary service
  - secondary service
  - public space/primary building entry
  - secondary building entry

# .tests

## 06

t e s t o n e



001 massing diagram

open space 001

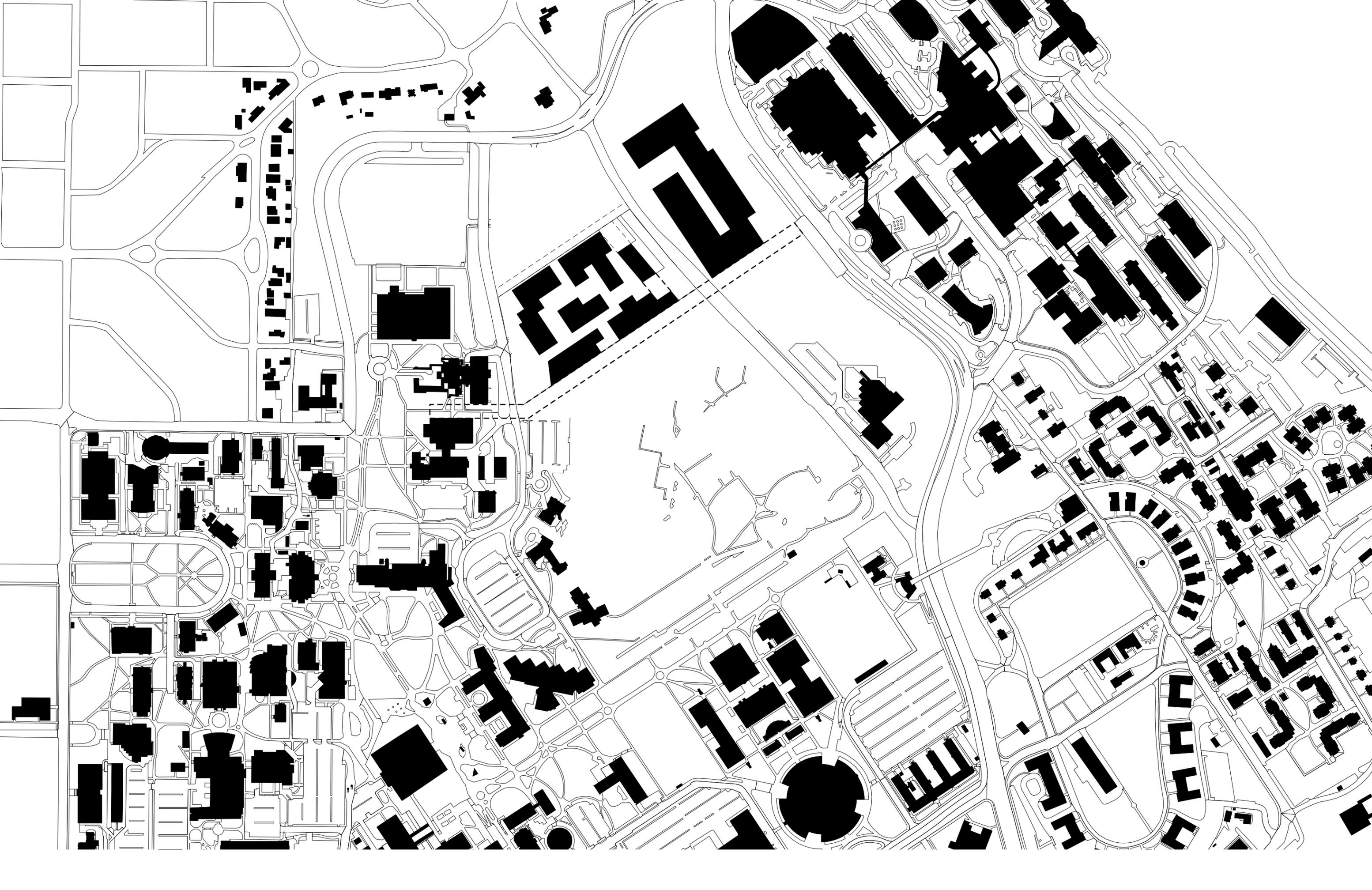
- public plaza:**
  - signature space
  - celebration space
- court yard:**
  - private sanctuary
  - terrace/garden
- pedestrian circulation:**
  - formal pathway
  - corridor
- landscape:**
  - garden/bosque/recreational lawn
  - formal planted area
- grade change zone:**
- bioswale:**
- existing tree:**
- proposed tree:**



# .tests

06

t e s t t w o



# .tests

06

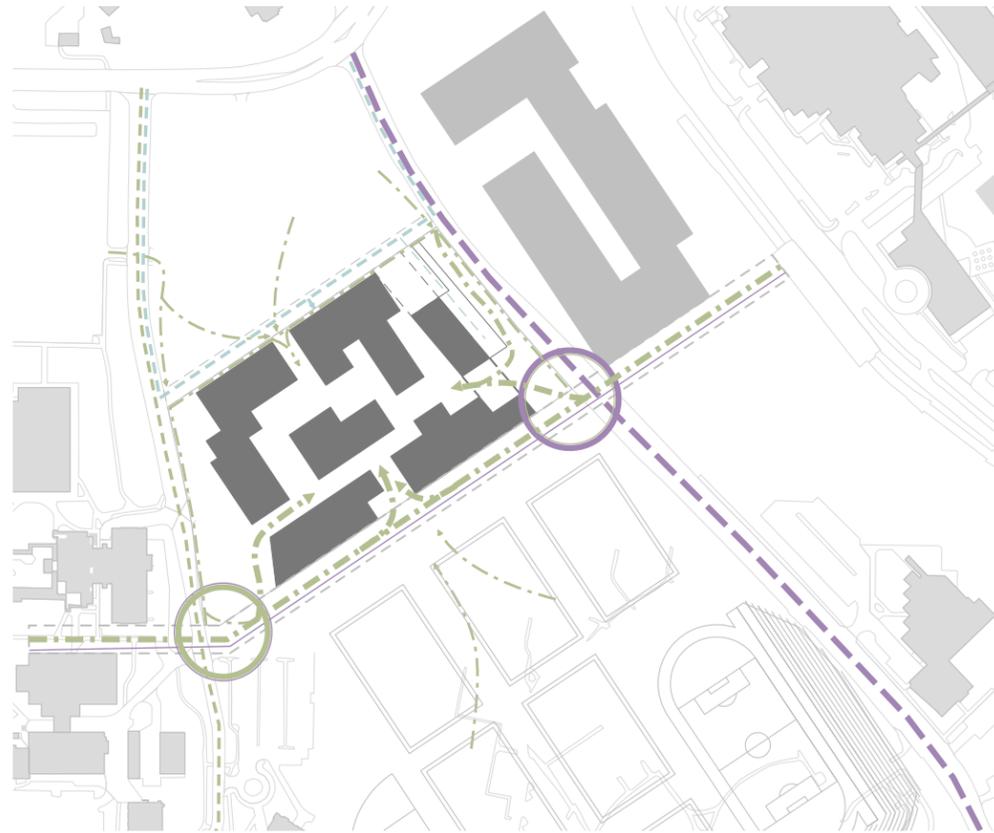
t e s t t w o

- core program
- service / loading
- parking

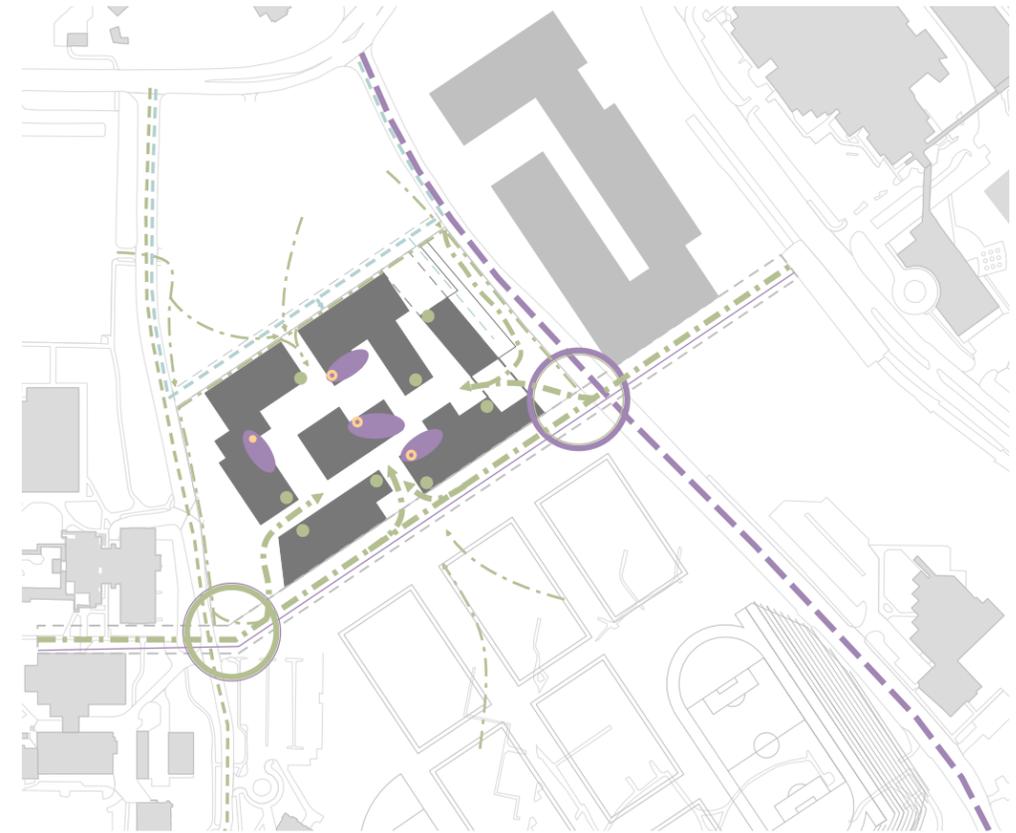
002 building lower level



002 site entries



002 building entries

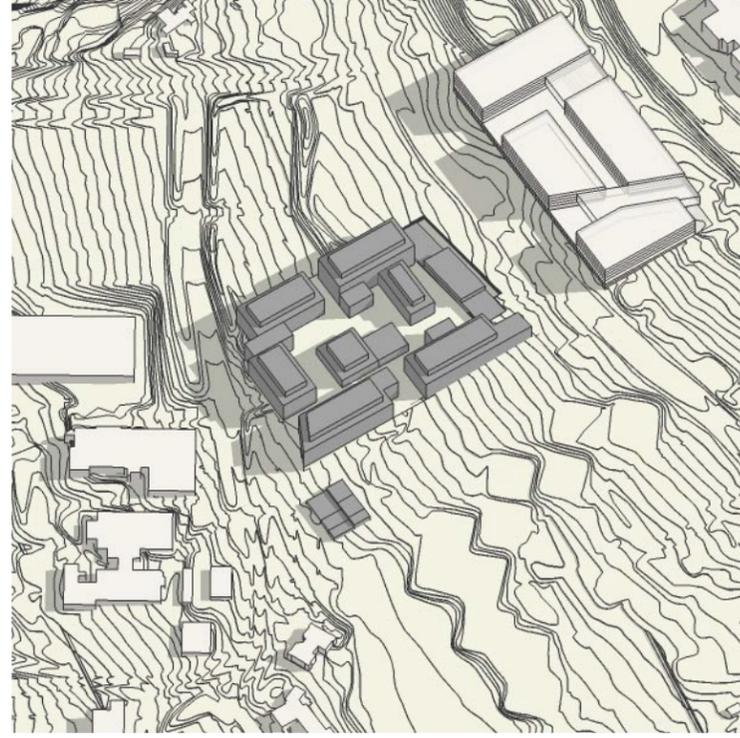


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observed from cars  
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students/faculty  
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  - campus traffic/campus street
  - campus pedestrian traffic
  - pedestrian entry
  - campus primary quad entry
- users:**  
workers/staff
  - user entry from parking
  - user entry from parking-option
- service:**
  - primary service
  - secondary service
  - public space/primary building entry
  - secondary building entry

# .tests

## 06

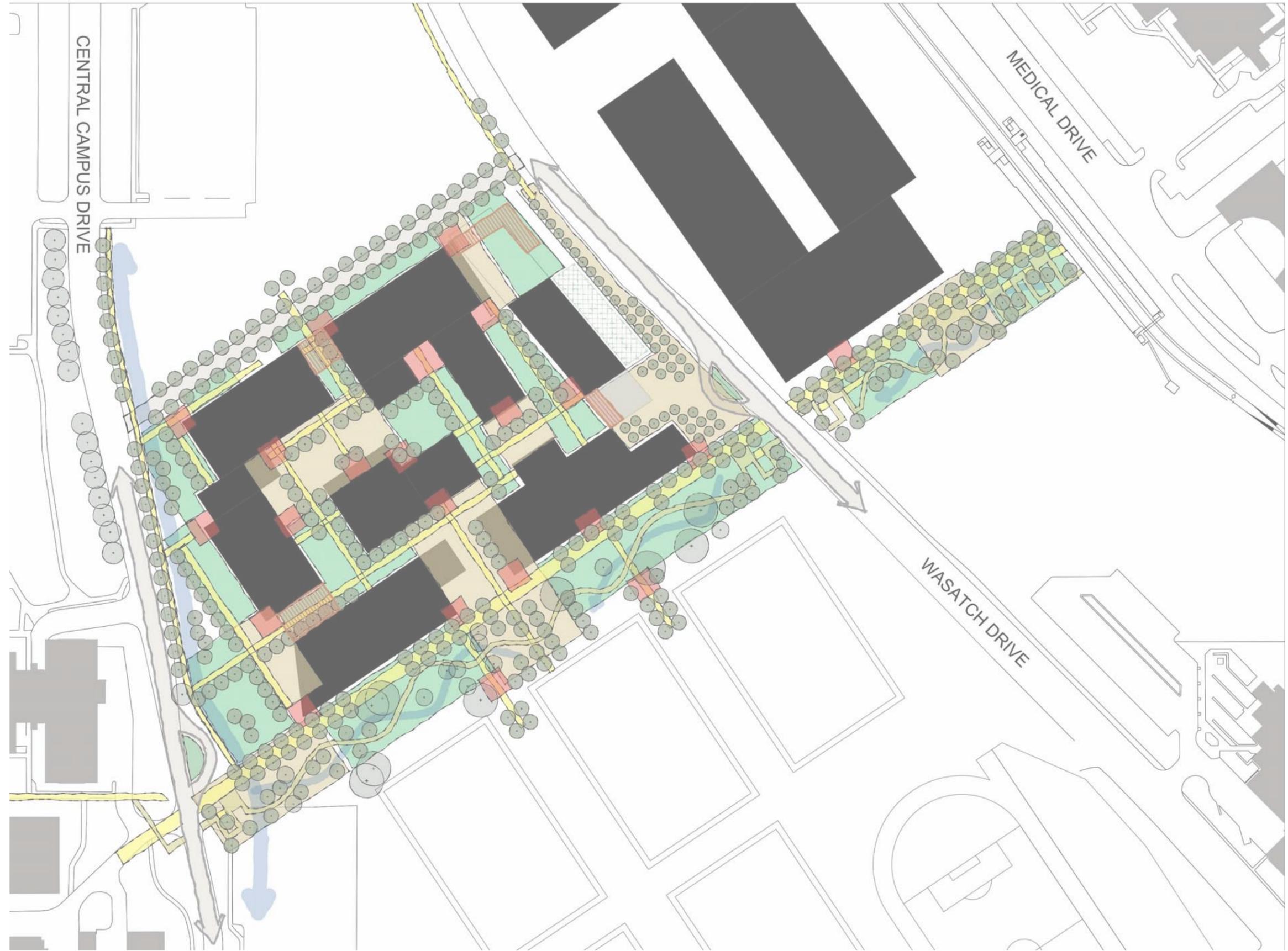
t e s t t w o



002 massing diagram

open space 002

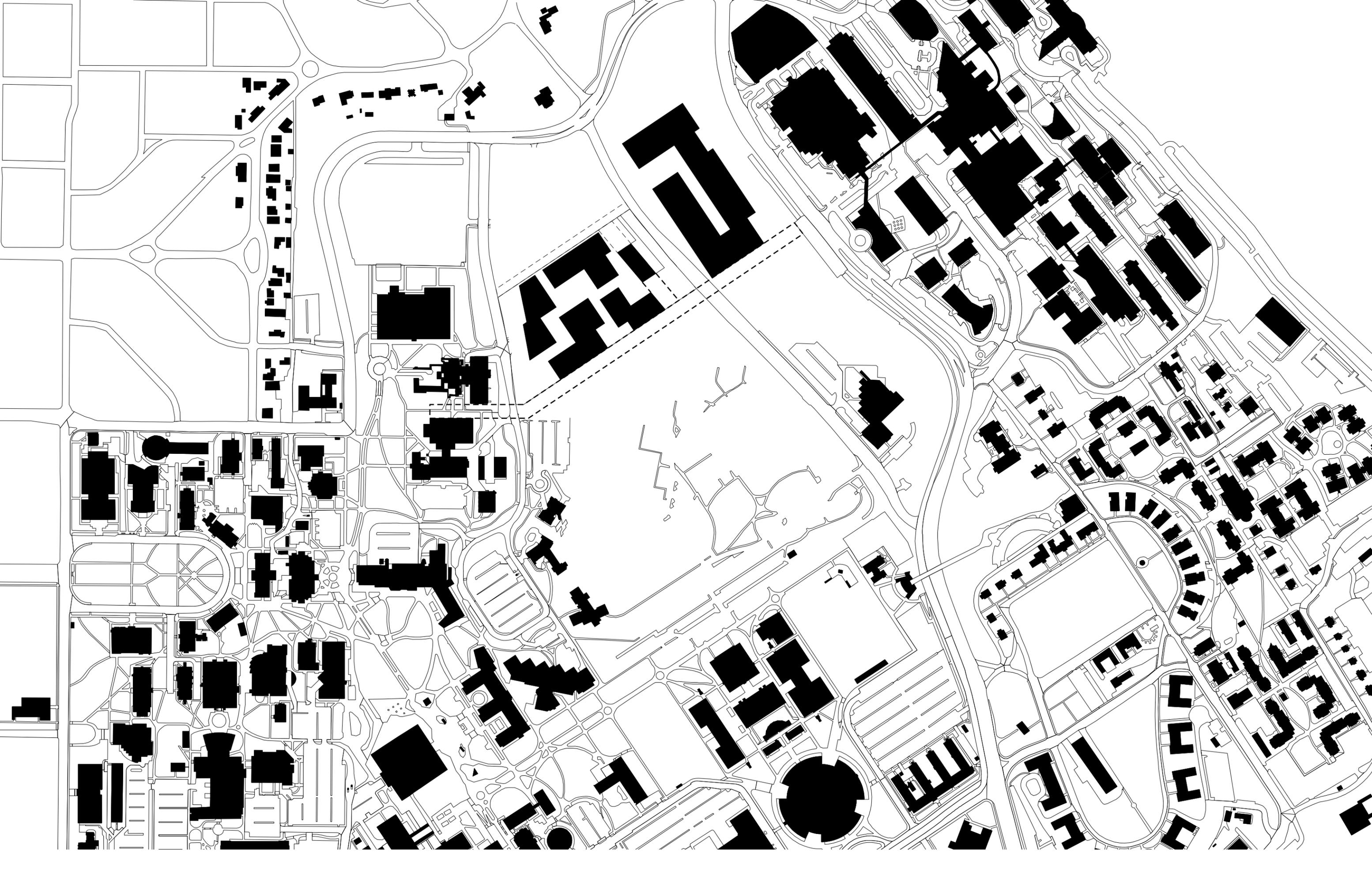
- public plaza:**
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  - garden/bosque/recreational lawn
  - formal planted area
- grade change zone:**
- bioswale:**
- existing tree:**
- proposed tree:**



# .tests

06

t e s t   t h r e e



# .tests

06

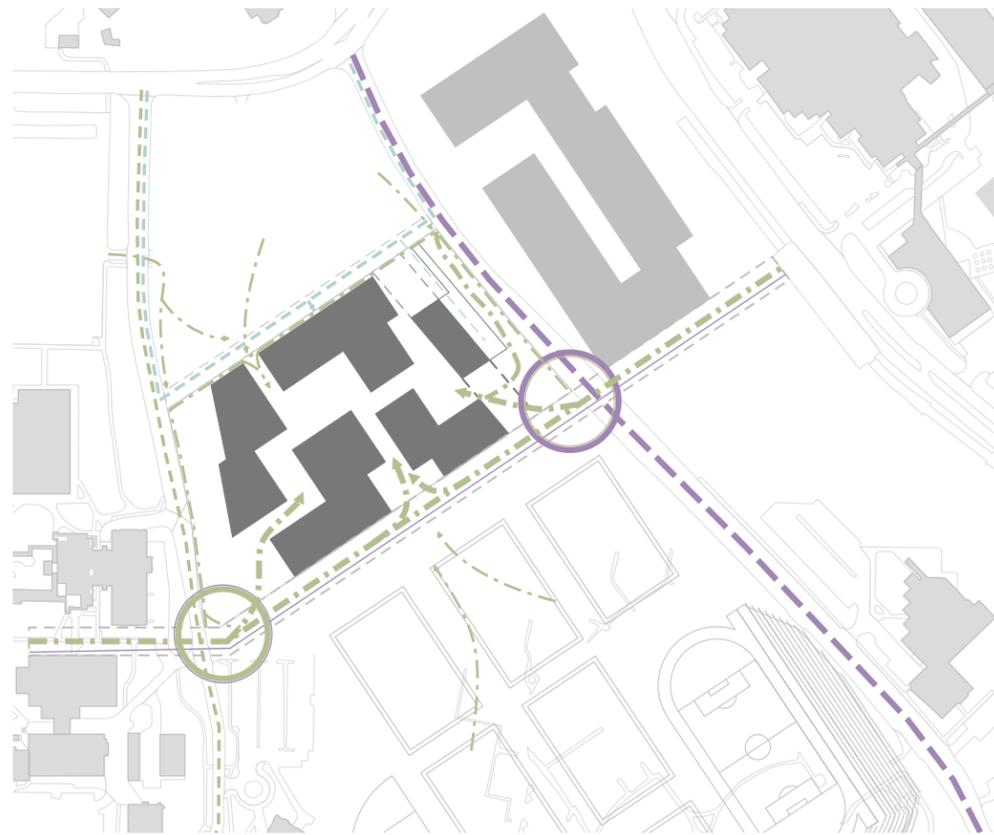
t e s t   t h r e e

- core program
- service / loading
- parking

003 building lower level



003 site entries



003 building entries

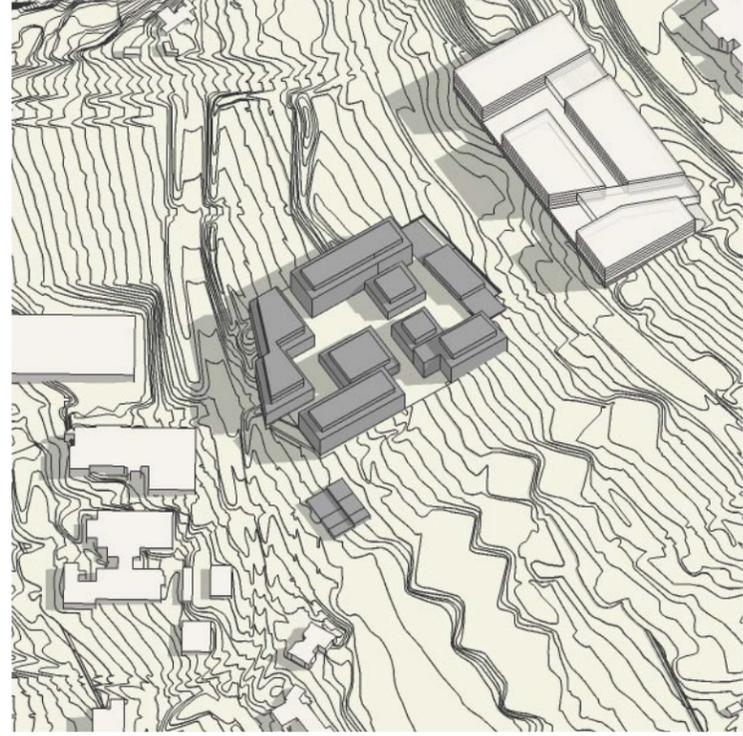


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  - user entry from parking-option
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  - secondary service
  - public space/primary building entry
  - secondary building entry

# .tests

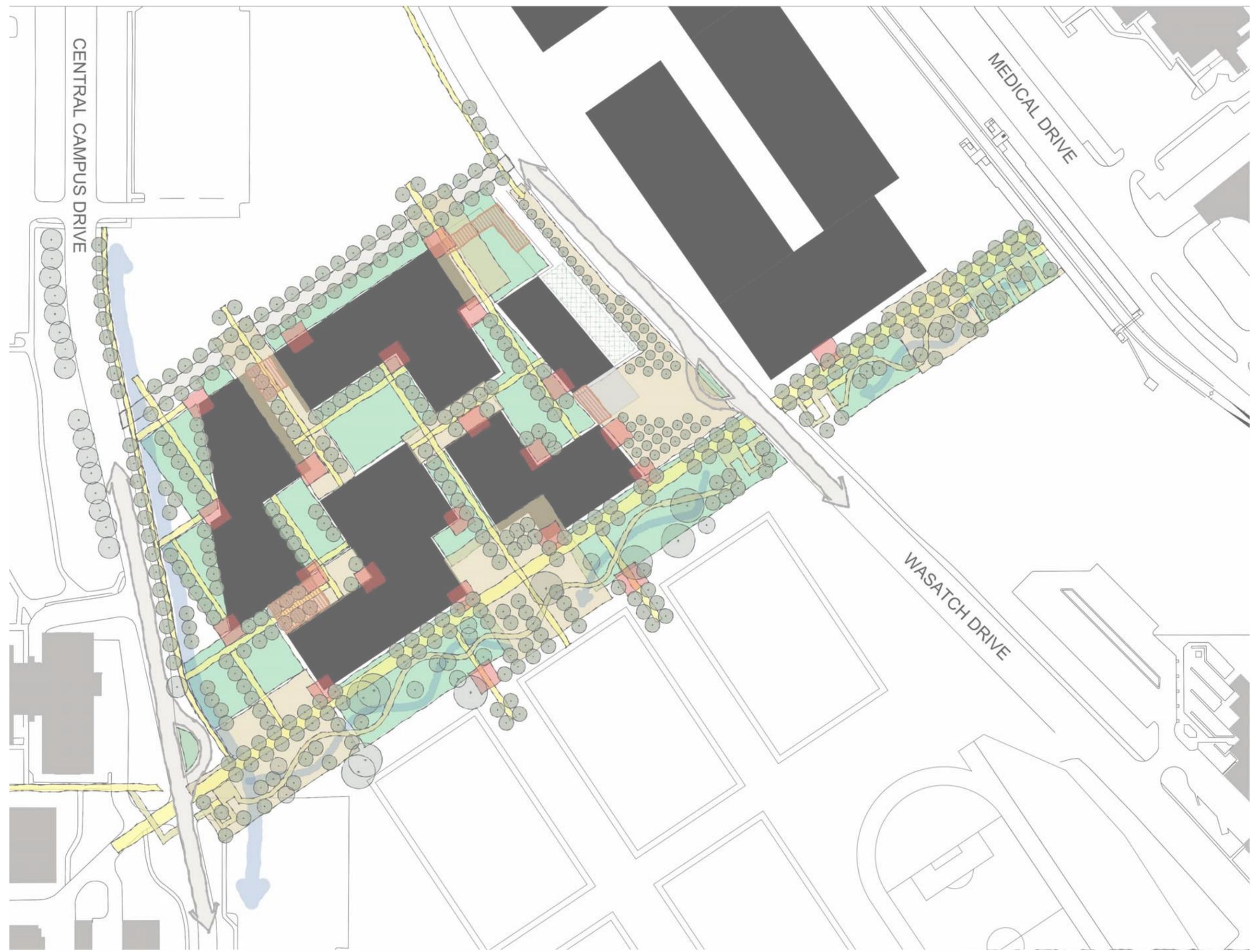
## 06

t e s t   t h r e e



003 massing diagram

- public plaza:**
  - signature space
  - celebration space
- court yard:**
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  - terrace/garden
- pedestrian circulation:**
  - formal pathway
  - corridor
- landscape:**
  - garden/bosque/recreational lawn
  - formal planted area
- grade change zone:**
- bioswale:**
- existing tree:**
- proposed tree:**



# .team

## a c k n o w l e d g e m e n t s

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SALT LAKE CITY, UTAH

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Lord, Aeck, Sargent Architecture  
Architectural Nexus

### **landscape**

ATLANTA, GEORGIA

EDAW

### **engineers**

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SALT LAKE CITY, UTAH  
SALT LAKE CITY, UTAH

m+w zander  
Ken Garner Engineering  
Van Boerum & Frank

### **contractor**

SALT LAKE CITY, UTAH

Jacobsen Construction

### **photography**

DURANGO, COLORADO

Andrew Gulliford

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