UW West Campus Utility Plant

UWAC DESIGN DEVELOPMENT APPROVAL

30 March 2015

W Mortenson construction ARUP MILLER HULL

GUSTAFSON GUTHRIE NICHOL LANDAU ASSOCIATES kpff

An Opportunity to Set a New Standard of Excellence

TODAY'S AGENDA

PROJECT OVERVIEW

PREVIOUS MEETING RECAP (2/17/15 UWAC MEETING ONLINE)

WHERE WE ARE NOW

1. SITE & LANDSCAPE DEVELOPMENT
2. ENGINEERING/SYSTEMS UPDATE
3. SCREEN/WRAPPER CHARACTER
4. BASE LEVEL MATERIALS & CHARACTER
5. INTERPRETIVE OPPORTUNITIES

NEXT STEPS

The team is scheduled to wrap up our Phase 1 Agreement on 5/8/15, and move forward with Final Design under the Phase 2 Design/Build Agreement

Construction scheduled to begin Fall 2015, with Substantial Completion in Fall 2016.
Final Completion scheduled to coincide with February 2017 ARCF opening.

PROJECT OVERVIEW

PROJECT PARAMETERS

PROJECT PRIORITIES

1. MAXIMIZE CAPACITY: Provide Centralized Source for Chilled Water and Emergency Power Serving as much of (future) campus as possible. Phased Equipment Installation.
2. CREATE ARCHITECTURAL VALUE: Campus Gateway & Fit with the West Campus Framework Plan
3. EXPRESS SUSTAINABILITY ETHIC: Opportunity to communicate UW's Commitment to Sustainability

FUNDING

$ 30.5 M Initial Budget for Phase I West Campus Utility Plant

<u>$ 5.7 M Value-Added Enhancements</u>

$ 36.2 M Total Project Budget

PROGRESSIVE DESIGN/BUILD DELIVERY METHOD

New Method. Two Contracts. Collaborative Design. Integrated Delivery. Successful Story.

SCHEDULE

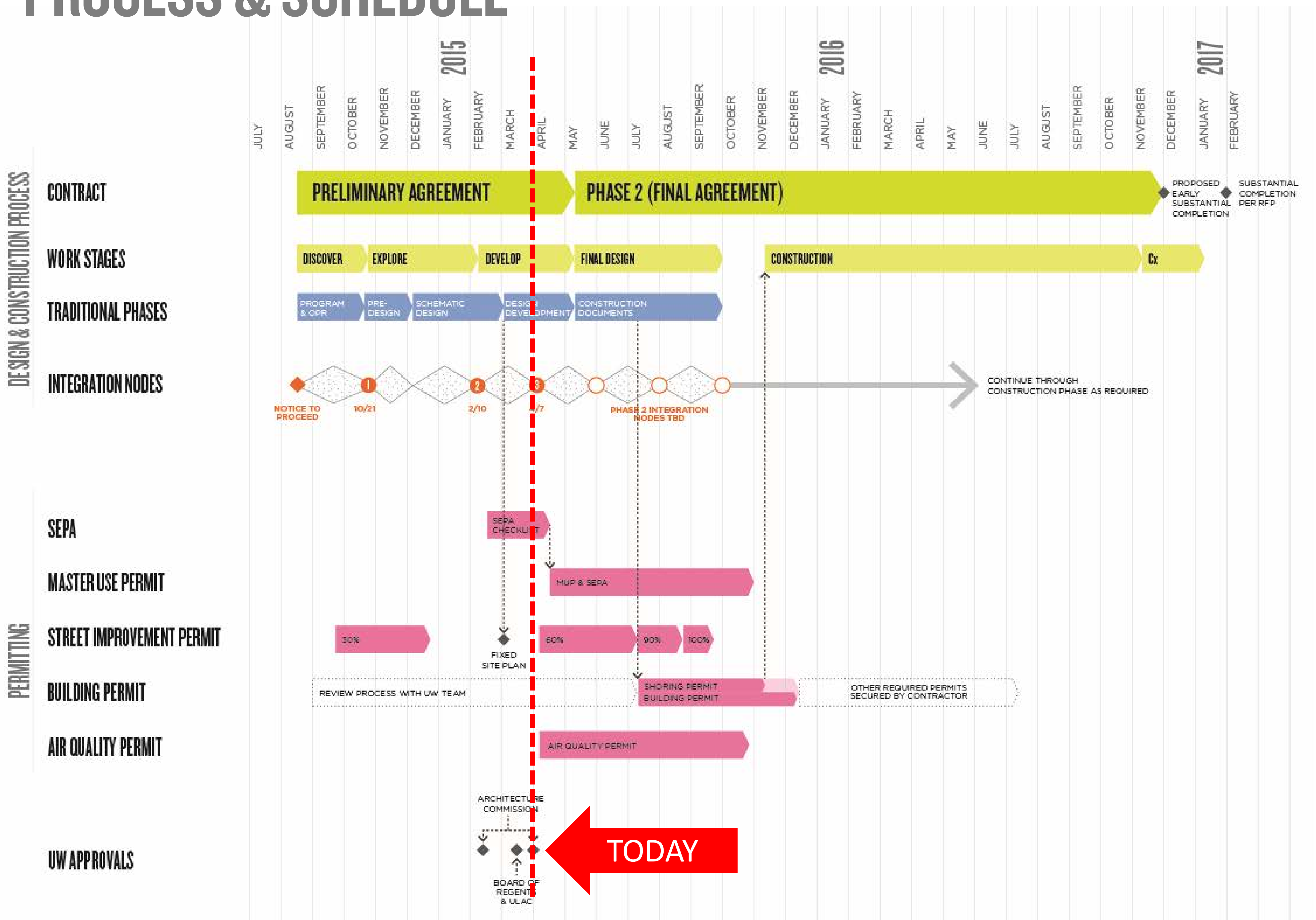
Design Build Contract in May 2015

Start Construction Fall 2015

Phase I: Substantial Completion - February 2017

Phase 2: Additional Equipment Only - TBD

PROCESS & SCHEDULE



PROJECT LOCATION / SERVICE AREAS

CURRENT AND FUTURE DEVELOPMENT

- 10,500 T Chiller Capacity (with additional 3,000 T provided by Future Thermal Energy Storage)
- Each 1,000 T serves approximately 350,000-600,000 SF of development
- 6,000 T planned to serve South Campus
- 7,500 T Future Capacity could serve roughly 4,500,000 SF of development on West Campus

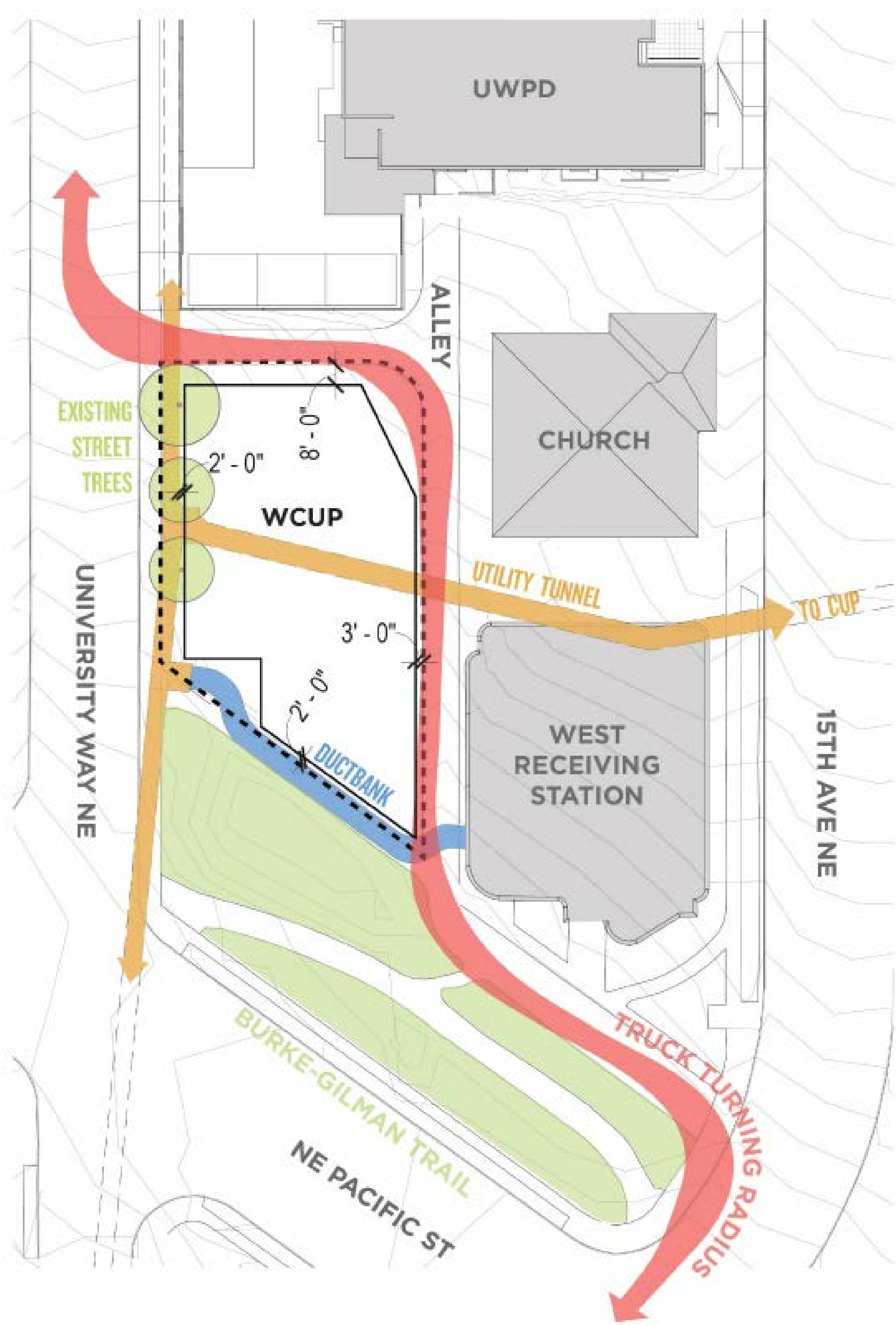
PREVIOUS MEETING RECAP

WCUP PROJECT SITE & IMMEDIATE CONTEXT

SITE ANALYSIS

KEY CONSTRAINTS

- **WEST:** North leg of utility tunnel to Gould Hall; South leg to South Campus
- **NORTH:** Alley setback, building screening, truck turning radius
- **EAST:** Alley setback, truck turning radius
- **SOUTH:** UW ductbank + SCL 26kV Service to West Receiving Station
- **ONSITE:** Utility Tunnel to Central Plant; Power Poles adjacent to alley; truck turning radii

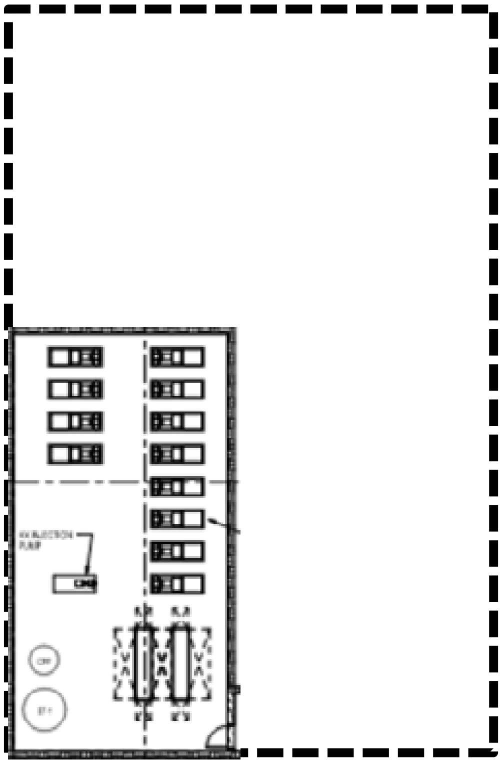


MAXIMIZING CAPACITY

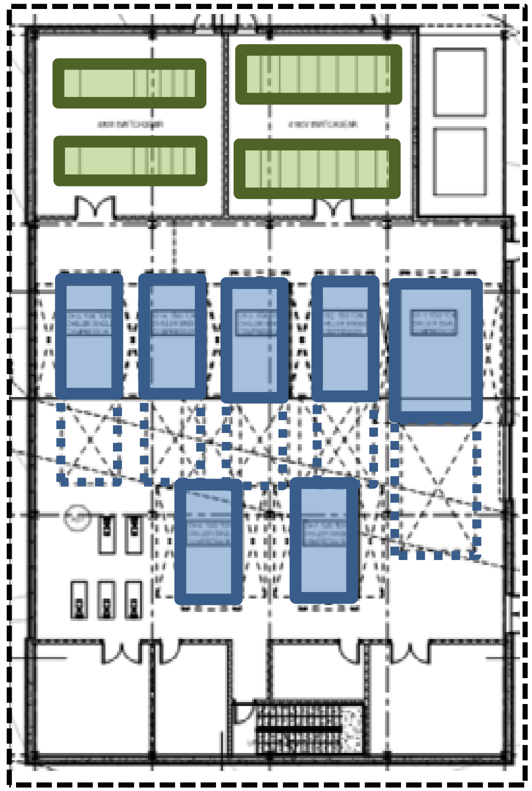
At 74' x 110', the WCUP Plant is:

- As **SMALL** as it can possibly be while maximizing the capacity of chilled water and emergency power it provides to the South & West Campuses.
- As **BIG** as it can be working within the various site constraints and budget limitations.

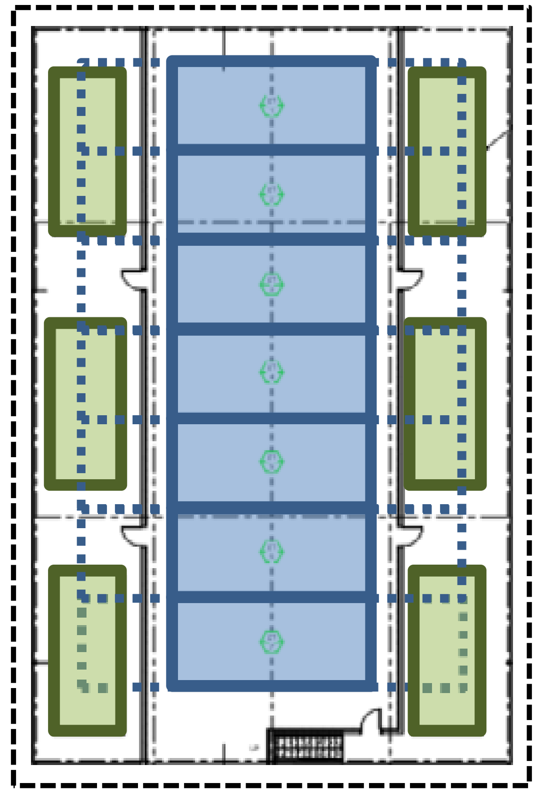
FUTURE BUILD OUT



PARTIAL BASEMENT PLAN



MAIN FLOOR PLAN



ROOF PLAN

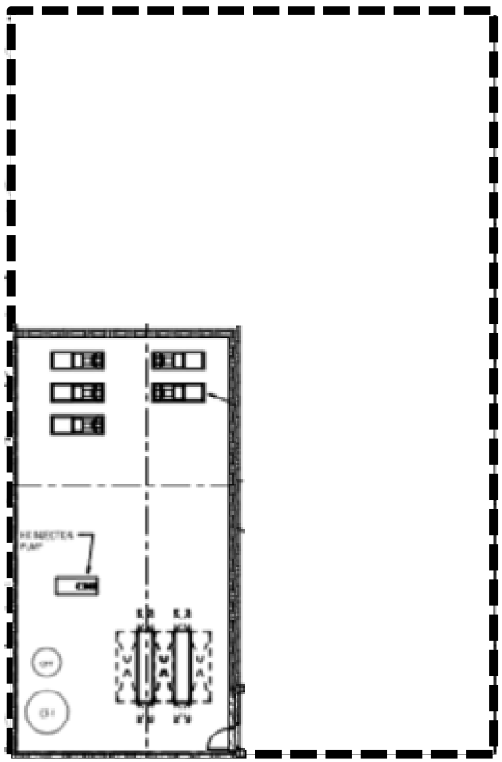
CHILLED WATER

- Chillers to support 10,500T total future capacity
- Ability to add Thermal Energy Storage for additional 3,000 T

POWER GENERATION

- Future expansion to 12MW

INITIAL INSTALL – DAY 1



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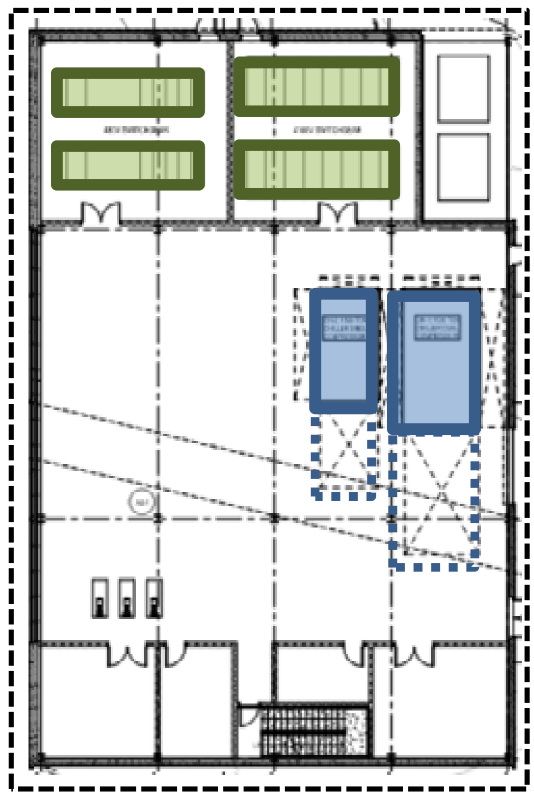

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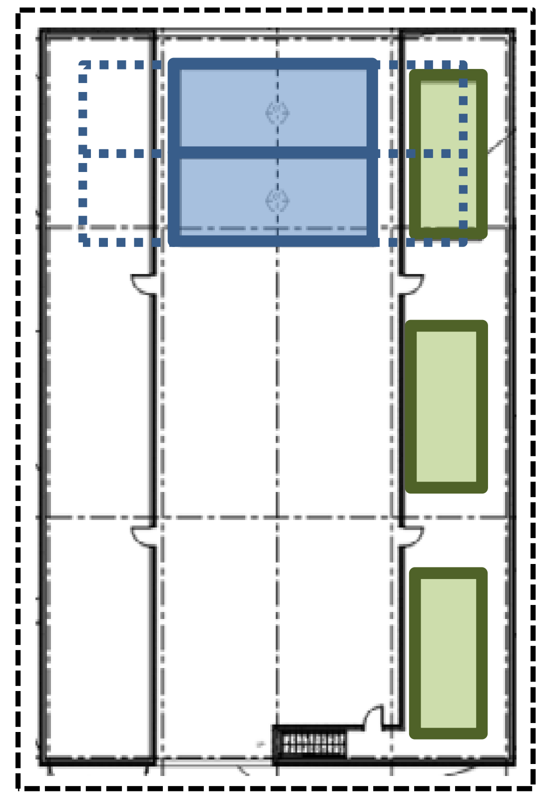


ROOF PLAN

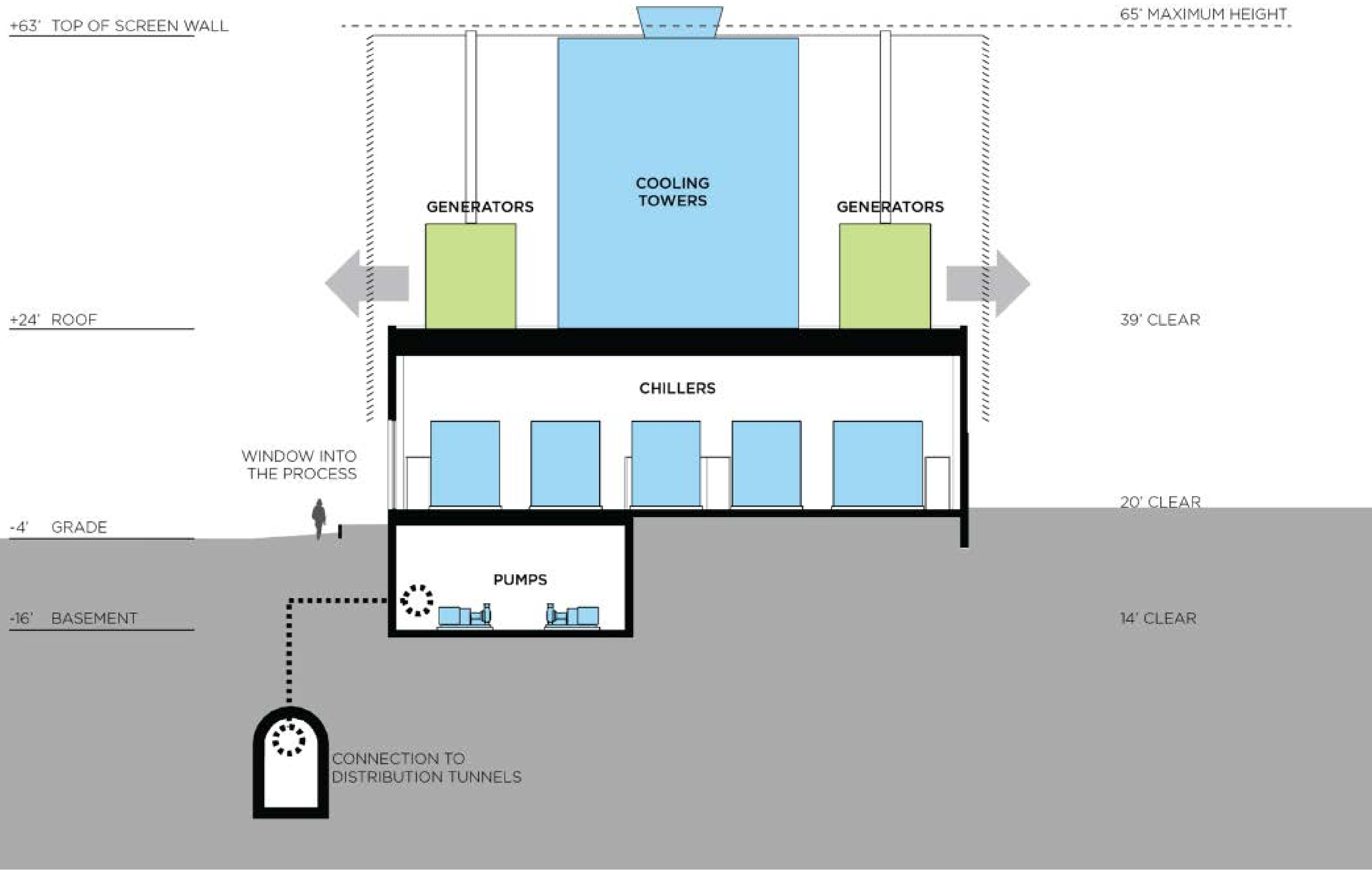
CHILLED WATER

- Chillers to support 3,000T initial capacity

POWER GENERATION

- Generators to support 6MW initial capacity

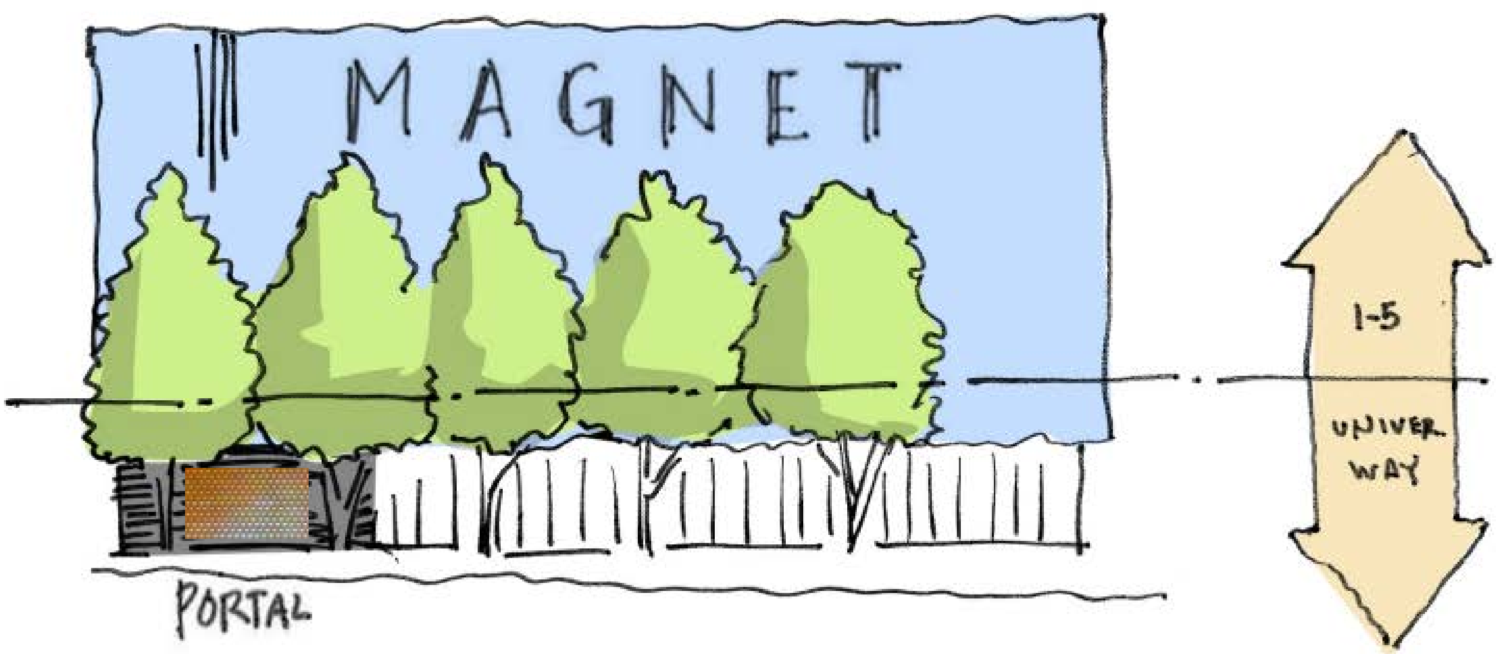
CLEAR ORGANIZATION OF SYSTEMS



BUILDING/INTERPRETIVE CONCEPT

MAGNET & PORTAL

- Facility to Attract Interest & Provide Opportunity for Engagement
- Interpretive Content to be Curated by UW ES&S
- Integrate Building Facades with Interpretive/Display at Multiple Scales
- Connect/Engage with BGT & University Way



INTERPRETIVE/DISPLAY OPPORTUNITIES

AUGMENTED REALITY

3-D Virtual Objects are Integrated into a 3-D Real Environment in Real Time

Connections Can be Made to Other UW Campus-wide Information/Data/News:

- Sustainability Initiatives
- Campus Energy Usage
- UW Nobel Laureates

Working with UW ES&S who will be responsible for curating the information content accessed through the PORTAL

PRIMARY SUBSTATION 2012 OLYMPICS – NORD ARCHITECTURE

GREEN BUILDING RATING SYSTEM - ENVISION

RECENT PROJECT SUSTAINABILITY PROGRESS

- 11/14/14 Direction from UW to Proceed with ENVISION
- 1/26/15 Sustainability Workshop with UW Stakeholders and Project Team

ENVISION™

- Alternative Third-Party Rating System designed for Infrastructure Projects
- Opportunity for UW to continue to demonstrate Sustainable Leadership

CREDIT LIST

QUALITY OF LIFE
13 Credits

1 PURPOSE
- QL1.1 Improve Community Quality of Life
- QL1.2 Stimulate Sustainable Growth & Development
- QL1.3 Develop Local Skills & Capabilities

2 WELLBEING
- QL2.1 Enhance Public Health & Safety
- QL2.2 Minimize Noise and Vibration
- QL2.3 Minimize Light Pollution
- QL2.4 Improve Community Mobility & Access
- QL2.5 Encourage Alternative Modes of Transportation
- QL2.6 Improve Accessibility, Safety, & Wayfinding

3 COMMUNITY
- QL3.1 Preserve Historic & Cultural Resources
- QL3.2 Preserve Views & Local Character
- QL3.3 Enhance Public Space

QL0.0 Innovate or Exceed Credit Requirements

LEADERSHIP
10 Credits

1 COLLABORATION
- LD1.1 Provide Effective Leadership & Commitment
- LD1.2 Establish A Sustainability Management System
- LD1.3 Foster Collaboration & Teamwork
- LD1.4 Provide for Stakeholder Involvement

2 MANAGEMENT
- LD2.1 Pursue By-Product Synergy Opportunities
- LD2.2 Improve Infrastructure Integration

3 PLANNING
- LD3.1 Plan For Long-Term Monitoring & Maintenance
- LD3.2 Address Conflicting Regulations & Policies
- LD3.3 Extend Useful Life

LD0.0 Innovate or Exceed Credit Requirements

RESOURCE ALLOCATION
14 Credits

1 MATERIALS
- RA1.1 Reduce Net Embodied Energy
- RA1.2 Support Sustainable Procurement Practices
- RA1.3 Use Recycled Materials
- RA1.4 Use Regional Materials
- RA1.5 Divert Waste From Landfills
- RA1.6 Reduce Excavated Materials Taken Off Site
- RA1.7 Provide For Deconstruction & Recycling

2 ENERGY
- RA2.1 Reduce Energy Consumption
- RA2.2 Use Renewable Energy
- RA2.3 Commission & Monitor Energy Systems

3 WATER
- RA3.1 Protect Fresh Water Availability
- RA3.2 Reduce Potable Water Consumption
- RA3.3 Monitor Water Systems

RA0.0 Innovate or Exceed Credit Requirements

NATURAL WORLD
15 Credits

1 SITING
- NW1.1 Preserve Prime Habitat
- NW1.2 Protect Wetlands & Surface Water
- NW1.3 Preserve Prime Farmland
- NW1.4 Avoid Adverse Geology
- NW1.5 Preserve Floodplain Functions
- NW1.6 Avoid Unsuitable Development on Steep Slopes
- NW1.7 Preserve Greenfields

2 LAND + WATER
- NW2.1 Manage Stormwater
- NW2.2 Reduce Pesticide & Fertilizer Impacts
- NW2.3 Prevent Surface & Groundwater Contamination

3 BIODIVERSITY
- NW3.1 Preserve Species Biodiversity
- NW3.2 Control Invasive Species
- NW3.3 Restore Disturbed Soils
- NW3.4 Maintain Wetland & Surface Water Functions

NW0.0 Innovate or Exceed Credit Requirements

CLIMATE AND RISK
8 Credits

1 EMISSIONS
- CR1.1 Reduce Greenhouse Gas Emissions
- CR1.2 Reduce Air Pollutant Emissions

2 RESILIENCE
- CR2.1 Assess Climate Threat
- CR2.2 Avoid Traps & Vulnerabilities
- CR2.3 Prepare For Long-Term Adaptability
- CR2.4 Prepare For Short-Term Hazards
- CR2.5 Manage Heat Island Effects

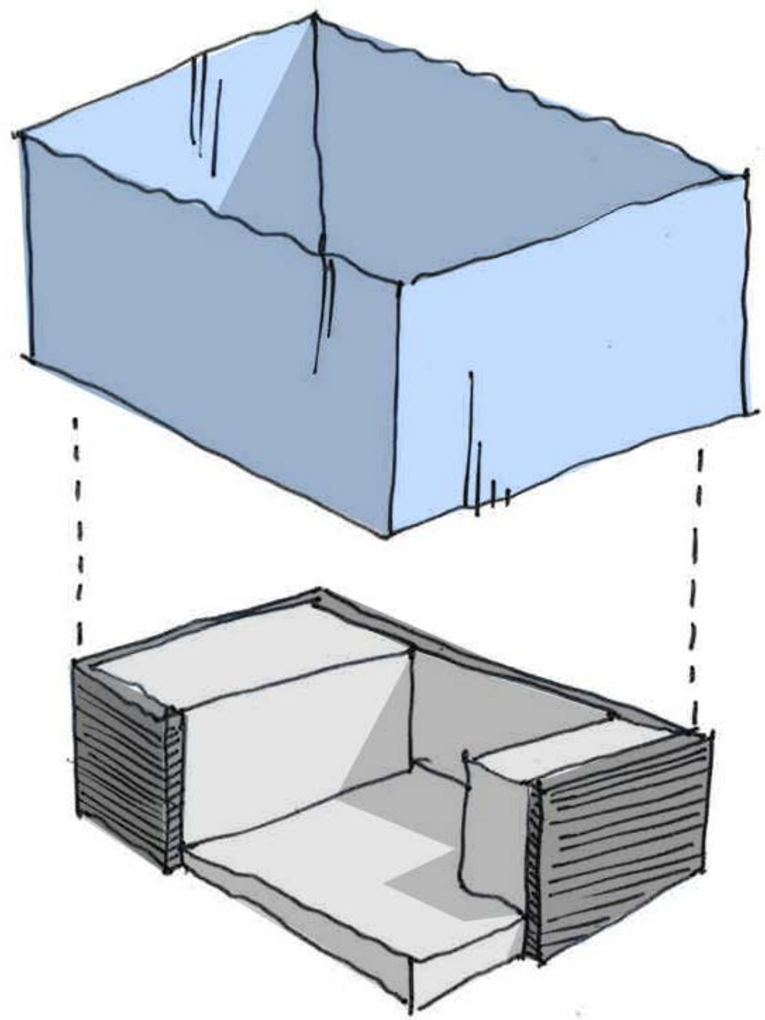
CR0.0 Innovate or Exceed Credit Requirements

DESIGN PRINCIPLES

- Thoughtfully integrate UW WCUP into the larger campus context
- Highlight the distinctly different characters of the Burke Gilman Trail and University Way
- Focus on the southwest corner; it works at both the regional/campus scale and the human scale
- Engage the public through "Windows into the Process" and a positive pedestrian experience along University Way
- Convey through architecture/landscape/interpretive program the concept of "**TRANSFER**" or "**EXCHANGE**". Relates to the plant's function, it's connection to other buildings on campus and the exchange of services/ideas/info that are the hallmark of a higher ed institution.

CAMPUS CONTEXT

MASSING CONCEPT



SCREEN

WRAPPER

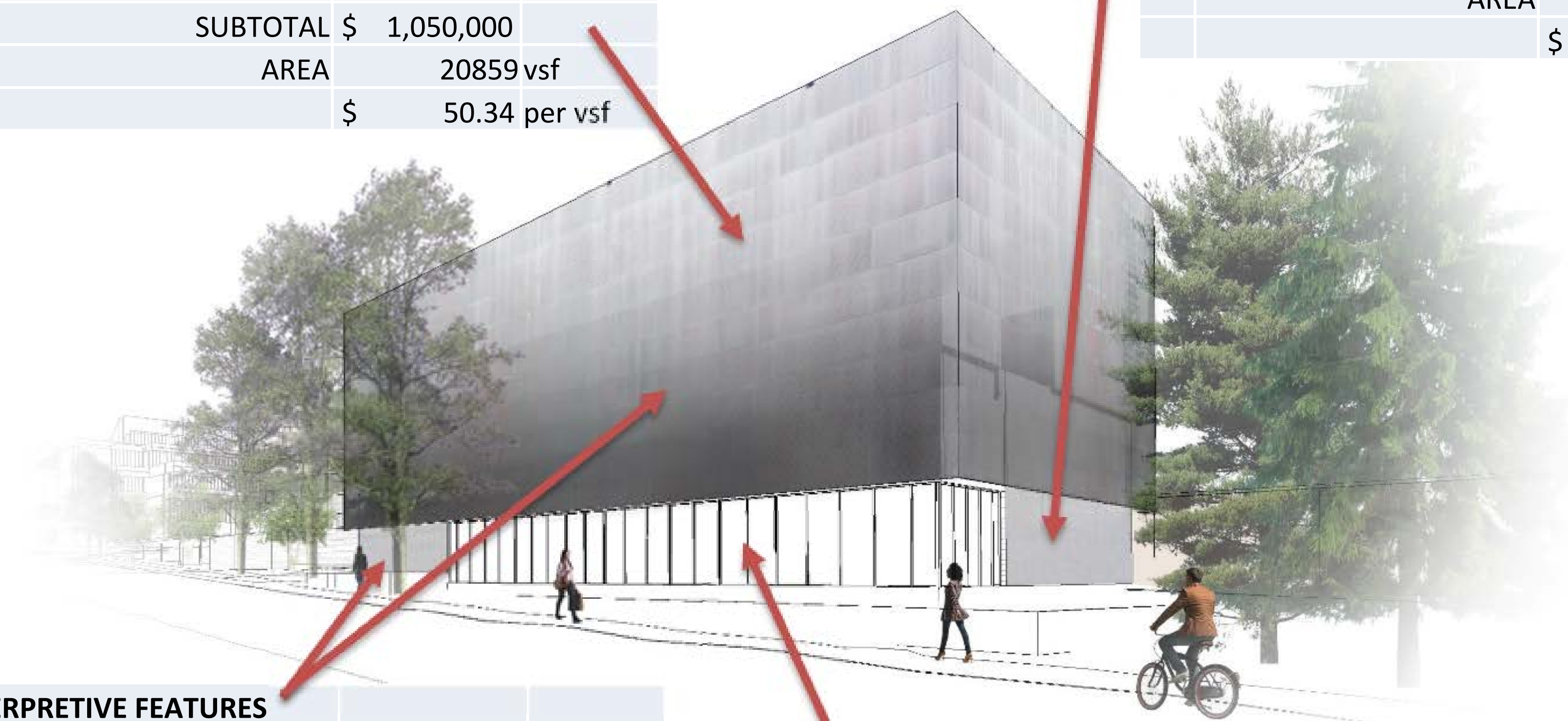
SOLIDS

SLAB

DESIGNING TO BUDGET

SCREENWALL			
Structure	$	260,000	
Screen Panels	$	575,000	
Misc Finishes/Coping	$	15,000	
Enhancement Allowance	$	200,000	
SUBTOTAL	$	1,050,000	
AREA		20859	vsf
	$	50.34	per vsf

PRECAST INSULATED CONCRETE PANELS			
Precast Panels	$	600,000	
Misc Support Steel	$	32,000	
Paint at Interior	$	7,000	
SUBTOTAL	$	639,000	
AREA		9136	vsf
	$	69.94	per vsf



INTERPRETIVE FEATURES			
IT Backbone	$	50,000	
LED Lighting / Dashboard	$	138,000	
SUBTOTAL	$	188,000	
AREA		1728	vsf
	$	108.80	per vsf

STOREFRONT			
Storefront System	$	80,000	
SUBTOTAL	$	80,000	
AREA		1250	vsf
	$	64.00	per vsf

PROFILED

LOTT CLEAN WATER ALLIANCE – MILLER HULL

PATTERNED

WILD TURKEY VISITOR CENTER – DE LEON & PRIMER

TRANSLUCENT

LABAN DANCE CENTRE – HERZOG & DE MEURON
CENTRE FOR SYNCHROTRON SCIENCE – BATES SMART

SOLID AND TRANSLUCENT

ZLTO– DE ARCHITECKTEN CIE
TATE MODERN ADDITION– HERZOG & DE MEURON

PERFORATED

OSU EAST REGIONAL CHILLER PLANT – LEERS WEINZAPFEL
UW ALDER HALL – MAHLUM
DE YOUNG MUSEUM – HERZOG & DE MEURON

LAPPED

SOUTH TACOMA COMMUNITY CENTER – MILLER HULL
HOUSE K - THAM & VIDEGARD HANSSON

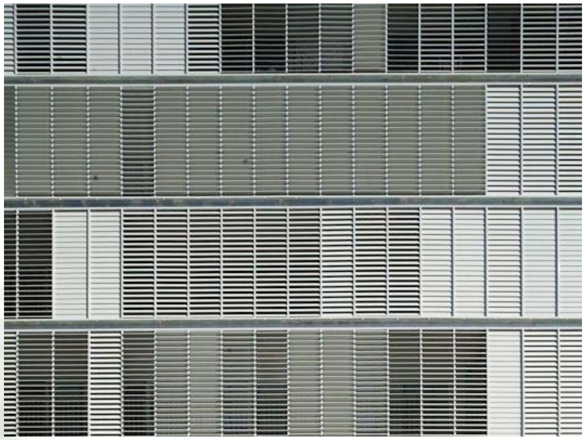
FACETED

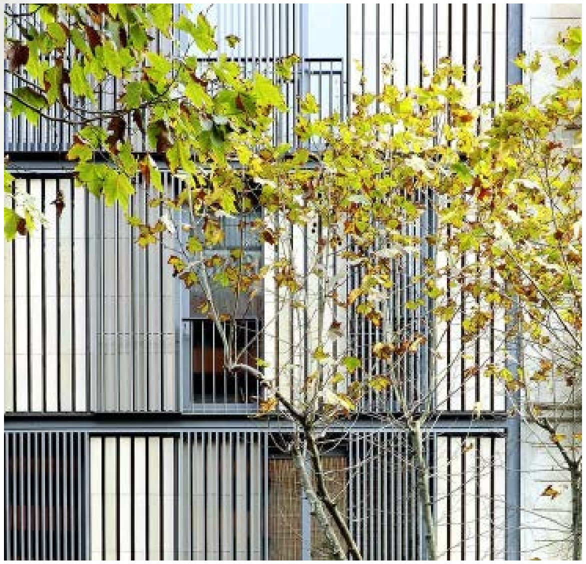
TRESARCA RESIDENCE – ASSEMBLAGE STUDIO
DEAR GINZA BUILDING – AMANO DESIGN OFFICE

FOLDED

IPERA 25 – ALATAS ARCHITECTURE
PORTOBELLO ROAD CARPARK

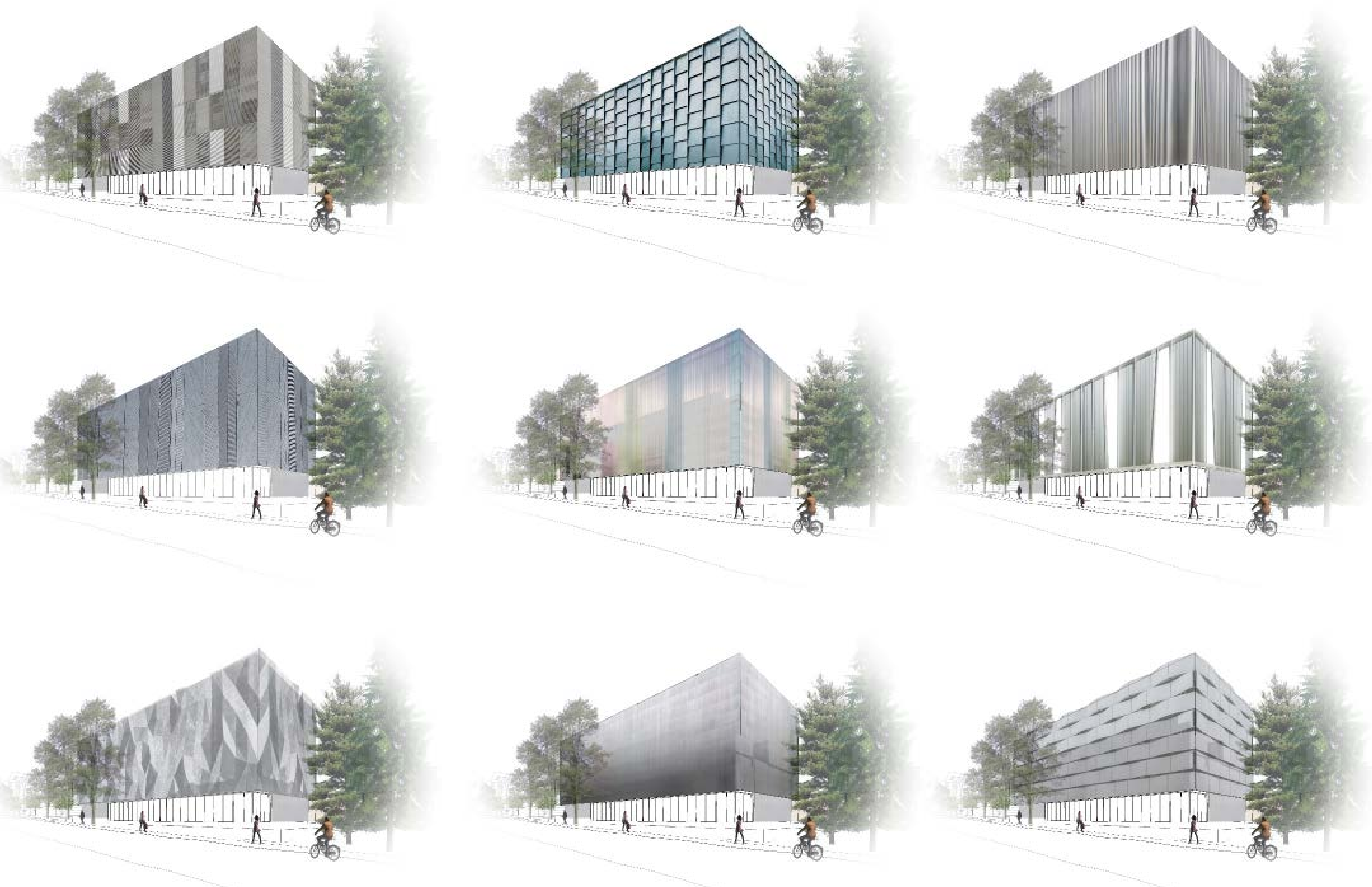
LOUVERED





SWISS RAILWAY MAIN OFFICE - LUSSI + HALTER
MULTIFAMILY BUILDING – LOLA DOMENECH + ANTONIO MONTES
CASP 74 - BACH ARQUITECTES

SCREEN WALL STUDIES



NOTES FROM UWAC ONLINE PRESENTATION – 2/17/15

SUMMARY OF YOUR COMMENTS

- A thoughtful and expected process leading to an "inevitable" package for the equipment.
- Project fits into campus context very well. The way the mass is articulated appears to be a good contributor to a larger collection of buildings.
- Slope of site has been used effectively to separate utility from pedestrian experience.
- The building can be simple and straightforward – it doesn't need to be overdone or self-conscious. Embrace its bigness and give it texture.
- Appreciate the idea of using the screen wall as a **MAGNET/PORTAL** and the intent of working with UW ES&S on curating the interpretive content.
- Consider how the building will appear differently in the day (solid object) and at night (transparent & permeable).
- Encouraged team to consider a 3-D expression of the screen. A 2-D expression simply becomes a graphic exercise.
- Consider weathering in tougher mechanical microclimate and appearance of materials over time.

- Key architectural decisions to be made:
    - Material Selection & Articulation of Screen Wall
    - Material Selection & Articulation of Solid/Glazed Base
    - The rest is "irreducible"

WHERE WE ARE NOW

SITE PLAN

- Total Landscape Area: 8393 sf
- Quantity of New Trees: 17

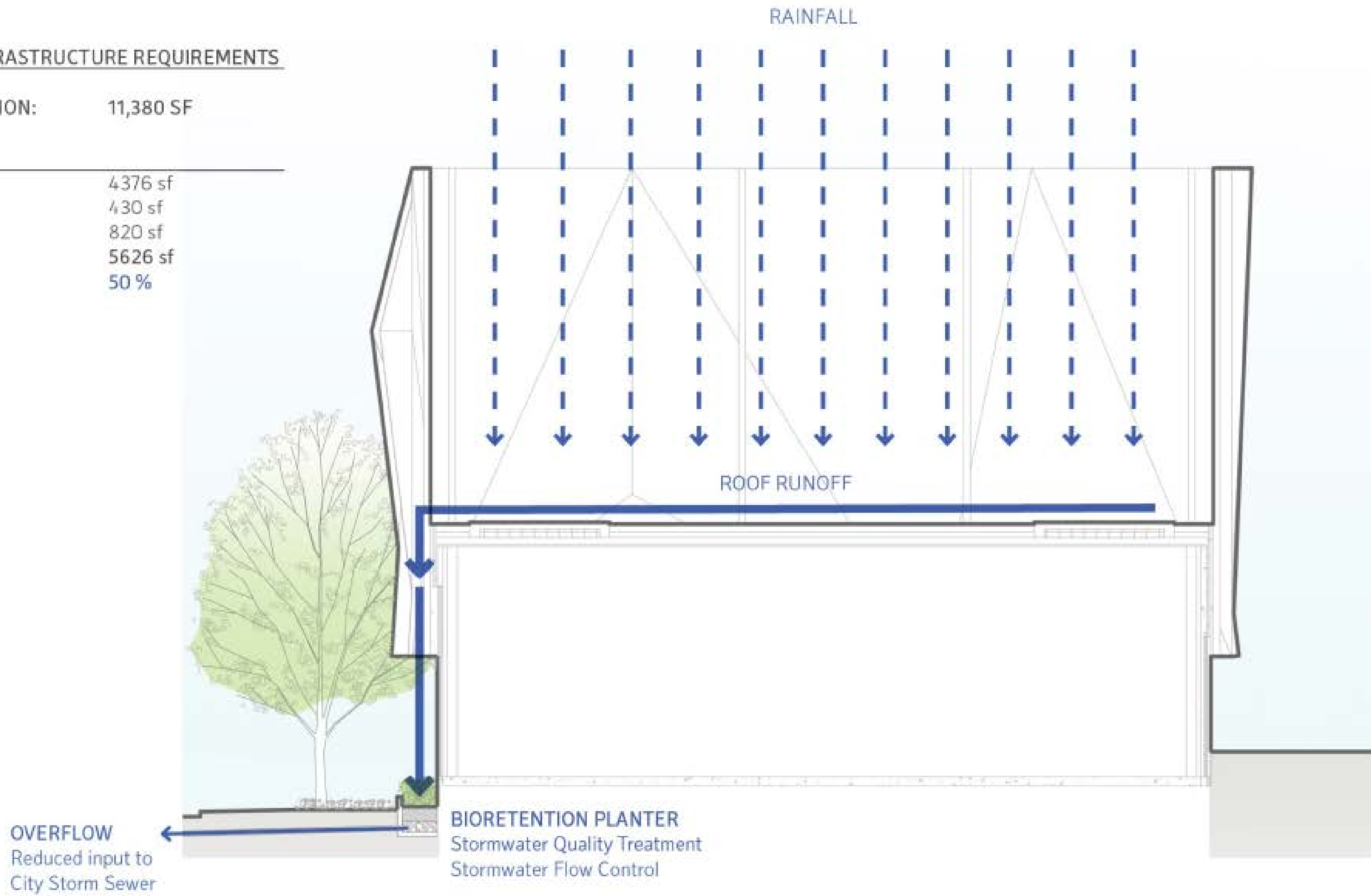
SITE OPPORTUNITIES

WORKING LANDSCAPE

GREEN STORMWATER INFRASTRUCTURE REQUIREMENTS

AREA REQUIRING MITIGATION: 11,380 SF

MITIGATION MEASURES:	
Bioretention:	4376 sf
Trees:	430 sf
Pervious Pavement:	820 sf
Total Area Mitigated:	**5626 sf**
% MITIGATION ACHEIVED:	50 %



UNIVERSITY WAY CONTEXT

EXISTING OAK

TULIP TREE

NEW TREES

UNIVERSITY WAY CHARACTER

Street Trees:

Green Ash

or

Pin Oak

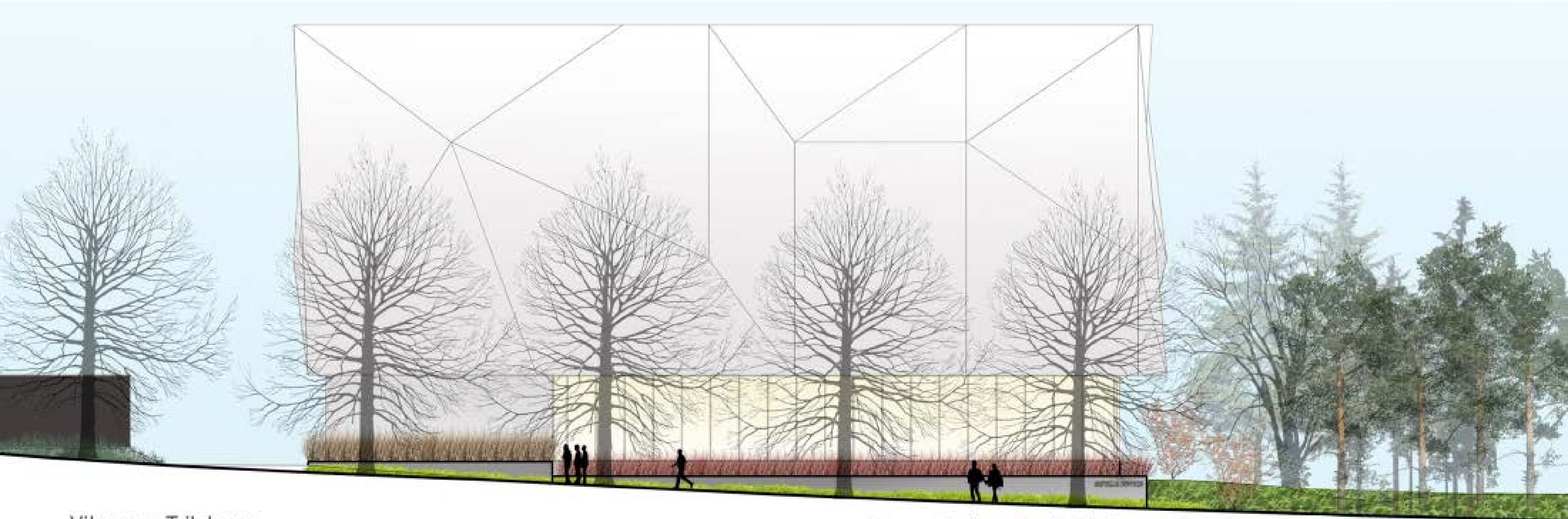
Understory:

Cotoneaster (Hot)

or

Vinca Minor (Cool)

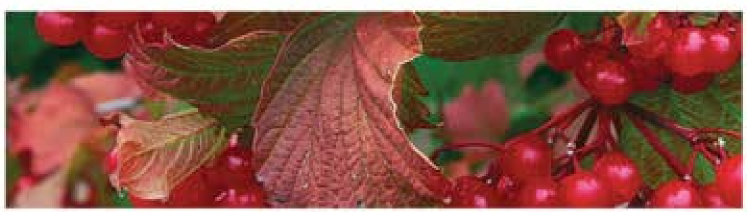
BIORETENTION CHARACTER



Viburnum Trilobum:

Spring

Fall



Winter

Cornus Sericea 'Arctic Fire'

Spring

Fall

Winter

BURKE GILMAN TRAIL CHARACTER

Tree Canopy:
Big Leaf Maple, Douglas Fir, Vine Maple





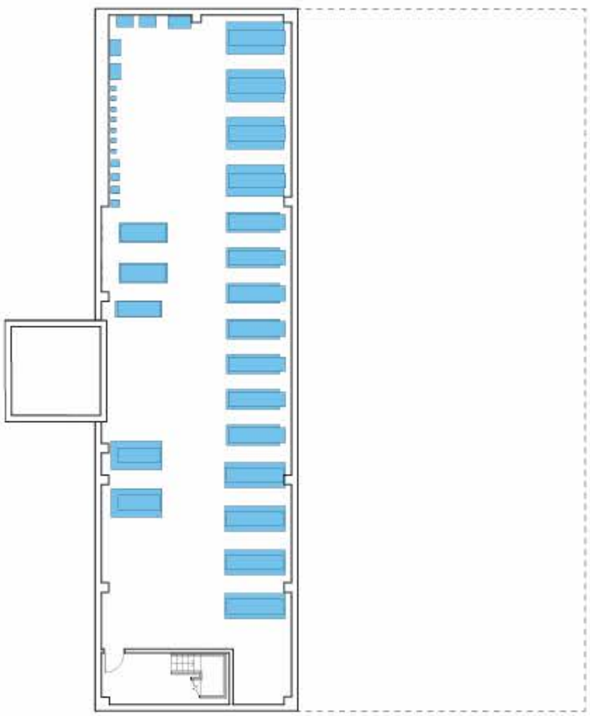
Understory:
Swordfern, Salal, Kinnickinick, Oregon Grape, Snowberry, Beach Strawberry



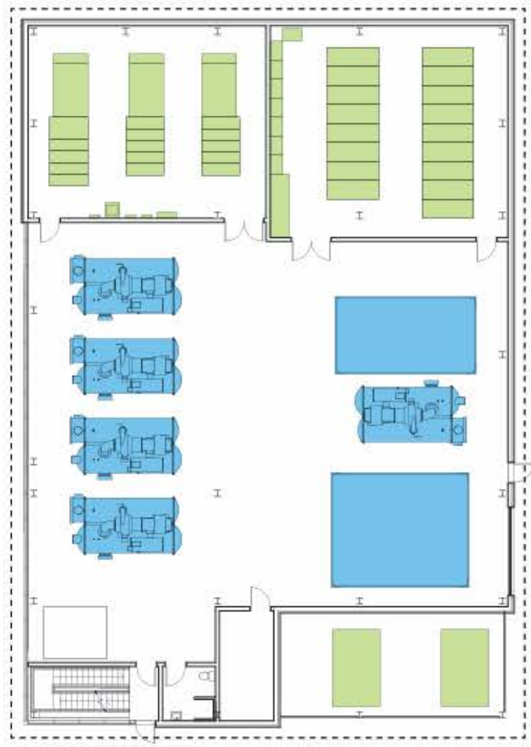




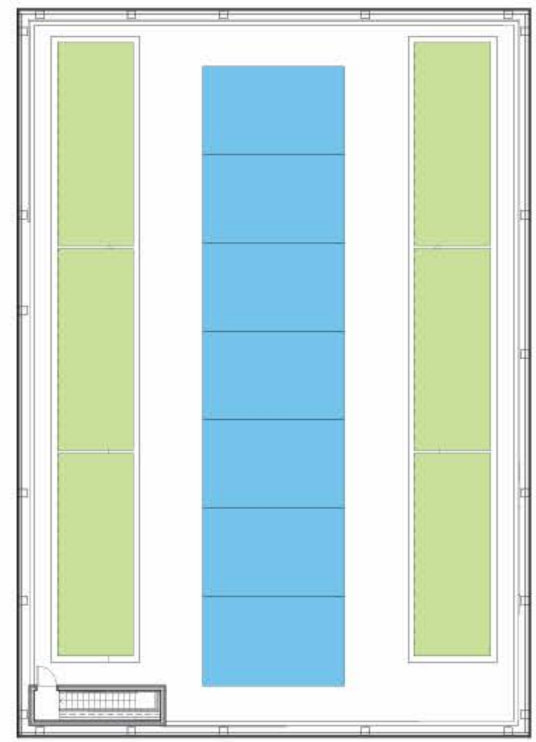
FUTURE BUILD OUT



BASEMENT PLAN



MAIN FLOOR PLAN



ROOF PLAN

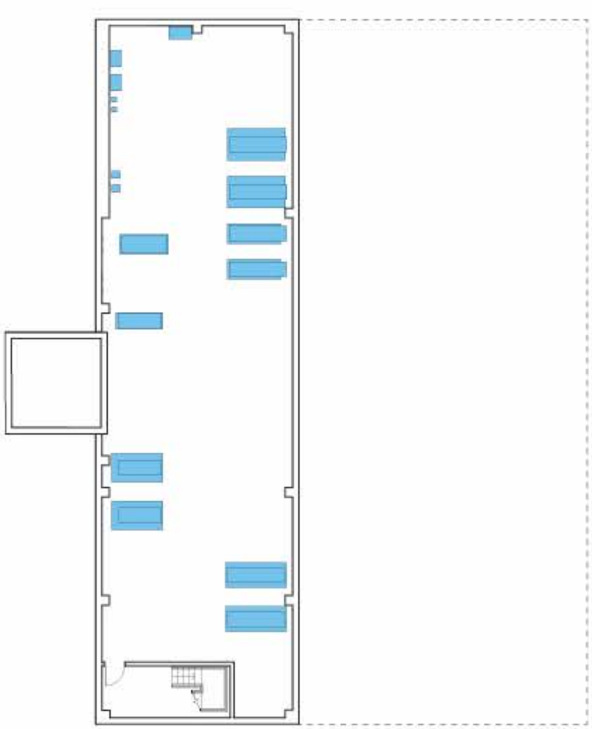
CHILLED WATER

- Chillers to support 10,500 T total future capacity (far exceeding the 6,000 T requirement in the RFP)
- Ability to add Thermal Energy Storage for additional 3,000 T

POWER GENERATION

- Future expansion to 12 MW

INITIAL INSTALL – DAY 1



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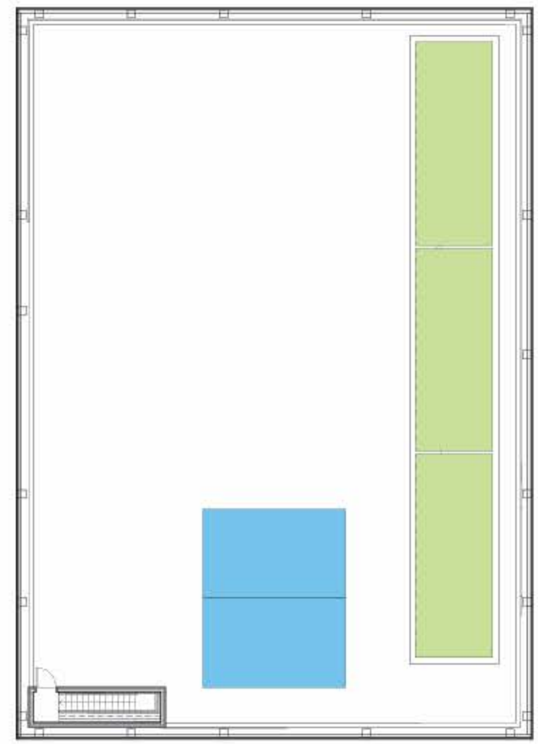


ROOF PLAN

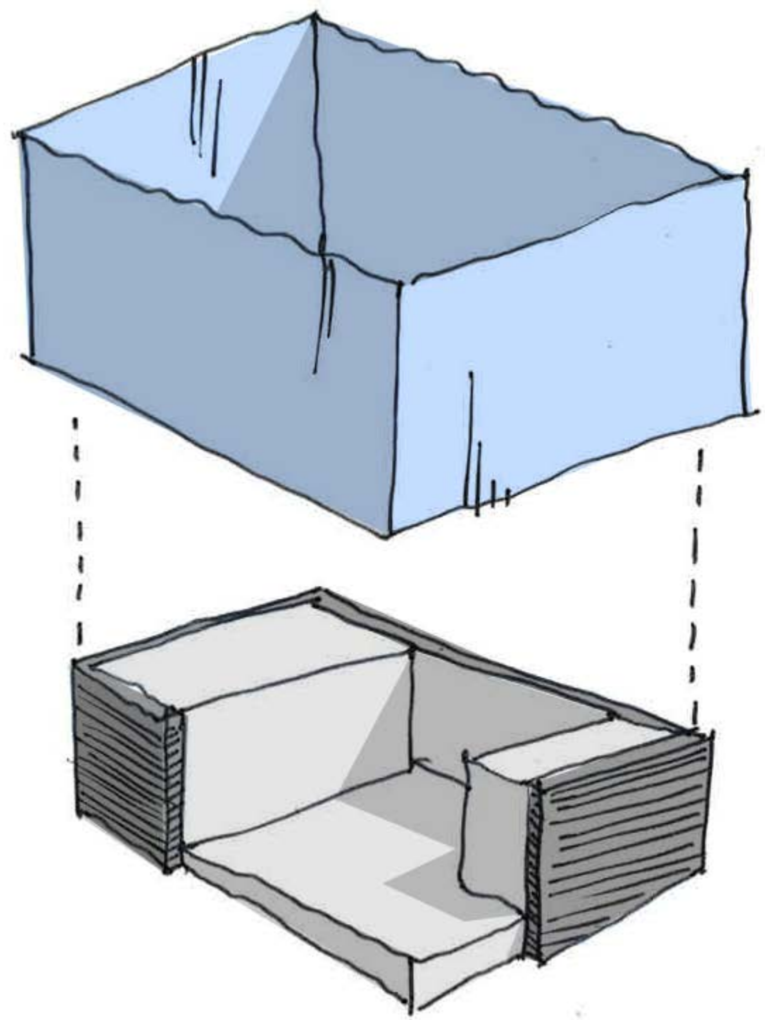
CHILLED WATER

- Chillers to support 3,000 T initial capacity (meeting the 3,000 T requirement in the RFP)

POWER GENERATION

- Generators to support 6 MW initial capacity

MASSING CONCEPT



SCREEN

WRAPPER

SOLIDS

SLAB

MATERIAL PALETTE

TEXTURED CONCRETE

POLYCARBONATE

CORRUGATED METAL

@ BASE

@ SCREEN WALL ABOVE

SCREEN WALL SYSTEM DESIGN DRIVERS

AESTHETIC/ARCHITECTURAL

- The screen wall contributes significantly to the architectural character of the building at this important gateway site
- Elegant simplicity rather than complex self-conscious expression is desired
- Surface modulation/articulation (3-D) may be more powerful than surface composition (2-D)
- Materials and detailing of screen must meet acoustic and cost requirements noted below

ACOUSTIC MITIGATION

- Project must meet Seattle Noise Ordinance (60dBa max. @ adjacent receiving property line)
- Acoustic mitigation required for (mostly) low frequency sound created by the Cooling Tower exhaust fans and intake louvers
- Emergency Generator noise is exempt from the Seattle Noise Ordinance
- Open screening or perforated panels on their own will not achieve the acoustic isolation required
- Acoustic performance requirements dictates solid panels with an average mass of 5psf

COST EFFECTIVE

- Budget allowance of $50/sf for screen wall system (structure, panels, interpretive, etc...)
- Budget for screen wall panels/skin is approximately ½ of the total screen wall system budget
- Look for efficiencies – every element addresses multiple requirements simultaneously

FACETED

TRESARCA RESIDENCE – ASSEMBLAGE STUDIO
DEAR GINZA BUILDING – AMANO DESIGN OFFICE

SCREEN WALL SYSTEM DESIGN DRIVERS

ARCHITECTURAL SCREEN

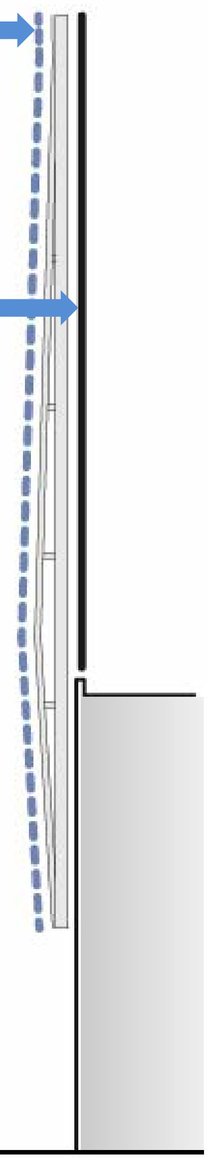
- Offers Maximum Flexibility In Panel Finish
- Outer Panel Can Be Perforated and/or Open
- Outer Skin Not Performing Acoustically

ACOUSTIC MITIGATION PANEL

- Acoustic Panel Not Visible From Exterior Of Building
- Acoustic Requirements Met Using Inexpensive Panel
- Sandwich Assembly Captures Screen Wall Frame

COST EFFECTIVENESS

- Requires Two Separate Installation/Labor Systems = More Costly
- Double Skin System Does Not Currently Fit Into The Established Cost Model



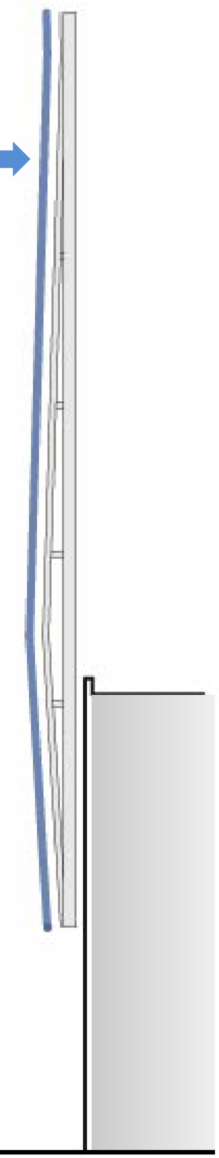
DOUBLE LAYER SYSTEM

ARCHITECTURAL SCREEN INTEGRATED WITH ACOUSTIC MITIGATION PANEL

- Architectural Skin Does Double Duty
- Provides Exterior Expression And Acoustical Mitigation
- Panel Must Be Solid and +/- 5psf To Meet Acoustic Requirements
- Exposed Screen Wall Frame Requires Durable Finish and Bird Roosting Protection

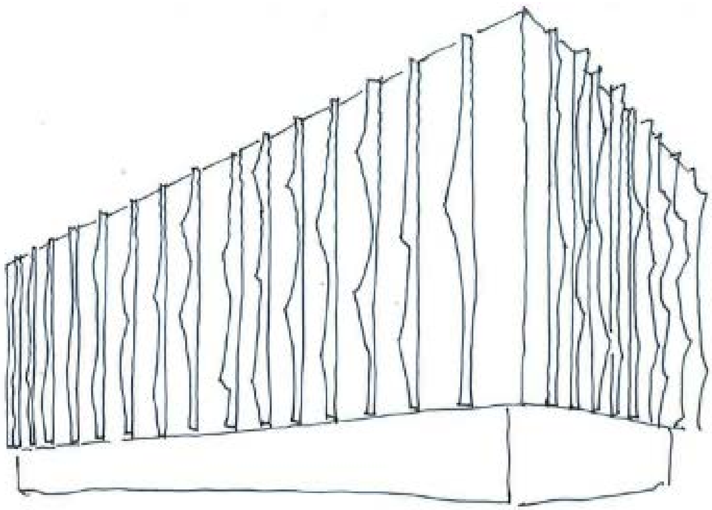
COST EFFECTIVENESS

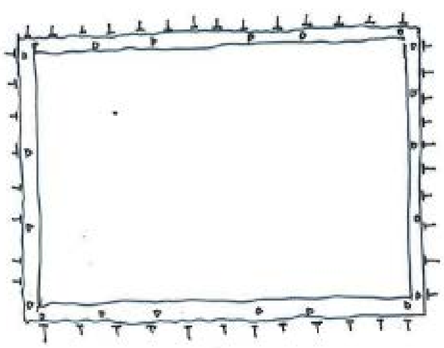
- Single Layer Requires Only One Installation/Labor System = More Cost Effective
- Single Layer Skin System Currently Fits Into The Established Cost Model

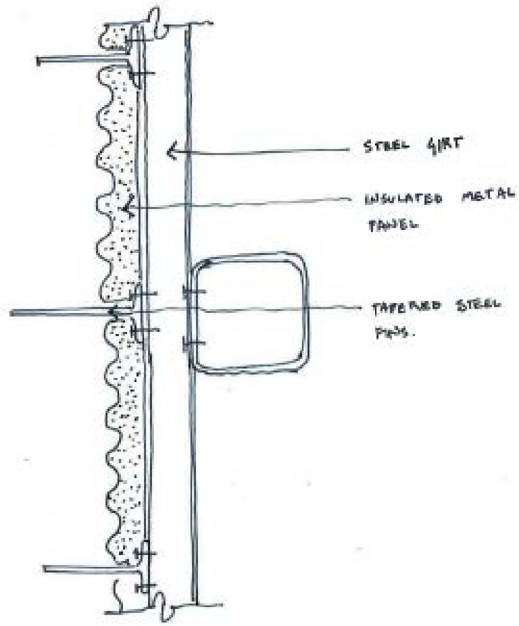


SINGLE LAYER SYSTEM

SHAPED FINS



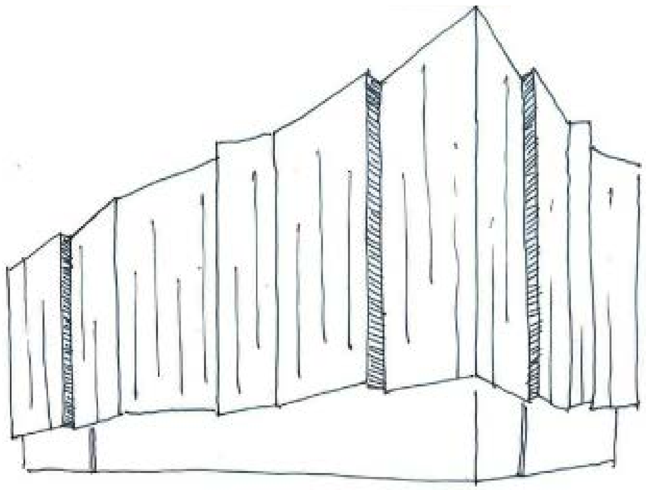


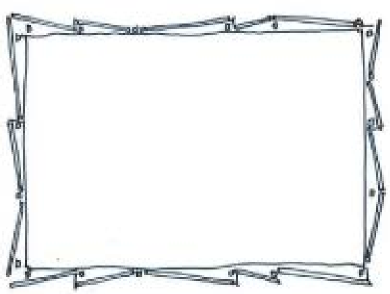


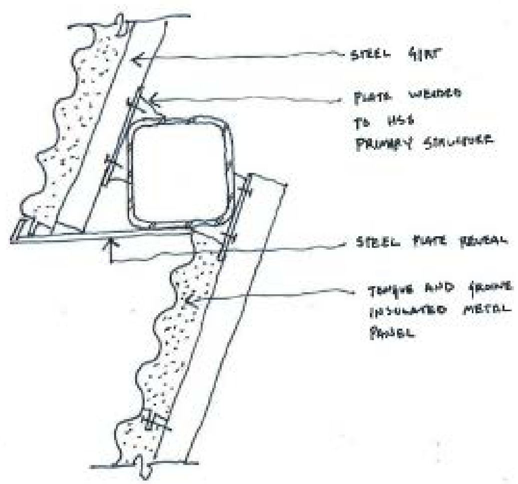
AMET SCHOOL- LIVE ARCHITECTURE
HOLLAND PARK SCHOOL - AEDAS

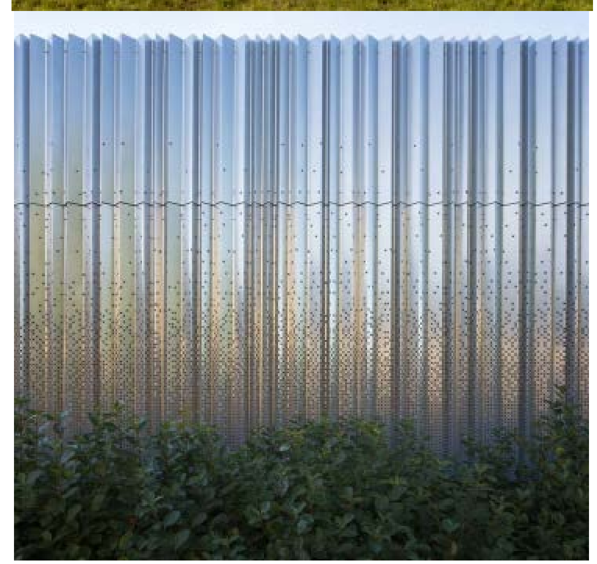
SHAPED FINS

ZIG-ZAG PANELS





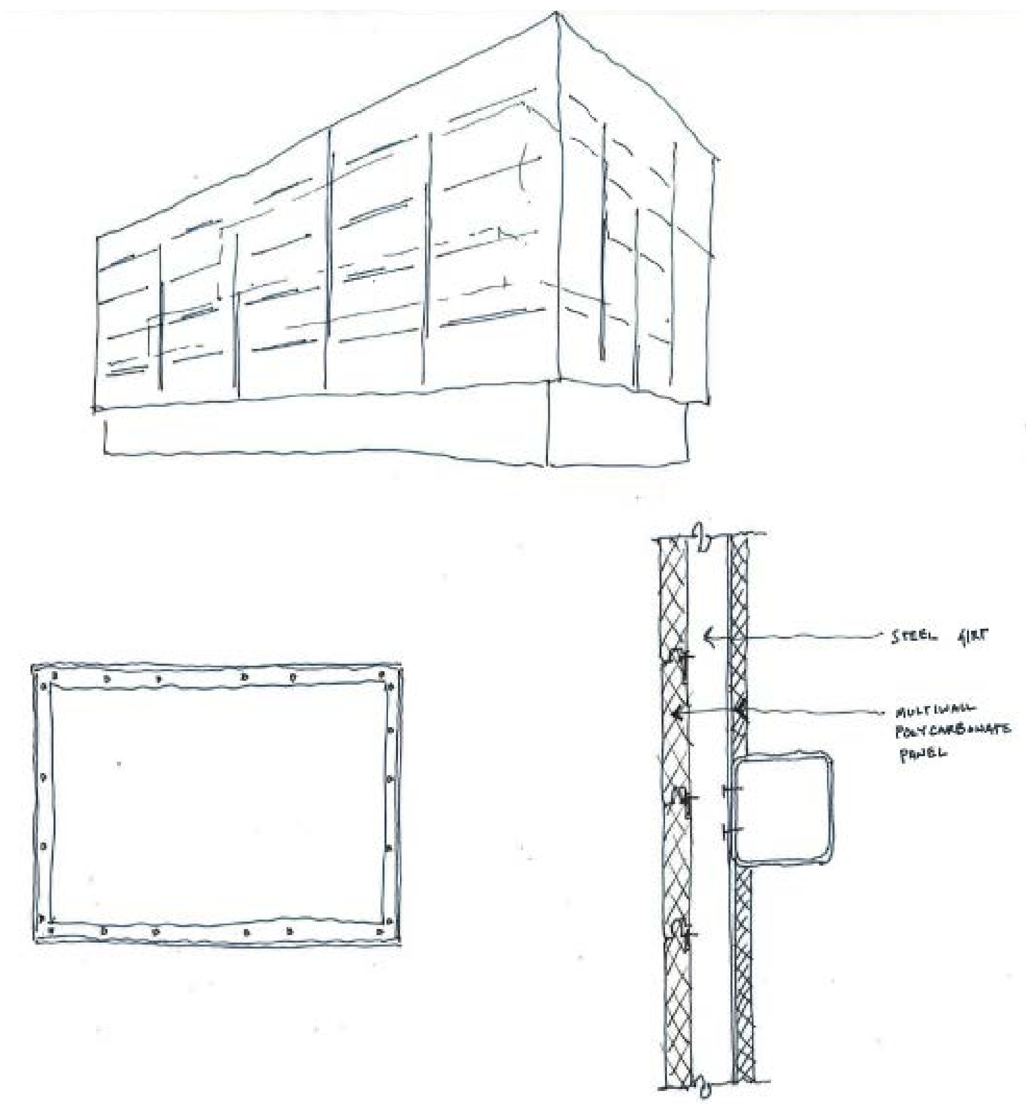




CHAPEL FOR THE DEACONESS OF ST. LOUP – LOCAL ARCHITECTRUE
ARCTIA HEADQUARTERS – K2S ARCHITECTS

ZIG-ZAG PANELS

GLOWING BOX

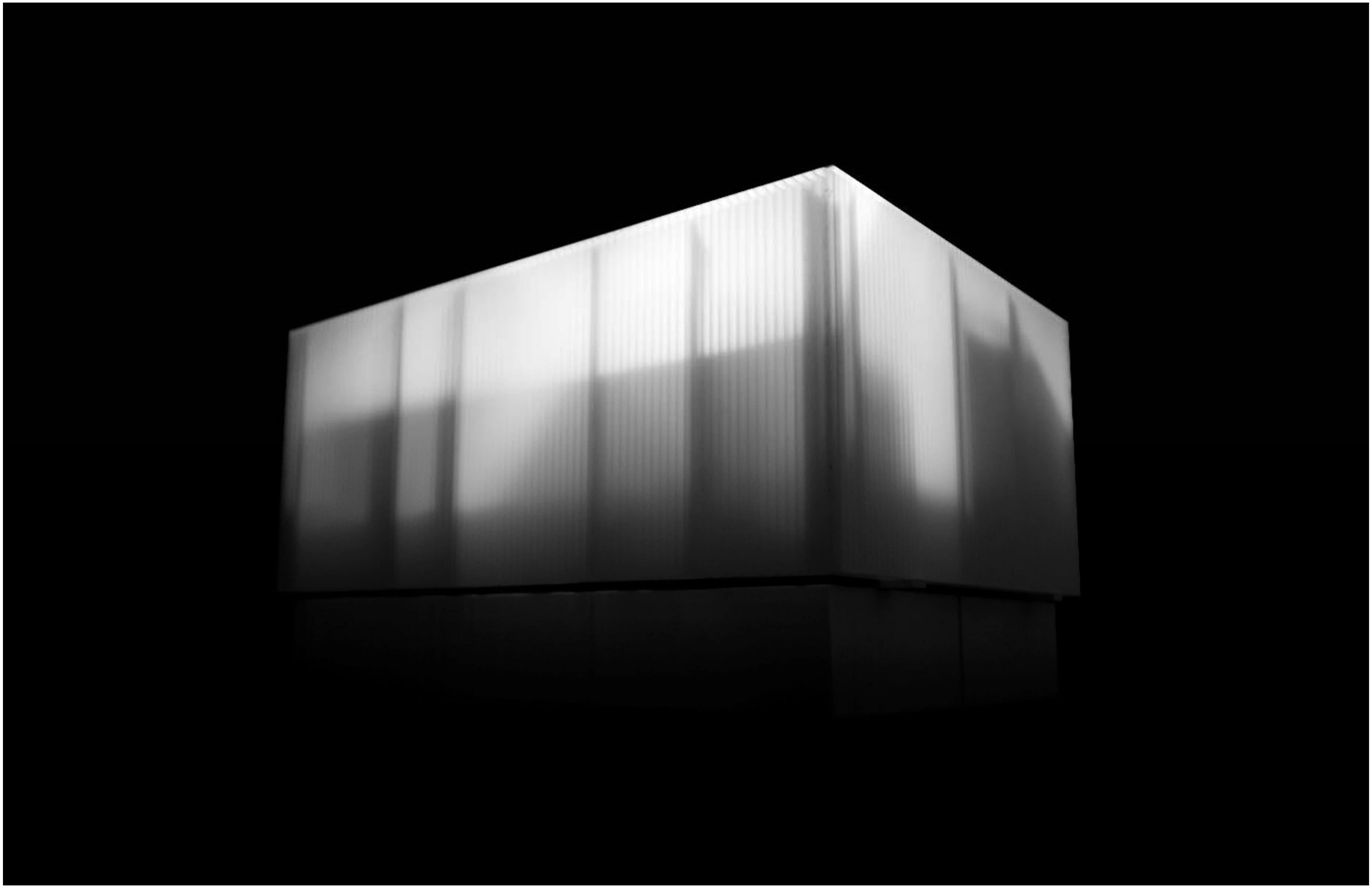


LABAN DANCE CENTRE – HERZOG & DE MEURON
CENTRE FOR SYNCHROTRON SCIENCE – BATES SMART

GLOWING BOX - SUMMER

GLOWING BOX - WINTER

GLOWING BOX – MODEL SHOT

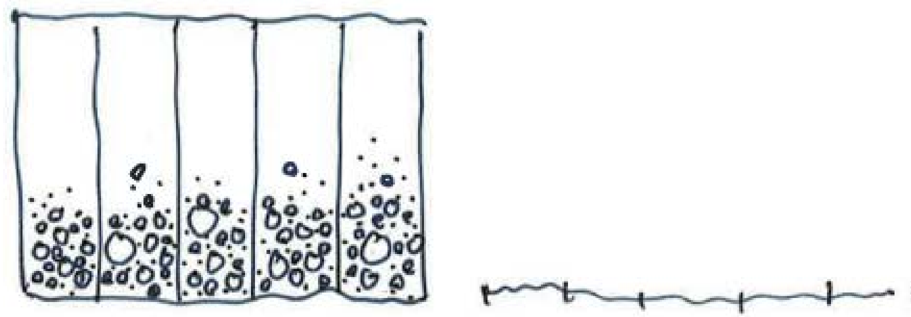


WINDOWS INTO THE PROCESS

WINDOWS INTO THE PROCESS - DESIGN OPTIONS

PATTERN

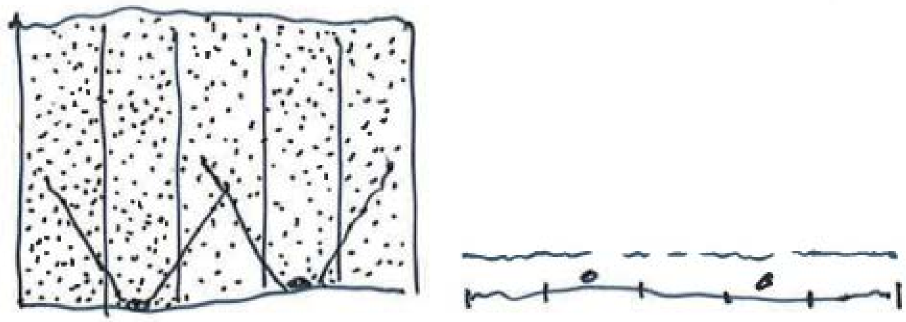
- Frit Can Be Fixed To The Glass Surface
- Can Be Activated With Light
- Inexpensive Initial Cost
- More Fixed/Less Flexible



FRIT PATTERN ON GLASS

LIGHT

- LED Lighting Could Be Programmable To Offer Variety Over Time
- Could Benefit From - But Not Require - A Receiving Surface

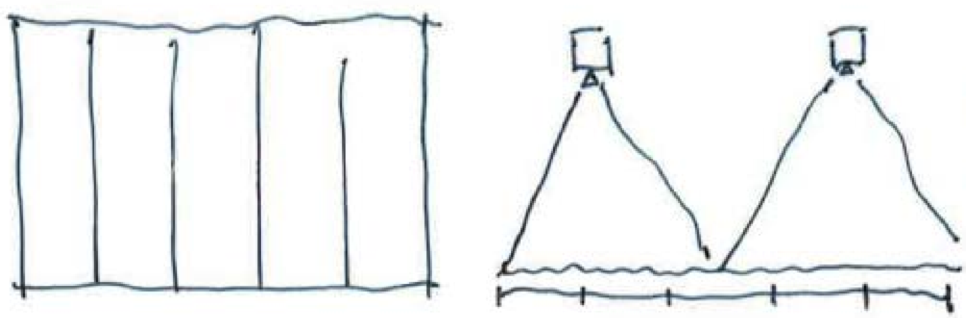


METAL MESH CURTAIN BEHIND GLASS

LED LIGHTING MOUNTED IN FLOOR

PROJECTION

- Ease Of Programming/Flexibility
- Requires An Active Curator To Maintain Subject Matter Interest
- Requires A Receiving Surface At Or Behind The Glass Plane
- Potential Higher Initial And Operating Costs



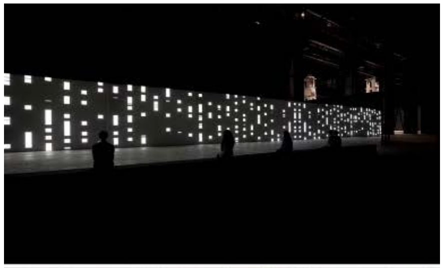
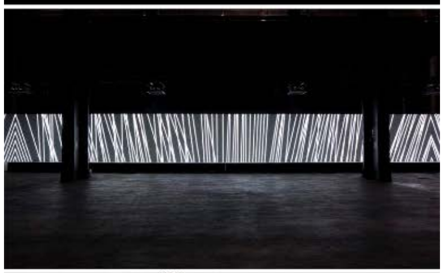
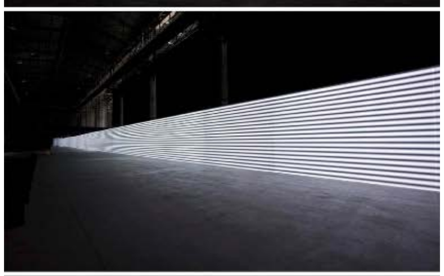
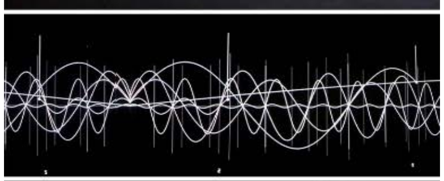
PROJECTION ONTO SCREEN OR MESH

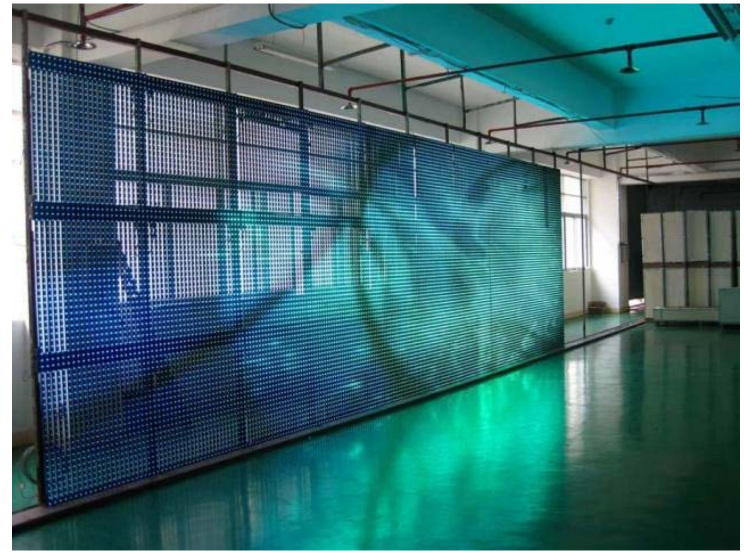
WINDOWS INTO THE PROCESS - PATTERN

WINDOWS INTO THE PROCESS - PATTERN

WINDOWS INTO THE PROCESS - PATTERN

WINDOWS INTO THE PROCESS - LIGHT


WINDOWS INTO THE PROCESS - LIGHT

WINDOWS INTO THE PROCESS - PROJECTION

WINDOWS INTO THE PROCESS - PROJECTION

CAMPUS GATEWAY

OPEN DISCUSSION

FEEDBACK & GUIDANCE