



MARITIME MAKERS

A Boat-Making and Research Center

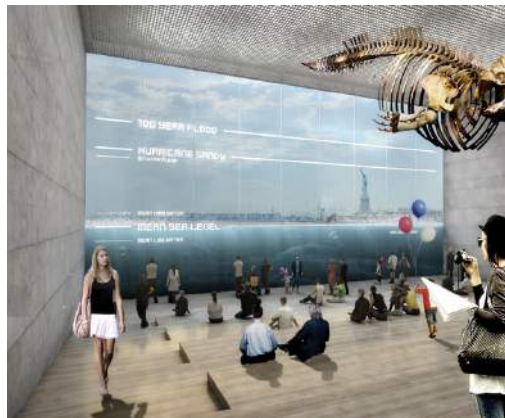
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PROJECT STATEMENT



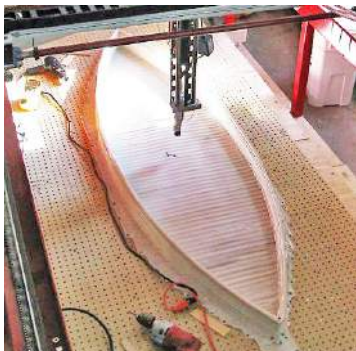
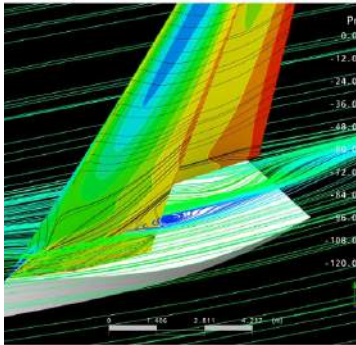
An ideal setting for students to learn and thrive should be a place that they can experience the subject as closely and authentically as possible. Located near the Central Eastside Industrial District of Portland, right next to the Willamette River, the site will be a great place to learn about the history and geography of the River, the large open space will also be a suitable place for apprentices to learn the art and manufacturing process of wooden boats. I would like to create an open area for enjoying scenic view; a museum for learning about rivers and a workshop for building boats. Since the climate in Portland is quite wet and cloudy, getting sunlight into the public area and the workshop will be important. The airflow will be important as well since paint will be applied to the boats on site.



Photos courtesy of BIG Architects & www.staugustinelighthouse.org



WHY?



Photos courtesy of US Navy, Northsails, University of Washington

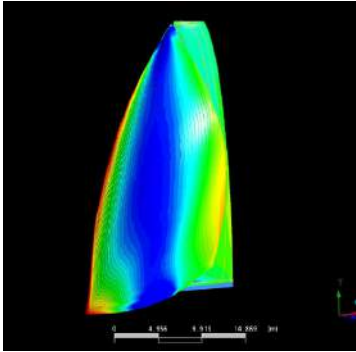
The Willamette River is one of the most valuable natural resources that flows through the city of Portland. The site's location and proximity to the river make this an ideal place to discover the gems hidden in its riparian ecology and experience this important river. From the point of view of economists, Portland has nearly all the elements that lead to a high quality of life – mountains, coastlines, mild winters and summers, restaurants, clean air and cultural institutions etc. However, Portland has not got a distinct city identity yet – “People move to New York to be in media or finance; they move to Los Angeles to be in show business; people move to Portland to move to Portland.”(Aaron Renn, Urban-Affairs Analyst)

According to The National Marine Manufacturers Association (NMMA) reports, there are more than 17 million recreational boats on the water, where 95 percent of them are less than 26 feet in length. Another noteworthy point is that, about 76 percent of boat owners have a household income less than \$100,000 per year, which suggests that you do not need to be extremely wealthy to own a boat. The U.S. recreational boating industry also contributed around \$35 billion to the U.S. economy in 2014, with a tendency to rise in the coming years. In 2014, the adult participation in boating increased 28 percent to an estimated of 88 million from 63 million in 2004. According to the U.S. Vacationers Rank, going to the beach, a lake or a river is the most popular outdoor activities, and more Americans fish than play tennis or golf. In addition, 26.6 percent of the respondents said that they had used a kayak/canoe/row boat to go out on the water.

By taking advantage of Portland's location and the city's abundant design and manufacturing resource, a boating industry can thrive in this city. It generate more revenues by attracting tourists as well as creating more jobs for the boat-making industry, helping to reshape Portland and add another dimension to the creative environment of the city.

“People move to New York to be in media or finance; they move to Los Angeles to be in show business; people move to Portland to move to Portland.”

HOW?



Via a boat-making and research space, the public can have a closer contact with the river by sailing along it in a vessel that is made by themselves; they can also learn different aspects of a boat craft during the making process, such as the materials used on various parts of a boat, as well as their shapes and types. The facility will also provide an educational space as well as organizing field trips for the public to learn about the history and ecology of the Willamette River – a river that plays a significant role in the development of the city.

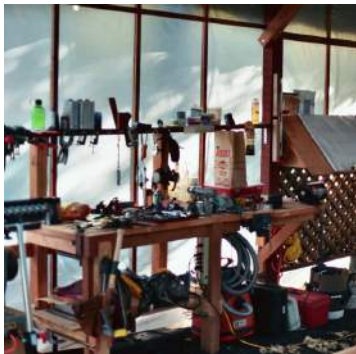


For the creation spaces, there will be two sections, targeting different age groups and audience – a Low Tech and High Tech section. The Low Tech section focuses on families and the majority of the public, they will be able to design and create wooden boats by themselves – as a group or individually. They will learn to use wood milling tools and drafting tools, which are activities that require a lower level of scientific and technology knowledge, as this section aims to provide a relaxed atmosphere for everybody to enjoy their hobby. The higher tech section aims to provide a space for scientists and students to do their studies. It will have machines and scientific equipment that help them to test or discover new findings in the area of marine architecture; for example, finding materials that can last longer in a salty environment or designing a hull shape that is more efficient in the water.



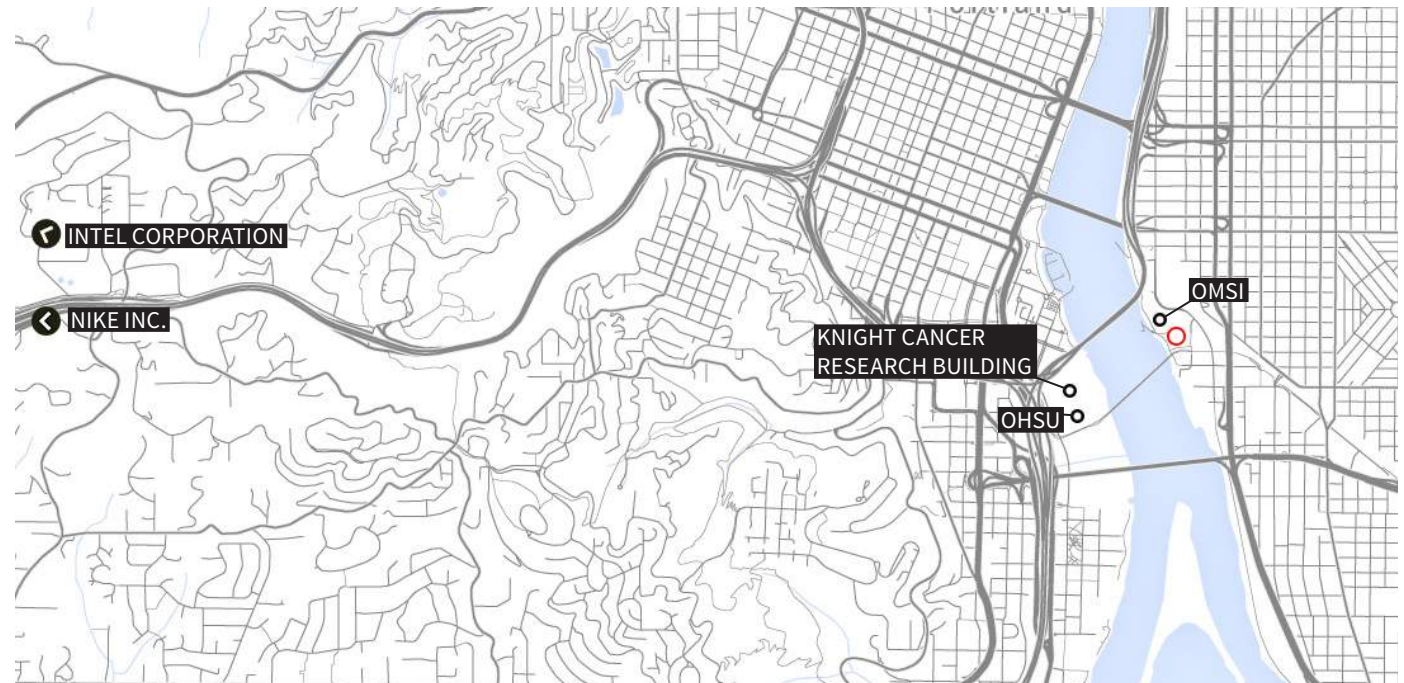
Photos courtesy of North Sails, Center for Wooden Boats, Northwest School of Wooden Boat

WHERE?



Photos courtesy of Northwest School of Wooden Boats, Riverwest Small Craft Center

By establishing a boat-making and research center at the current OMSI site, the center can take advantages of the surrounding resources, such as the railway system right next to it. The area around the OMSI site is currently occupied by warehouses and factories, and the district right across the river is starting to develop into a high technology research district with the addition of Knight Cancer Institute. The semiconductor industry (Intel) in Hillsboro, as well as small businesses that support outdoor-apparel businesses, such as Nike, Adidas and Columbia Sportswear (3D Printed Shoes, R&D in new materials) will be able to provide valuable resources to the Boat Research Center with the exchange of knowledge and findings. So the current OMSI site will be a suitable place for an institute that will provide both high and Low Tech service to different group of users.



THE SITE

AN OVERVIEW



THE SITE

ZONING



ZONE IG 1

IG1 (General Industrial 1) areas generally have smaller lots and a grid block pattern. The area is mostly developed, with sites having high building coverages and buildings which are usually close to the street. IG1 areas tend to be the City's older industrial areas.

ZONE CX

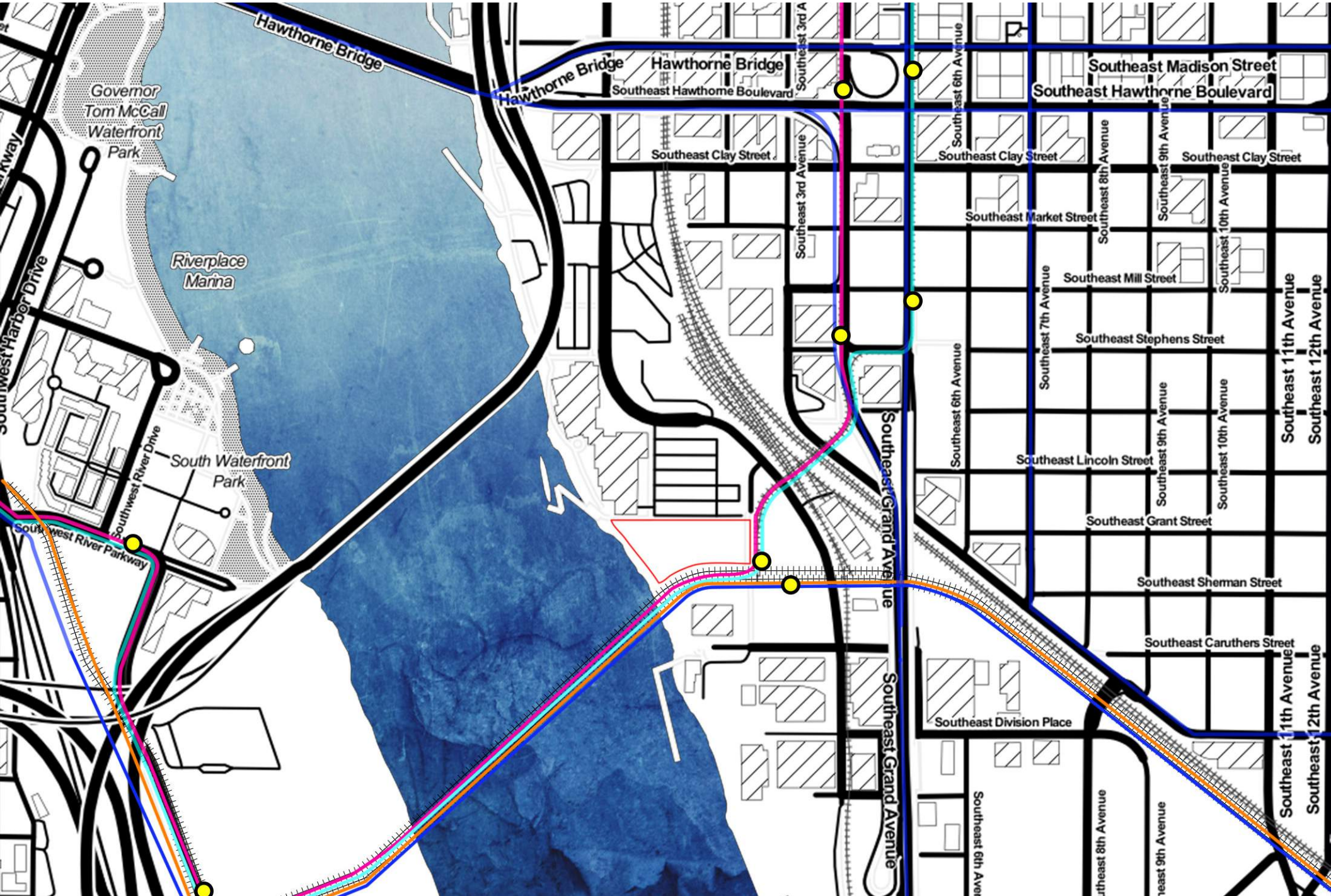
The Central Commercial (CX) zone is intended to provide for commercial development within Portland's most urban and intense areas. A broad range of uses is allowed to reflect Portland's role as a commercial, cultural and governmental center. Development is intended to be very intense with high building coverage, large buildings, and buildings placed close together. Development is intended to be pedestrian-oriented with a strong emphasis on a safe and attractive street scape.

ZONE EG2

EG2 (General Employment 2) areas have larger lots and an irregular or large block pattern. The area is less developed, with sites having medium and low building coverages and buildings which are usually set back from the street. EG2 zoned lands will generally be on larger areas than those zoned EG1.

THE SITE

TRANSIT ROUTES & STATIONS



THE SITE

SEWER SYSTEM



SANITARY SEWER

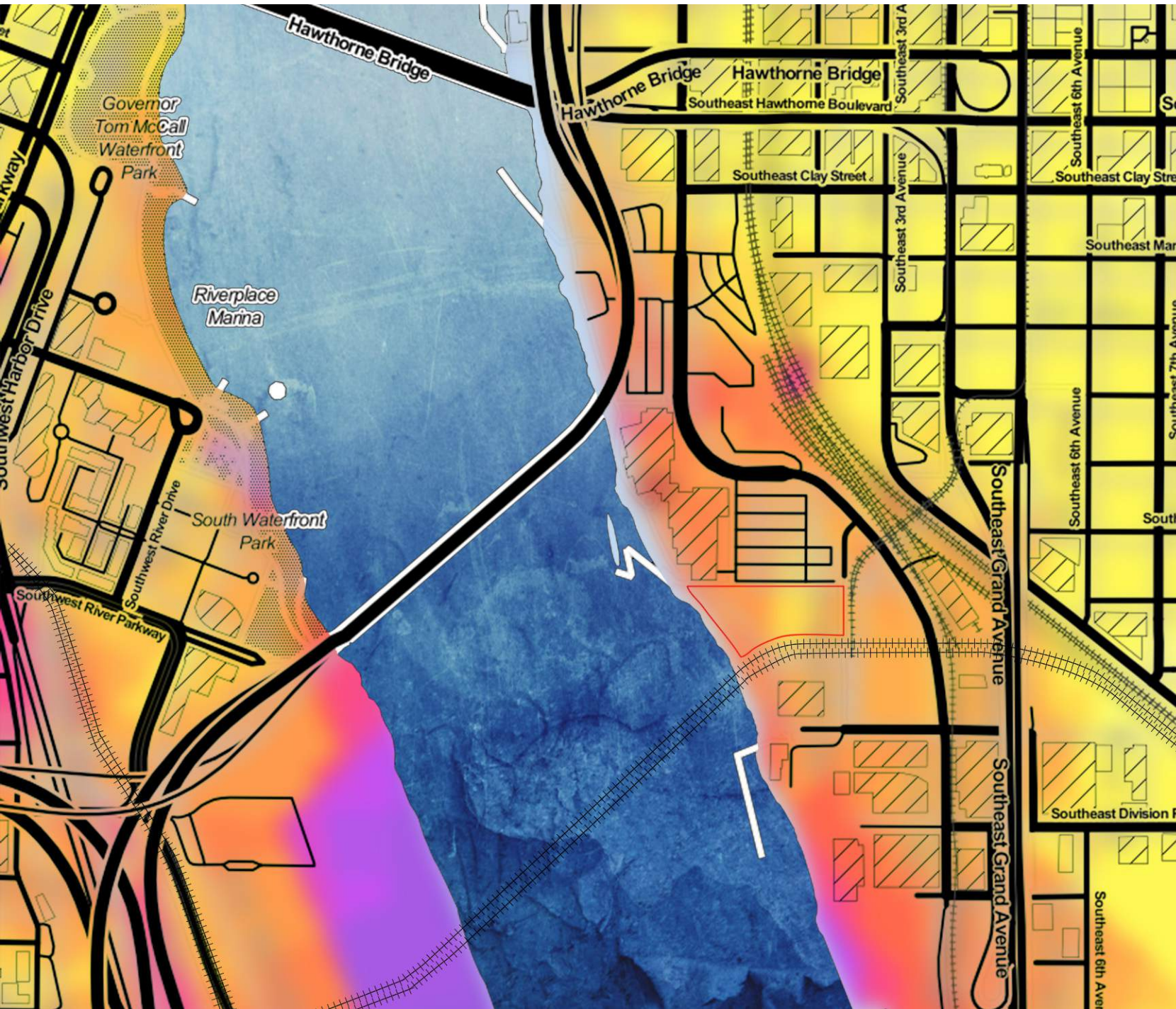
Sanitary and wastewater from the site is pumped to the North, away from the site

STORM SEWER

Storm water collected on site are discharged directly into the river

THE SITE

WALKABILITY

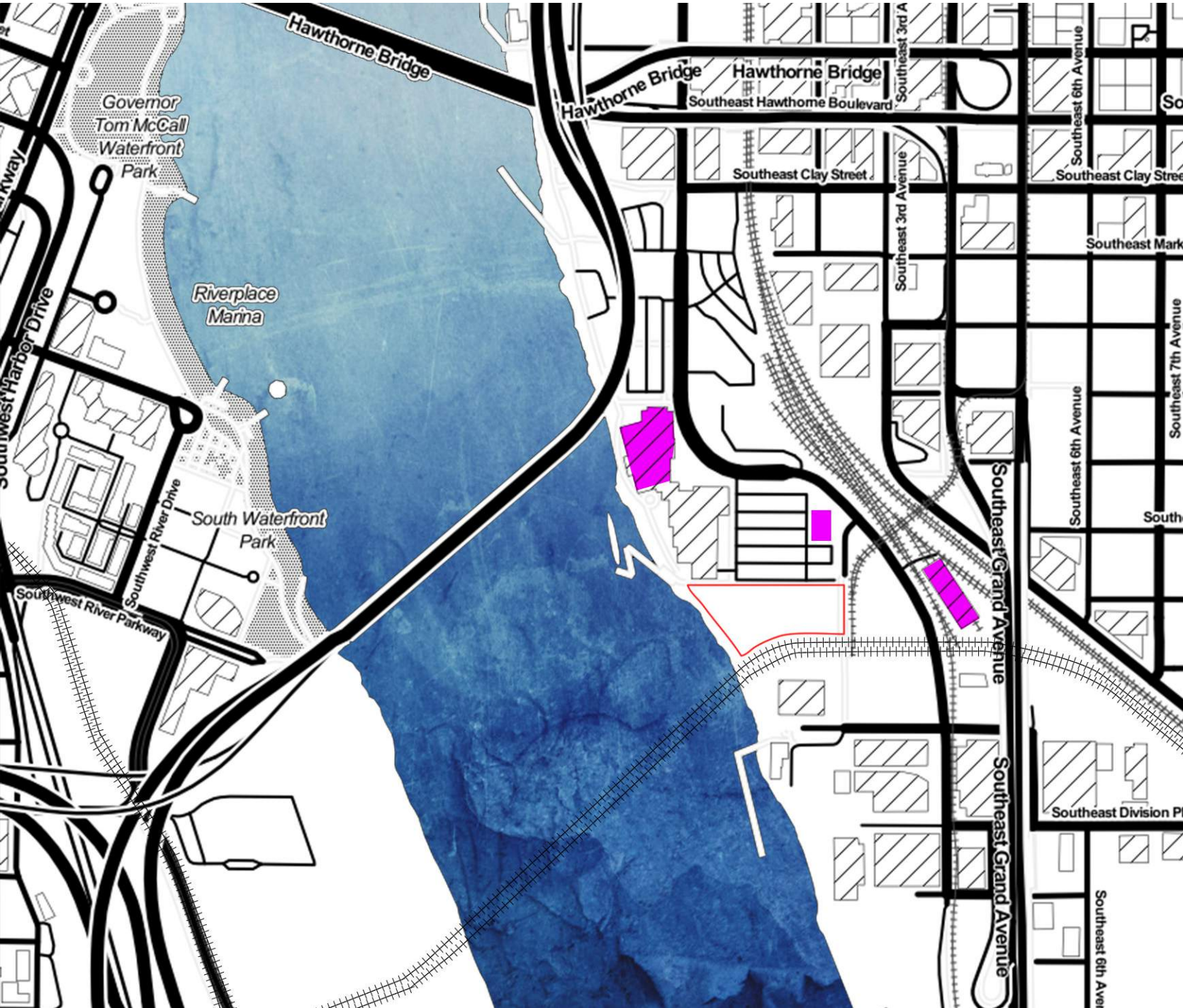


The resultant "hot spot" map shows the gradient of access in different parts of the city. "Hot spots"--red, orange, to yellow (hot)--reflect areas with a greater degree of access. Magenta to blue areas have less convenient pedestrian access to services.

This mapping analysis highlights areas that have a relatively high level of walkable access to amenities and commercial services. These destinations include grocery stores and other commercial establishments, parks and recreation facilities, as well as elementary schools. The map indicates locations that have concentrations of amenities and commercial services that are within relatively short walking distances of households. Additionally, the analysis takes into account factors that impact access, such as sidewalks, street connectivity, bicycle routes, and transit.

THE SITE

HISTORIC RESOURCES



PORTLAND GENERAL ELECTRIC COMPANY STATION "L" GROUP



The Portland General Electric Company Station "L" Group in southeast Portland in the U.S. state of Oregon was a cluster of six industrial buildings listed on the National Register of Historic Places.

OREGON RAIL HERITAGE FOUNDATION



It is a new engine-house that house historic locomotives as well as a visitor center and an interpretive center.

THE SITE

CRIME MAP



On the left is a map shaded based on the number of total crimes in a half mile grid.

The OMSI Site is relatively safe compared to its neighborhood. During the period of January 2014-December 2014, one incident of Vehicle Theft was recorded on the OMSI site.

THE SITE

BIKE PATH



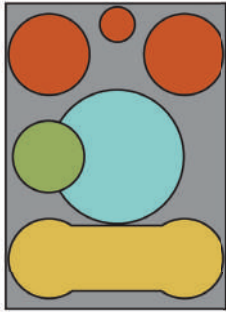
- OFF-STREET PATH
- CITY BIKEWAY

PRECEDENT 1

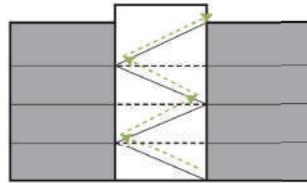
COLUMBIA BUSINESS SCHOOL

UN STUDIO

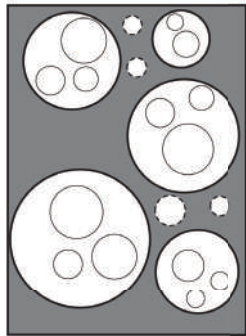
The UN Studio has designed a competition project for the new Graduate School of Business at the Columbia University in New York. The project aims to increase the interaction of the students with the professional world in a creative and fluid way. Flexibility is an important theme in this project, as the design seeks to create spaces that are not constrained in anyway. The students working area and the faculty spaces are placed near together in plan to promote intersection across different disciplines. As for the circulation, different levels are connected vertically with a series of voids and internal staircase. Traditional corridors are eliminated as they have turned into social spaces to contain a number of people while also accommodating traffic and walking individuals. Different spaces are designed in an informal way to enable a mixture of activities to occur, and these spaces are open for reconfiguration by their users.



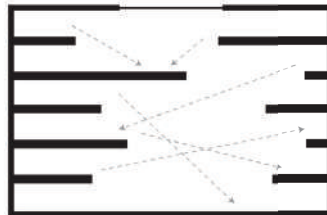
program distribution



vertical circulation



space configurations



visual connections



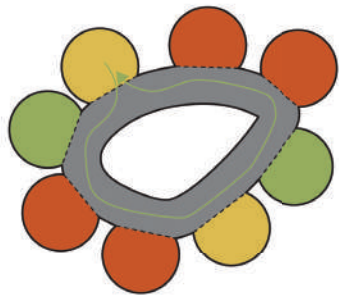
Photos courtesy of UN Studio

PRECEDENT 2

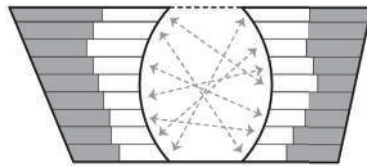
LEARNING HUB

HEATHERWICK STUDIO

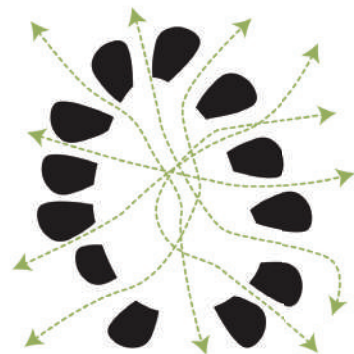
The Learning Hub at NTU, Singapore designed by Heatherwick Studio is part of the school's redevelopment plan to provide a number of multi-functional spaces for about 33,000 students around the campus. Different from traditional cube like lecture rooms, this project merges social and learning spaces together to create a more dynamic environment for students, professors and visitors to interact with each other. The entire building consists of twelve towers which taper outward in the middle then back to the center at the top. The twelve towers wraps around a center atrium and provide around 60 multi-functional rooms that do not have an obvious front or back. Each level have different "pod-like" areas that serve different functions, such as stairwells, seating areas, classrooms, offices or outdoor patios. The building is also open and permeable, this allow natural ventilation to occur and maximize air circulation around different rooms to ensure human comfort; this also decrease the need of energy to maintain a certain temperature in the hot climate of Singapore. This project is awarded the "Green Mark Platinum", which is the highest in its category.



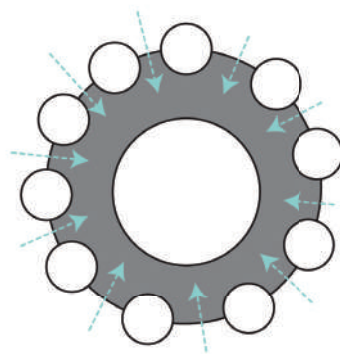
program distribution



atrium



walking paths



air flow



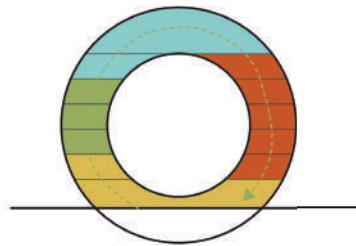
Photos courtesy of Heatherwick Studio

PRECEDENT 3

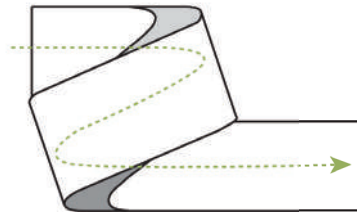
ST. PETERSBURG PIER

BIG

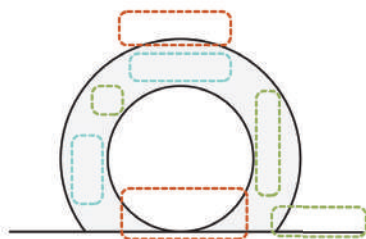
The Wave at the St. Petersburg Florida is a competition project by the BIG Studio designed to replace the original public pier. The project aims to bring more pedestrian flow into the end of the pier as oppose to what it is now – a failed shopping mall. The studio created a variation of activity spaces along the edge of the pier in regard to different factors such as the depth of sea level and the strength of waves, the activities includes surfing, water park, seating area, boat parking area etc... The main part of the project, "The Wave" is located at the far end of the pier, it is a large loop structure that houses different activities in different levels, including the top and the center of the loop. The studio proposed a museum that teaches children the path of water cycle, where they put a "cloud room", "falling water room" and "wave room" into the loop in sequence – just like the water cycle, from ocean, evaporation, condensation, precipitation to the ocean again. In general, the studio has created an educational space where people can walk through the cycle in a physical way.



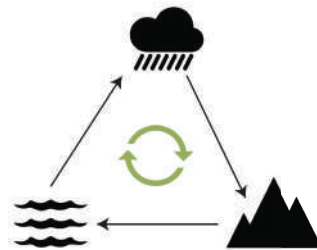
program distribution



walking path



activities



"the cycle"



Photos courtesy of BIG studio

CASE STUDY



<http://woodenboatfactory.org/>

- + targets 14-21 teenagers
- + located in an area that have high unemployment and crime rate as well as substantial poverty
- + encourages them to take risks and learn from failure
- + aims to help create constructive life decisions and to enter and succeed in employment or post-secondary education
- + afterschool educational model
- +introduces youth to a craft while also addressing their academic and social-emotional needs.



<https://www.nwswb.edu/>

- + teaches and preserves traditional and contemporary wooden boat-building skills
- + develops the individual as a craftsman
- + provides Associate Degrees courses
- + creates traditional and contemporary wooden boats, large and small
- + everybody is welcome, even those without experience
- + accredited by the Accrediting Commission of Career Schools and Colleges



CASE STUDY



<http://www.thewoodenboatschool.com/>

- + 64-acre campus
- + students range in age from mid-teens to 80 year olds
- + provides access for wooden boat enthusiasts to construction, maintenance, repair, design, seamanship and other related crafts
- + establishes a meeting ground for the finest and most knowledgeable boating professionals to share their skills, techniques, and appreciation of the traditional craftsmanship in wooden boats



<http://www.riverswest.org/>

- + use of sustainable, beautiful boats built to operate on the human scale.
- + building bays available for members, and woodworking tools available for use
- + maintains a history of Northwest small craft
- + teaches more people the respect involved in human-scaled boating
- + members have built boat from, aluminum, steel, and fabric
- + opportunities to learn from one another



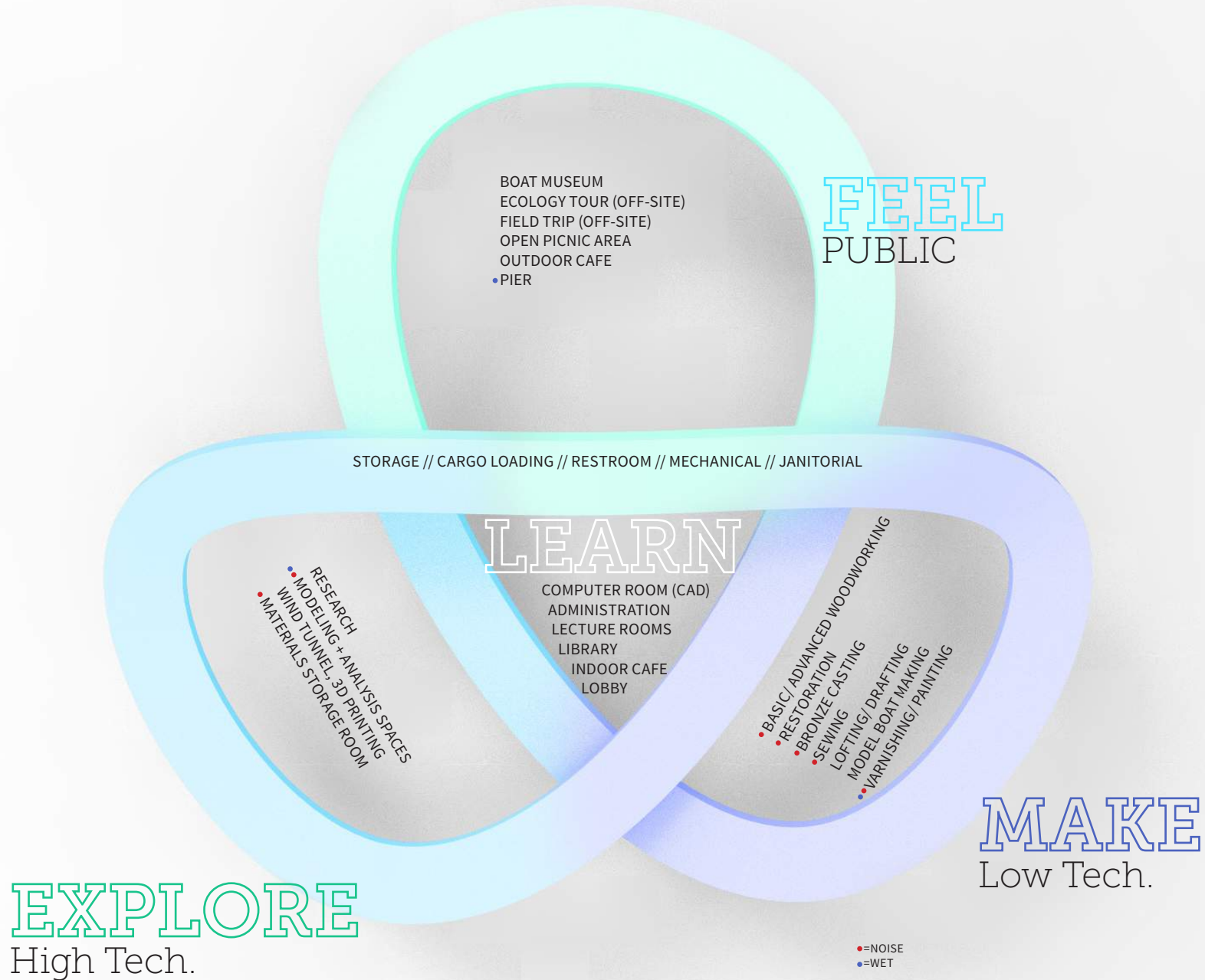
PROGRAM

ACTIVITIES		CHILDREN	TEENAGERS	ADULTS	APPRENTICE	FAMILY	RETIREES	AREA NEEDED (ft2)	Noise?	Wet	Dry?
TO MAKE											
	Basic Woodworking		X	X		X	X	6000	X		Dry
	Advanced Woodworking				X		X	3000	X		Dry
	Lectures				X		X	1500			Dry
	Restoration				X		X	1500	X		Dry
	Bronze Casting			X	X		X	1000	X		Dry
	Computer Room (CAD)		X	X	X	X	X	500			Dry
	Lofting/ Drafting			X	X		X	500			Dry
	Sewing			X	X		X	500	X		Dry
	Model Boat Making	X						250			Dry
	Library	X	X	X	X	X	X	1500			Dry
	Varnishing/ Painting		X	X	X	X	X	1500	X		
TO SEE											
	Boat Museum	X	X	X		X	X	6000			Dry
	Ecology Tour (Offsite)		X	X	X		X				
	Field Trip (Offsite)	X	X								
TO FEEL											
	Open picnic area/ Public Open Space	X				X	X				
	Outdoor Café										
	Pier	X	X	X	X	X	X		X		Wet
TO FIND (HIGH TECH)											
	Research			X	X			2000			Dry
	Modeling + Analysis (e.g. Wind Tunnel, 3D Printing)			X	X			5000	X		Dry
	Materials Experimenting Room			X	X			3000	X		Wet
Supporting Area											
	Storage							2500			Dry
	Cargo Loading							1000			Wet
	Restroom							500			Wet
	Mechanical							250			Dry
	Janitorial							200			Wet
	Indoor Café							1000			Dry
	Lobby							500			Dry
	Administration (Offices)							750			Dry

TOTAL AREA

40450

DIAGRAM



PERSONAS

TEENAGERS (12-17 Years Old)

Teenagers, either on their own or with their families, are able to create small wooden boats using only the basic wooden tools. The more complicated process will be prepared for them by the staff in the center. They can learn how to use the tools during the process as well as understand the basic physics behind a boat, such as why they are designed like this, why they float and what are the functions of different parts of a boat. They came here just to relax or want to do something that is rewarding. If they are not interested in making a real boat, the teenagers can also make a scale wooden model boat, in which they can also learn the basics of a boat. There will be field trip tours and museum space that will teach the teenagers about the history and ecology of Willamette River.



ADULTS (18-60 Years Old)

Besides learning the basic tools and knowledge about a boat, people who are above the age requirement can learn to use the more advanced tools, so that they can create a wooden boat from scratch without the help of the others. They will be involved in everything from designing a boat on paper, cutting the wood, casting the metal pieces to sewing a sail. They can do this for their enjoyment as well as prepare for their possible future career that involves in the boat industry. They can also attend a few lectures that are offered by the center after they have registered.



RETIREEES

People who own a boat can rent a space and bring theirs to the center to perform repair or upgrade activity by paying a small fee. Of course, they can also use all the tools and machines in the center and create a boat from scratch. Retirees could use the space without paying a fee if they volunteered to help the other users.

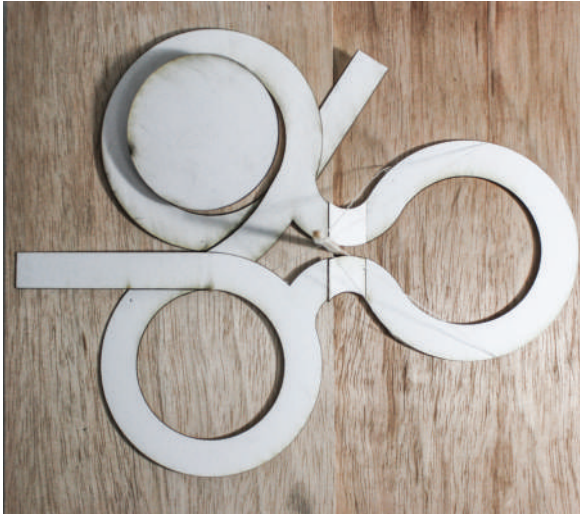


PROFESSIONS + STUDENTS

The High Tech area will focus on students, scientists, experts, researchers and professionals. Colleges and universities are able to rent these High Tech room to perform experiments or lectures. There will be different scientific tools and machines such as wind tunnels, materials library, laboratories that could perform different test that is related to the boat industry. These spaces are not open to the public, but the professional users are encouraged to teach and communicate with the users in the Low Tech shop.



METAPHOR - PHYSICAL

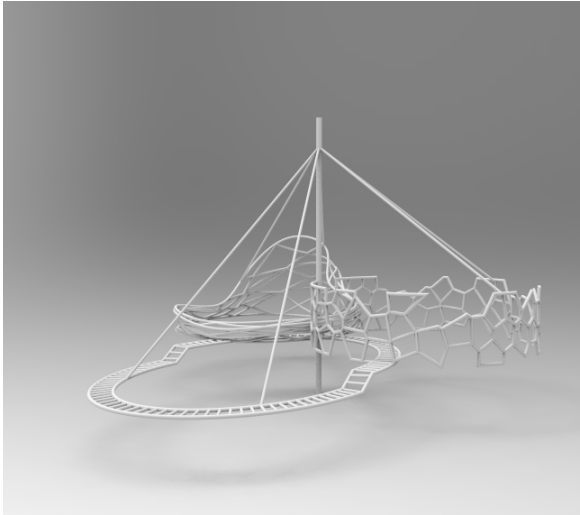


In the first version of my metaphor, I would like to represent the different aspects of my program into three similar geometries, each represents the different characteristic and qualities of my user spaces. They are unified together with a circulation on a rooftop garden-like pathway that loops and links all three parts, which suggests that they are open to everyone as well as including those that are not using the equipment inside the buildings. In the first portion, the circle that has a roof top represents a place for professionals to learn and do research on boats, it is a place for people to prepare for their future career life, so it should look more formal and confined. The second circle that is located right next to the first one is a space for the public and different age groups, so it is more open and informal, as this is a place that aims to provide a relaxed atmosphere for hobbyists. The last circle, which is located at the edge of the river bank and half sunk into the river, is the open space for people to enjoy the river as well as space for users to launch their boats. It is a place for everyone even though they are not the users of the boat center. The three circles are connected and supported together with a tall thin structure in the middle, which reflects the structural quality of the sail of a boat.

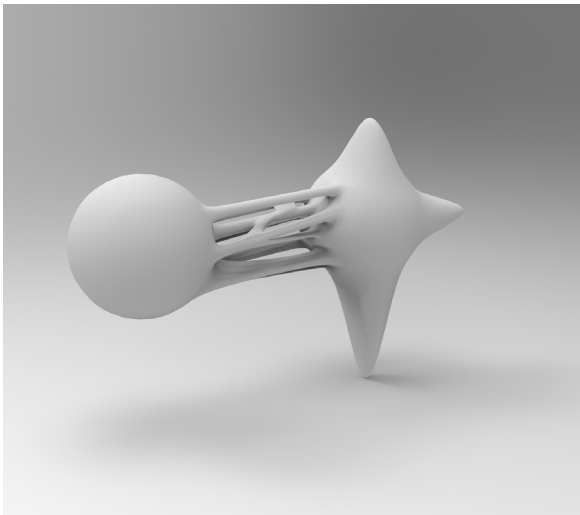


The second metaphor focused more on the materials. I used copper wire and wood to create the metaphor (although copper is not a typical metal used to make boats, it represents the idea of metal), and further develops the circular and circulation ideas. The shape of this model looks like a tree, with different sizes of copper circles, bursting out from the middle of the wood – the shape suggests the merger of nature and industry; while the circles represent different functions within the building and their connection.

METAPHOR - DIGITAL



The third version is a digital version created in Rhino and Grasshopper. It is another version of the first metaphor, but done in a more contrasting way. The three circles have three completely different textures and patterns, though they are all developed from the same circle shape. The circle with a looser wall represents the Low Tech. portion of the center while the one with a perfect circle is a symbol of accurate, digitally generated shape – the High Tech. area of the building. The last oval shape with a dent is the public area that can be used by everybody in the city.



The last version is more abstracted and emphasized more on the connections between the two main areas of the project. Both of them begins as a perfect sphere, one of them starts to evolve with four pointing shapes growing from the surface pointing at four different directions. This morphed shape represents High Tech. area – streamlined, digitally calculated, reaching outward and forward. The little elements in between the two spheres is a symbol of connections between High Tech and Low Tech industry.

WOOD PLATFORM

