 

NJ/DEP Natural Lands Trust

Petty's Island Preserve
Cultural and Environmental Education Center
Conceptual Design

VITETTA

15 May 2017

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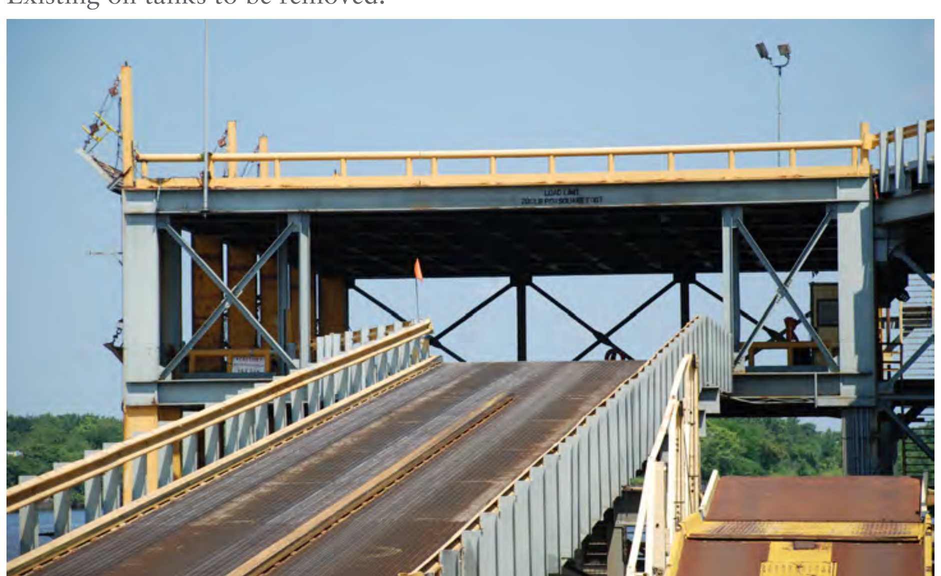
Wildlife found on Petty's Island

Existing oil tanks to be removed.



Existing shipping terminal.

View of Philadelphia through fauna found on Petty's Island.

Executive Summary

Petty Island is a 300 acre[1] island in the Delaware River. It is currently the home to a CITGO fuel/oil storage operation and a tenant, the Crowley Maritime shipping company. In 2009, CITGO announced that it would donate the island to the New Jersey Natural Lands Trust (NJNLT), an agency in but not of NJDEP.

The island has become home to many native species of birds and wildlife in addition to an abundant plant life. The New Jersey Natural Lands Trust's goal is to turn the island into an urban nature reserve with a nature (environmental) center that will serve the local community as well as the greater New Jersey and Philadelphia areas.

VITETTA was retained in 2015 to review the site and its existing structures to determine if any of the objects on site should be kept for future interpretation of the industrial heritage of the island. The final report provided recommendations to NJNLT regarding those artifacts that best represent the industrial heritage of Petty's Island that could be salvaged for future use in art, interpretive displays and/or landscaping at public access locations.

After reviewing the site and the existing structures, the NJNLT decided that re-purposing the existing shipping terminal structure on the northwest side of the island would be the optimal place on the site for a visitor's center. This location also will be more ecologically preferable than constructing a new building on the island as the area has already been built upon. It is the NJNLT's desire to interpret not only the natural features and attributes of the island but also its industrial past.

In 2016, the VITETTA design team was retained to study the Crowley shipping terminal structure to determine its viability for being renovated and adaptively reused into the Petty's Island Cultural and Environmental Education Center ("Center"). Using the program developed earlier for NJNLT and a site survey of the structure and its surrounding features and utilities, VITETTA presented four design options for the Trust's review. Based on the that feedback, VITETTA presented a fifth design option which best incorporates the design objectives and comments of NJNLT for the future Petty's Island Cultural and Environmental Center. MacIntosh Engineering used the construction drawings and site observations to determine if any structural modifications would be necessary to support the new function in the building. DEDC Engineers reviewed the on-site utilities to understand what utilities exist on the island and what will need to be brought to the island to support the new mechanical, electrical, plumbing and fire protection systems. Love Dirt, LLC reviewed the plantings and landscape of the area, as well as the previous reports on the flora and fauna of the island, and made recommendations for the design of the outside areas and landscaping that will be associated with the new center. The following report documents the findings of the site survey and the proposed layout for the site and structure. This layout has been completed at the conceptual design level and will need to be further refined as the project moves forward.

1 http://nj.gov/dep/njnlt/pettysisland.htm

Building History and Construction

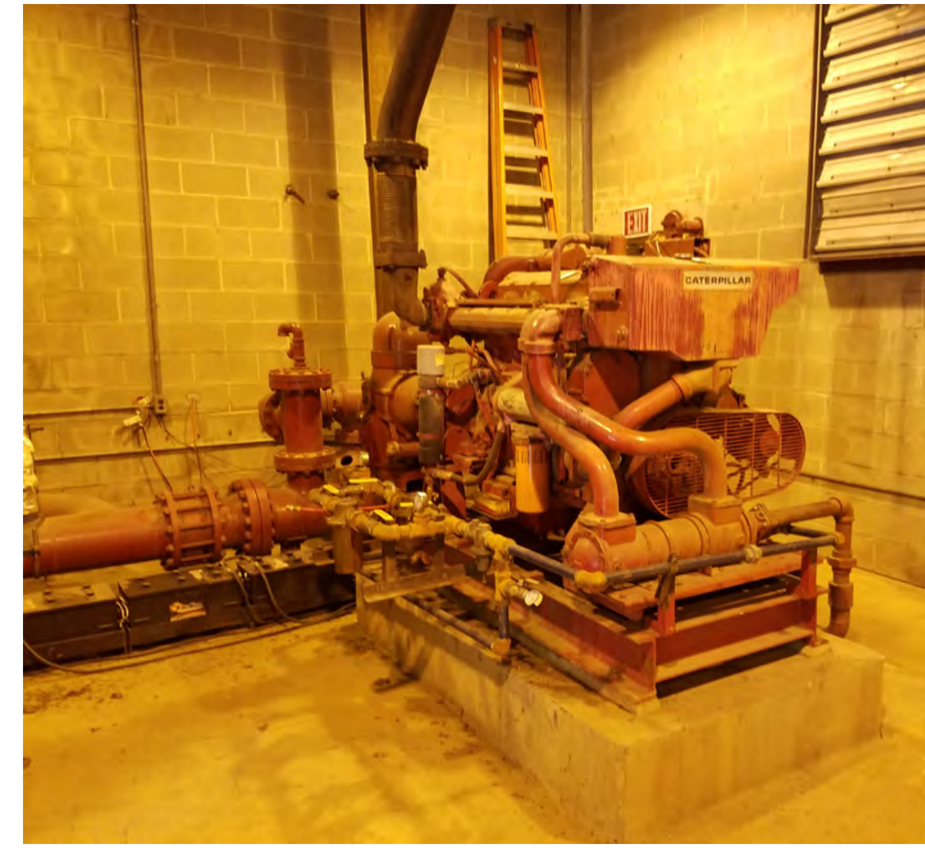
The island has been owned by oil storage and handling companies since the early 20th century. The current shipping terminal structure was designed in 1983 by S. T. Hudson Engineers Inc. of Philadelphia, PA for the Trailer Marine Transport Corporation, a petroleum and chemical transportation company which leased a portion of the island. Documentation suggests that the Crowley Maritime Corporation(Crowley) purchased the Trailer Marine Transport Corporation within the last 20 years. CITGO Petroleum Corporation, an indirect wholly owned subsidiary of Petroleos de Venezuela, SA, the national oil company of Venezuela, acquired the island in 1983 and continued to lease the shipping terminal to Crowley. CITGO donated a conservation easement for the entire island to the Trust in 2009 for the creation of an ecological, cultural and historic preserve. Crowley will be vacating their portion or the island including the shipping terminal structure at the conclusion of their lease at the end of 2017. Following the completion of remedial activities by CITGO on the entire island, title to the island and surrounding riparian areas will also be conveyed to the Trust.

Current Use

Crowley Maritime Corporation currently uses the two-story steel framed structure with three concrete decks as a shipping terminal dock. A large triple deck barge is able to dock on the west side of the structure to allow trucks to load and unload containers from each of the three levels of the barge to each of the three levels of the structure. Each level of the structure is accessible from the Island with direct truck access on the main level and an elevated ramp on the intermediate and top level. The concrete floor plate of the shipping terminal is approximately 7,000 SF per level. The structure is supported by concrete piles set into the Delaware River. The structure was inspected in December 2015 by a design team of Lammey & Giorgio, architects, O'Donnell & Naccarato, engineers and JMT, pier inspection engineers. There were a few repair items identified in the report which will be addressed by Crowley Maritime Corporation before the end of their lease with CITGO in December 2017.


Existing Second Level of shipping terminal showing exposed structure.


Existing electrical transformer.


Existing fire pump.

Summary of Existing Conditions

A site visit was completed by the VITETTA design team in July 2016. A team of architects, engineers and landscape architects toured the building with representatives of NJNLT to review the existing conditions of the structure and the adjacent site features. The following is a summary of our observations:

Building

The building is constructed of three levels of open concrete platforms that are currently used as a staging area for loading and unloading barges. The building is supported by concrete piles set into the Delaware River. A barge is docked on the west side of the structure and trucks access the three levels of the barge via the concrete platform. The concrete platforms are accessed on grade and via a steel ramp to each of the two upper levels. In addition to the ramps, there is an open grate steel stair mounted on the east side of the concrete platform that connects the three levels. The concrete platforms are not enclosed. There are steel leveling ramps on the west side where the barge docks and safety railings on two sides, east and north.

Structural

The existing Marine Terminal has three framed concrete levels, each with a footprint of approximately 64 x 120 feet. The primary structure for the two upper levels consists of a combination of formed cast-in place concrete slabs and concrete slab on metal deck spanning over W16 beams which are all supported on steel girders and steel columns. The steel girder/column assemblies create rigid bents spaced at approximately 20 feet on center spanning the 64 foot width of the building. Portions of the girders are designed as composite construction, engaging a portion of the slab to provide their full design strength.

The lowest level of the building is constructed of an 18 inch thick cast-in-place concrete flat plate system spanning between 12 inch square prestressed concrete piles, which are spaced on a 10 foot by 10 foot grid and set into the Delaware River. The floor to floor dimensions from the first to the second are 20 feet 1-3/4 inches (17 feet 10-3/4 inches to underside of structure) and 17 feet 3 inches from the second floor to the roof (15 feet to underside of structure).

The structural components are generally in good condition. The concrete slabs exhibited a moderate amount of surface deterioration and the steel beams and metal decking exhibit localized areas of corrosion. Any deficiencies can be addressed as part of the renovation /adaptive reuse of the building.

The underside of the first level was not examined by this team but repairs to this level have been identified in the December 2015 report by O'Donnell & Naccarato and are to be addressed by Crowley before the end of 2017.

Building Systems & Site Utilities

There is currently no potable water on site. Crowley Maritime Corporation brings water to the site by truck for their use. There is currently no existing mechanical system in the building as the structure is not enclosed as it is a platform used only for vehicular access to a barge. There is an existing oil-filled pad-mounted 300KVA, 480V, 3 phase electrical transformer that exceeds the current power demands for the building and an existing fire suppression system supplied by a diesel-fed fire pump. It is recommended that both of these pieces of equipment; (the electrical transformer and fire pump) be maintained and incorporated into the design of the new Center. The existing fire suppression system is supplied by river water. River water is acceptable per the Code as long as it meets the following criteria:

- The supply will not be jeopardized at any time by drought, flood, tides or ice. Possible ice buildup on the surface of the water must be anticipated and provisions made to keep the entire surface from solidifying.
- Trash gates and screens are properly arranged and maintained in accordance with NFPA 20 and 25.
- Nuisance marine life forms, such as clams, mussels or algae, do not impair the water supply. Proper inspection and control measures must be in place.
- The quality of water is such that silt will not plug sprinkler lines or cause piping to corrode.

NJNLT will need to review with the NJ Department of Community Affairs if it is acceptable to continue to use river water for the new sprinkler system or whether it would be necessary to design a system that uses rainwater since there is no water source on site.

There is currently no stormwater piping on site. There is currently no septic system on site.

All new building systems except for the electrical transformer and a fire pump will need to be provided for the new Center.

Proposed Use

Program

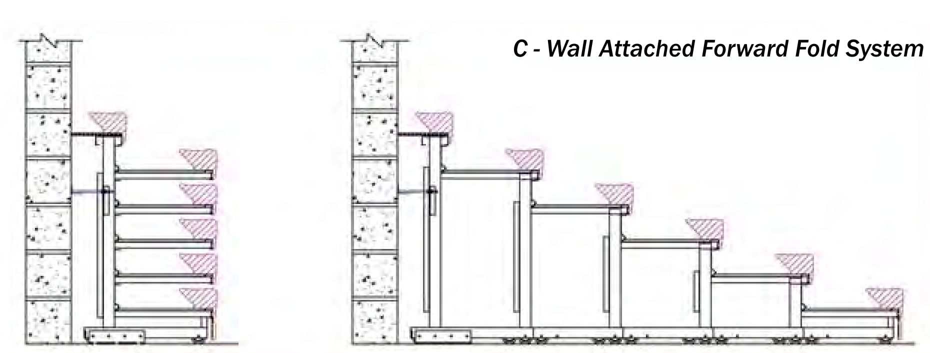
The basis of design program was established in Lammey & Giorgio's report titled Petty's Island/ Cultural and Education Center dated 3 October 2013. The VITETTA Design Team reviewed the 10,000 sf program included in the 2013 report to see how it could be accommodated within the Crowley Maritime site. The Crowley structure has a floor plate of approximately 7,000 sf per level which exceeds the space needed to accommodate the proposed new use.

The first floor plan contains the following program:

- Glass Vestibule.
- Reception Area.
- Public toilet rooms that are accessible when the building is closed.
- Janitor's Closet.
- Open Exhibit Space.
- Presentation Area with telescoping seating that can accommodate 100 persons. This location on the ground floor can be used for orientation, lectures, films, videos etc. As the design is developed, window and acoustical treatment will need to be studied to allow the space to be used during the day.
- Outdoor Observation Area.
- Elevator and fire stair near the entry for access to the second floor and roof deck.
- Open grand stair leading to the second floor.

The second floor contains the following program:

- Office Suite for NJNLT; two offices for two persons each with small storage area and staff kitchenette.
- Classroom that can accommodate 80 persons or be divided into two smaller classrooms.
- Outdoor observation area that can also be used as a classroom.
- Storage room for tables, chairs and other building materials.
- Mechanical room.
- There is a desire to have a wet lab in the classrooms which will need to be further defined and studied after the water source has been identified.



Example of telescopic seating.

The exterior of the building contains the following program:

- A "green" roof with two seating areas that can also be used for classrooms or quiet seating. The views from the roof provide a 360 degrees unobstructed view of the island, New Jersey and the skyline of Philadelphia. The existing roof structure cannot support a rainwater collection container and the "green" roof design with seating. The rainwater will be collected from the roof and piped to an above ground collection tank. The rainwater will be reused for irrigation, greywater, and if the Code, allows potable water.
- New code-compliant railings will be installed behind the existing railing on all 4 sides of the roof.
- The roof is accessible by an exterior ramp or interior stair and elevator.
- Entry courtyard that can be used for orientation to the building and site.
- Exterior classroom to accommodate 40 persons.
- Parking for 40 cars and 10 buses plus a visitor drop off near the front door.
- Maintaining the boat basin for possible future visitors arriving by boats/ ship.
- The existing open exterior stair located on the north side of the building which is not code compliant will be removed.

The concept behind the layout of the building is to create as much open exhibit space on the first floor for the visitor to explore after they have entered the building. The visitor will be able to learn about the environment, flora, fauna and history in the exhibit as well as enjoy the views of the river. The casual visitor will be able to go out onto the site where they can hike the trails and explore the island or head up to roof observation deck.

The restrooms on the first floor were sized based on the NJNLT's goal of being able to accommodate groups as large 10 bus loads. Assuming 30 people per bus, the restrooms were sized to serve 300 visitors plus the staff[2].

The next tier of visitor (students, professionals, associated organizations) will also have access to the second floor. The classroom is designed to be as flexible as possible. There is a folding wall so it can be divided into two classrooms or one large classroom depending on the nature of the presentation and the number of participants. It could be set up with either freestanding chairs or chairs and tables when lab/demonstration work is desired. There is also an exterior area adjacent to the classrooms for additional demonstration space. The second floor has many of the utilitarian functions of the building as well. This includes the mechanical and storage spaces as well as the offices. Additional restrooms are located on this floor so the Center can accommodate both large school groups on the first floor and visitors there for the classroom experience simultaneously.

The roof has been left entirely as observation space without any utilitarian or programmatic functions associated with it.

If the project was being implemented now, the building would be designed to comply with the 2015 International Building Code which is the current version of the Code adopted by the State of New Jersey.

2 Per Table 7.21.1 of the National Standard Plumbing Code 2015, the number of required plumbing fixtures for Use Group A-3, Museum with an occupancy of 300+ persons would be calculated at 150+ males and 150+ females. This would require the building have a minimum of 2 toilets for males and 3 toilets for females, 1 sink for males and 2 sinks for females, 1 water fountain and 1 service sink. NJNLT asked that we duplicate the number of toilets required for the building on the second floor.

Building Program

Program Space	2013 SF	Shipping Terminal SF
Indoor Classrooms	1,400	1,325
Exhibit Hall	2,500	4,575
Reception Area	400	550
Vestibule	100	230
Offices	320	570
Staff Kitchenette	120	100
Administrative Equipment	100	100
Administrative Storage	50	Included in Janitor's Closet
Observation Deck	400	1,175
Toilet Rooms	380	970
Janitor's Closet	50	100
Mechanical	150	450
Tools/Equipment Storage	500	475
Total	**6,470**	**10,620**

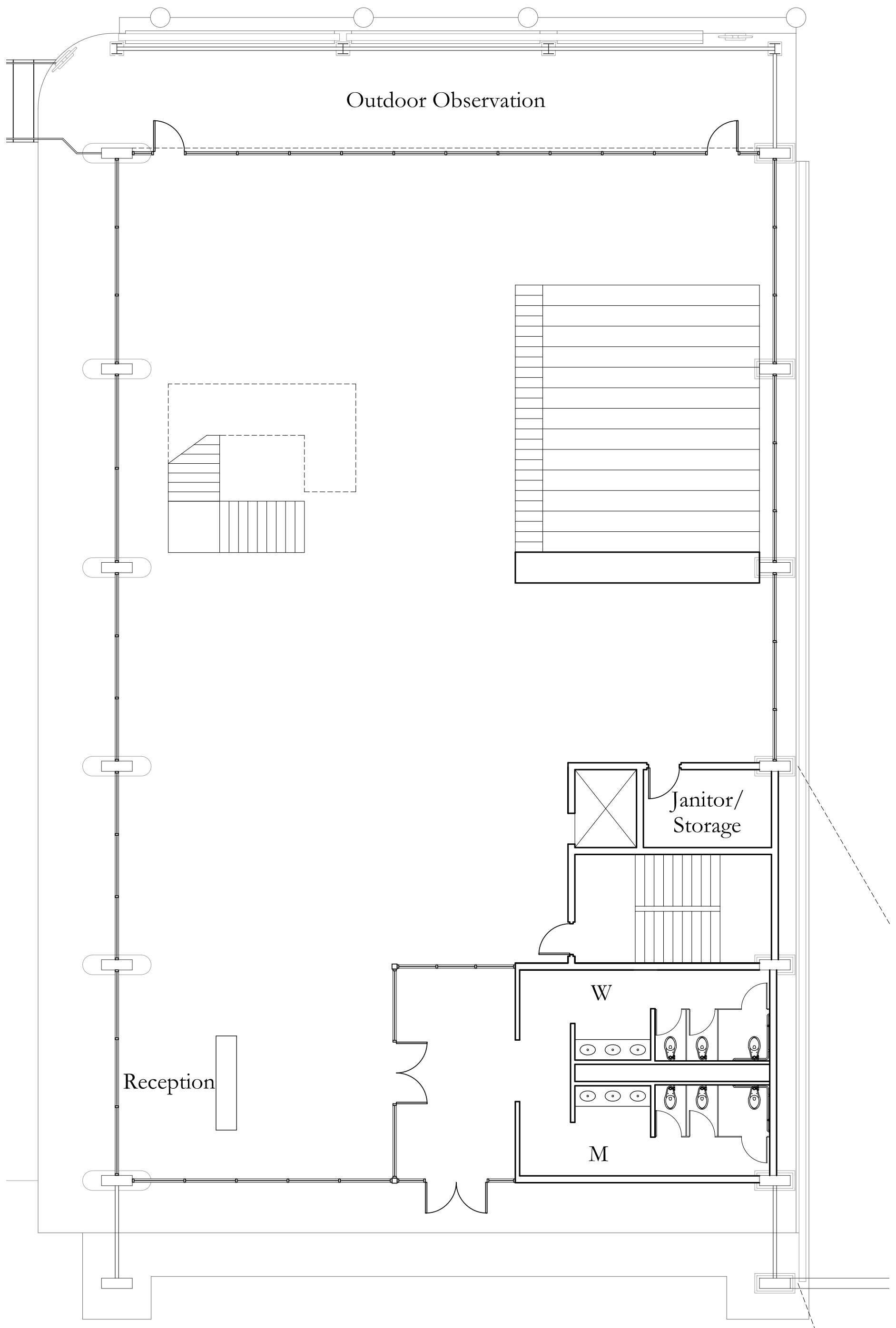
Site Program

Program Space	2013 SF	Shipping Terminal SF
Exterior Classroom	1,200	4,000
Observation Deck	800	6,975 (roof)
Entry Courtyard/Gathering Space	800	9,500
Jitney Drop Off	3,000	3,750
Accessible Parking	2,250	2,250
Service Vehicle Parking	1,500	1,500
Total	**9,550**	**27,975**

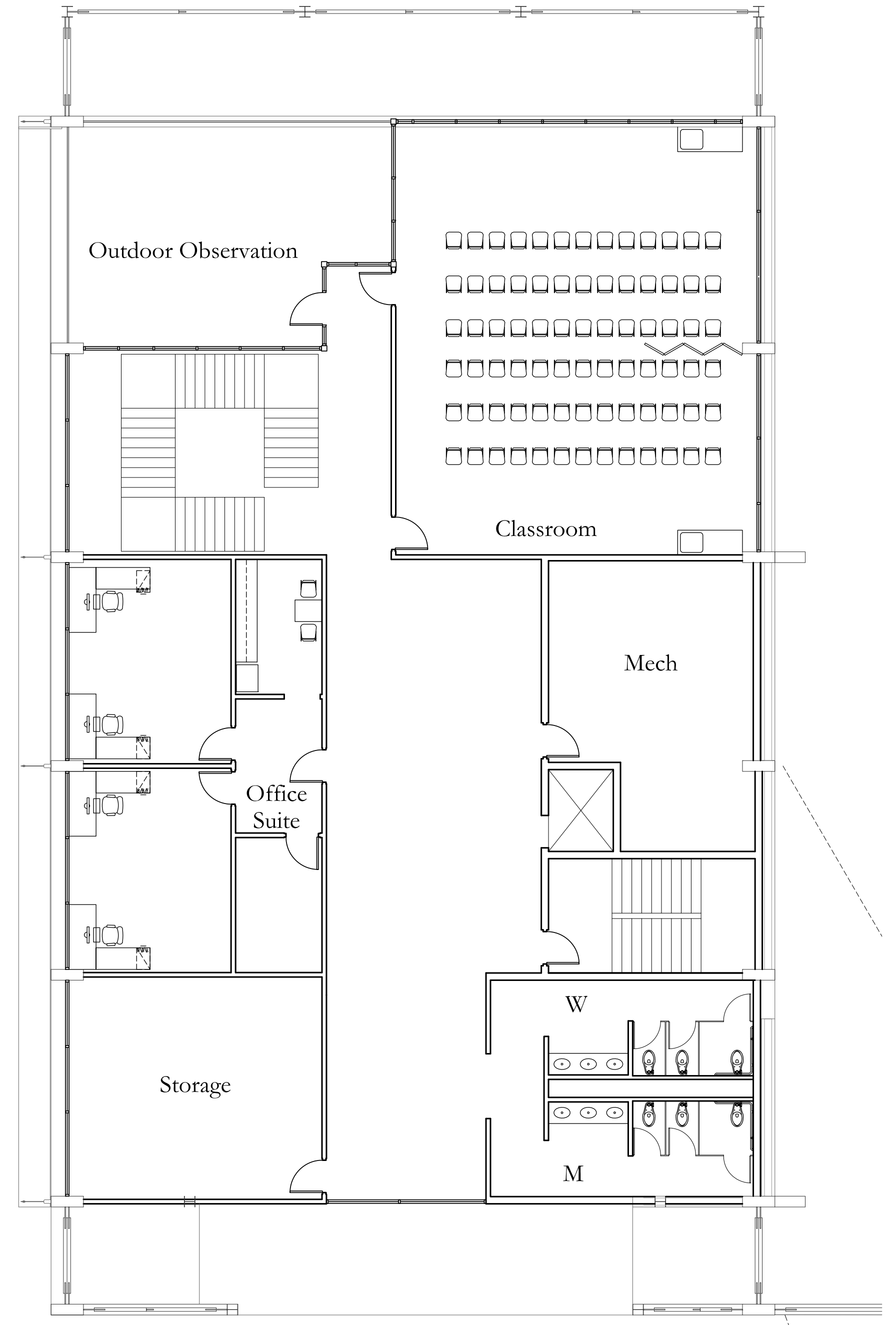
Proposed Use

Petty's Island

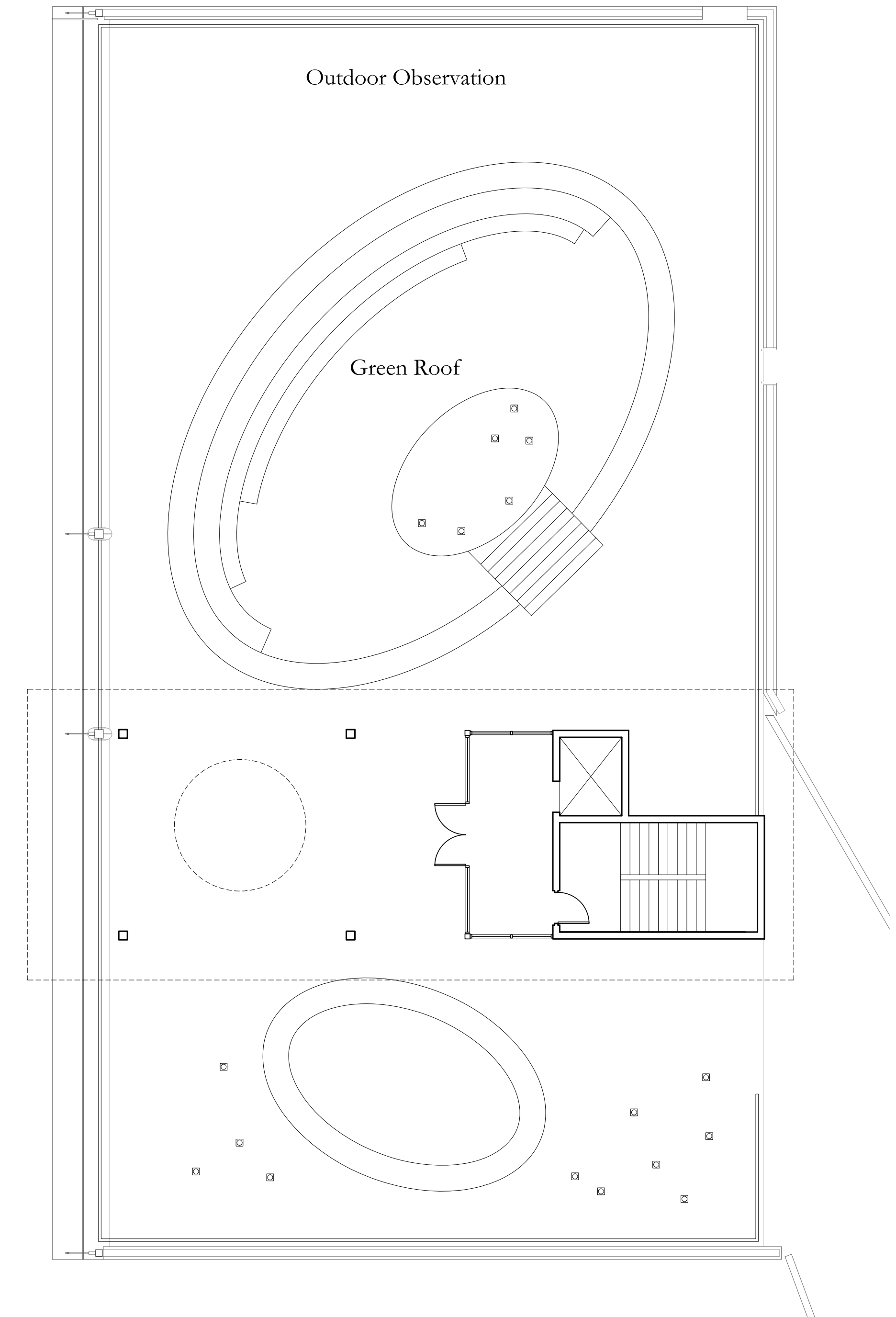
Environmental Education Center Conceptual Design



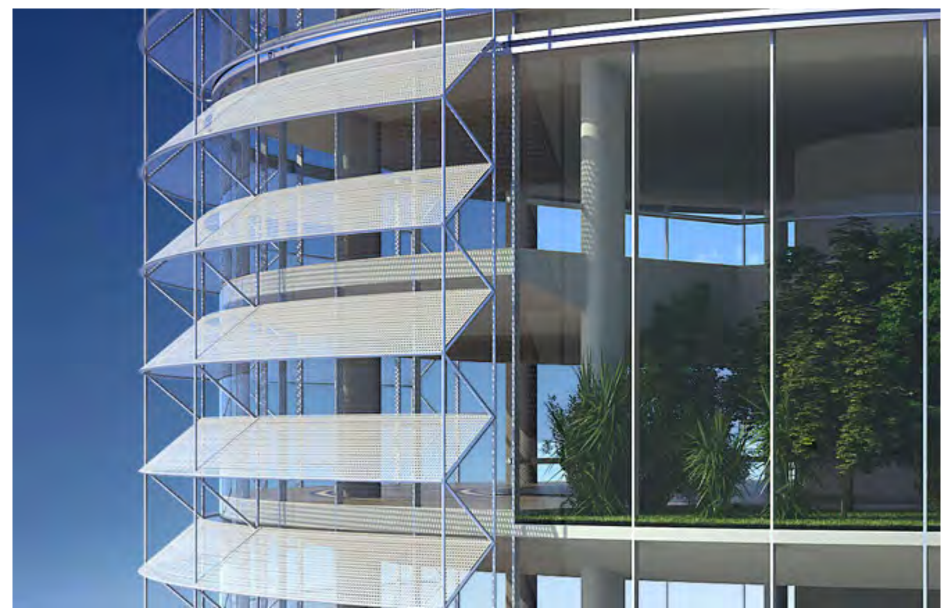
First Floor Plan Not To Scale

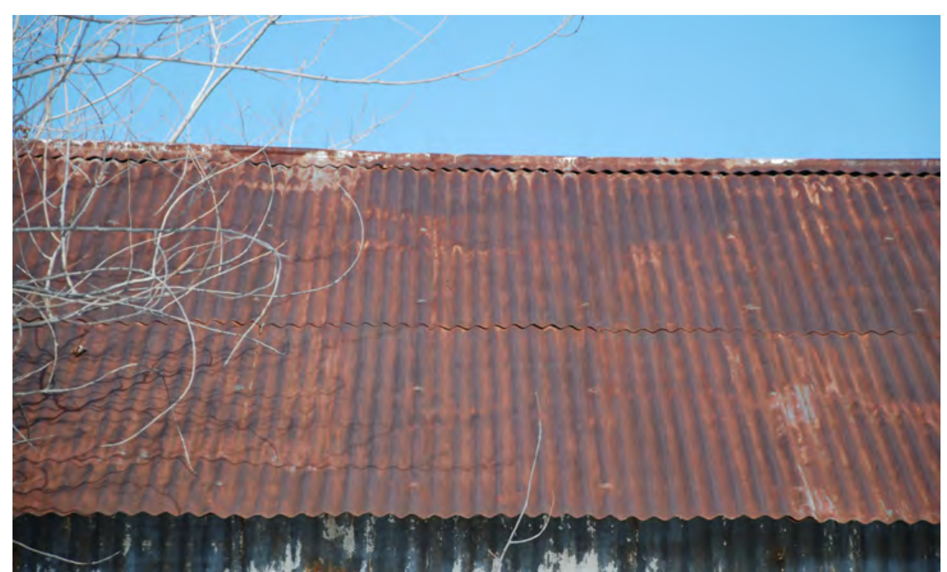


Second Floor Plan Not To Scale



Roof Plan Not To Scale





Images on this page were used as inspiration in the design of the new facility.

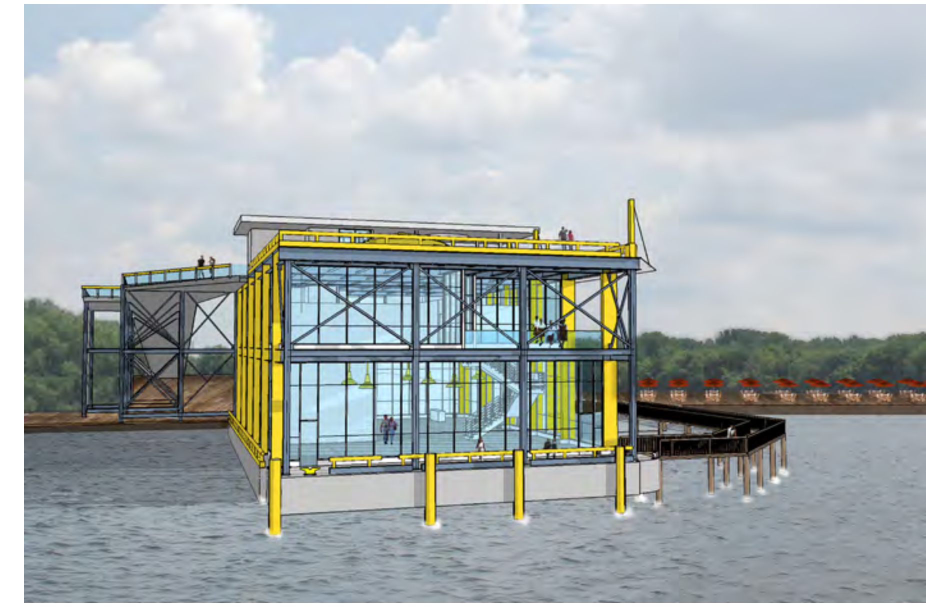
New Building Envelope

The exterior of the building is currently open on all four sides. To maintain the ability to see in all directions, we have proposed that most of the building be clad with glass except where the building program suggests a more opaque material.

Possibilities for the opaque walls could be:

- Metal panels reminiscent of the shipping containers.
- Smooth metal panels with rivets that would be reminiscent of the oil storage container.
- Some of the corrugated metal roofing found on the existing site buildings could be upcycled to be wall cladding.
- Graphics placed on the solid wall adjacent to the entry that will introduce the visitor to the site and provide a branding opportunity for the Center.

Exterior rendering showing the possible roof observation deck.



Exterior rendering showing the view from the river.

When selecting an energy efficient glazing system, one must consider the frame and the glass. The frame should be fabricated of a durable, low-maintenance material that is thermally broken in order to reduce heat transfer between the outside and inside and also to help insulate the building. The glass unit should be constructed of multiple panes with an air or gas-filled space in the middle between the two panes of glass. This system will provide better insulation than a single pane of glass. When selecting the glass, there are four Energy Star climate zones, differentiated by whether heating, cooling, or a mix of the two is most critical to energy performance of the building. It is recommend that the glass meet Energy Star requirements that have the following ratings:

- U-Factor Range: 0.20 to 1.20.
- Solar Heat Gain Coefficient (SHGC) Range: 0 to 1.
- Visible Transmittance Range: 0 to 1.
- Little to no Air Leakage.
- Provide Condensation Resistance.

For the purposes of designing the (mechanical) heating, ventilation and air conditioning system, we have selected a glass unit that will meet the following criteria as a basis of design:

- 1" Insulating glass with frit = ¼" clear with 50% frit coverage, ½" air space, ¼" clear (Viracon). A frit is a ceramic composition that has been fused in a special fusing oven, quenched to form a glass, and granulated. It is typically a pattern applied to the surface of the glass to address issues of heat gain, reflectivity, glare, etc.
- Winter U value = .31
- Summer U value = .29
- Solar Heat Gain Coefficient (SHGC) = .37

As an environmental center, it is important that the building address not only human visitor needs, but also the needs of the surrounding wildlife. Wildlife research has indicated that hundreds of millions of birds die each year due to collisions with buildings. Reasons for these collisions range from bird's inability to perceive the glass as an obstacle, the reflectivity of the glass, to the interior lights creating a beacon for the bird during nighttime hours.

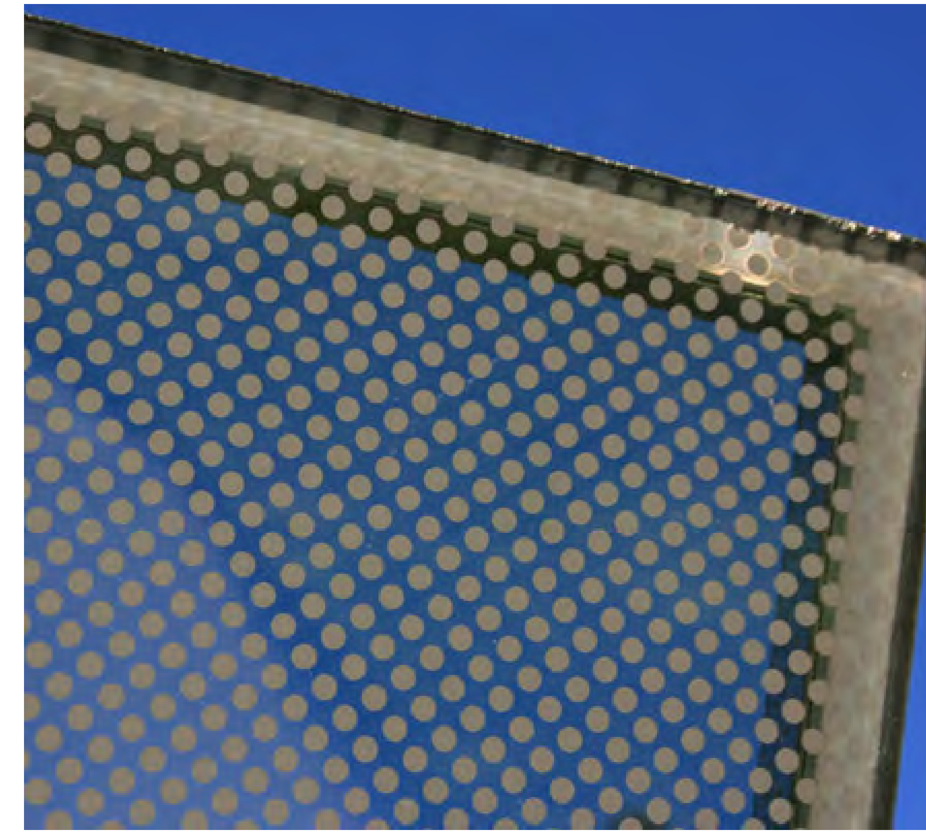
To limit the number of these collisions and keep the existing bird populations safe, we have proposed a frit be added to the design of the glass. We believe that a small frit pattern may be enough for the birds to see the glass as a solid, but will still allow the visitors an open view of the surrounding riverscape. Other solutions to this problem exist, such as installing a mesh or screening in front of the glass. However, we believe that these solutions will interfere with the interior views.

The frit pattern will not solve the problem of bird collisions in its entirety. Additional design considerations are:

- Reducing or eliminating the mirror effect of the glass.
- Addition of exterior shading.
- Integrating the design of the daylighting and nighttime lighting of the building.
- Selection of the type of light and color of lamps as well as placement of the fixtures.
- The location and design for site lighting and night lighting on the roof.
- The design development of the green roof and the selection of trees and shrubs.

There are new technologies being developed now to create better "bird-safe" glazing. Approaches including acid etching of the glass, laminated glazing and electrochromic coatings will be more advanced and should be considered as possible solutions to reduce the potential of birds hitting the glass when the project is designed in a few years. Two publications that were reviewed to gain information on bird safing were Bird Safe Building Guidelines, Audubon

Exterior rendering showing the view from the ramp.



Example of glass with dot frit pattern to prevent bird collisions into facade. Patterns can be customized for shape, density and color and silk screened onto glass.

Minnesota, MN.audubon.org and Bird Friendly Building Design, American Bird Conservancy.

On the loading side of the shipping terminal exists a chain system of raising and lowering metal plates so trucks and equipment can be driven or rolled off the barges and onto the platforms. We are proposing to keep the design intent of this suspension system on the building but replace the metal panels with solar shading to reduce the glare on the west side of the building. It is not planned to add these devices on the north or south elevations where the glazing is set back from the building edge by approximately 10 feet or on the east side which is shaded by the ramp and existing trees.

It is also proposed on the exterior of the building to design an ornamental gate on the first floor to prevent entry when the building is closed and an ornamental gate at the top of the ramp to the roof to prevent visitors to the Island from accessing the roof when the building is closed.

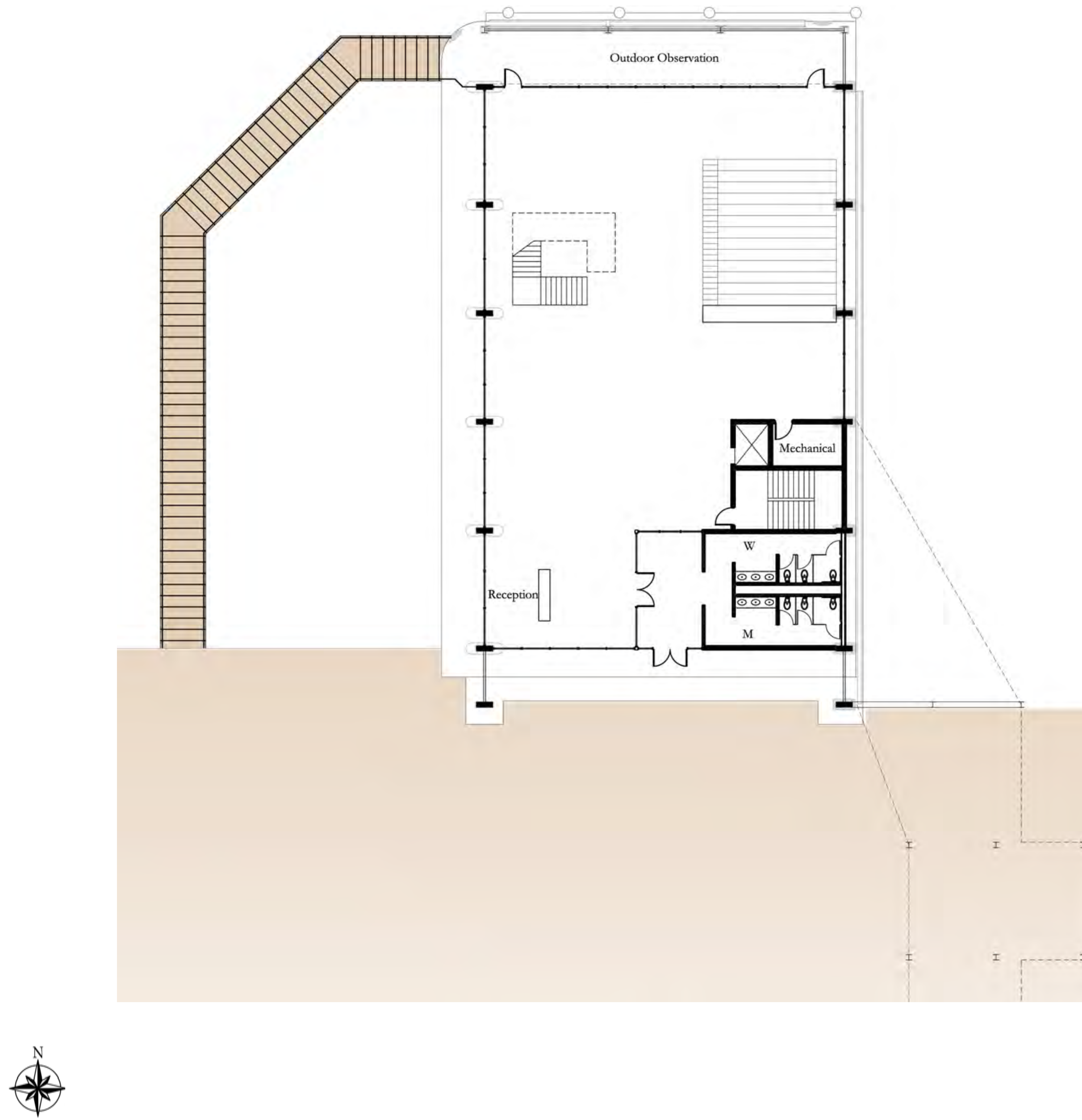
Interior rendering showing First Floor exhibit space.


Image showing how walls will not go to underside of slab.


Image showing super graphics being used as signage.

New Interior Finishes

We believe that the interior design should maintain the industrial spirit of the existing building. The limited number of new walls will be painted drywall or corrugated metal on metal studs. The walls can provide a surface to be used to interpret the industrial history of the island. Rivets or stair pattern from an oil storage tank can be added as part of an exhibit design. It is proposed that the walls not extend to the underside of the slab above to allow the size of the structure to be still be appreciated as well as allowing for the installation of building systems; round mechanical ductwork, sprinkler piping and conduit for new general purpose industrial lighting and track lighting. The wall at the open amphitheater will need to extend to the underside of the ceiling in order to provide adequate support for the seating. At the locations requiring more acoustical privacy; offices and toilet rooms, drywall ceilings will be installed. There may also be locations where acoustical baffles or wall treatments are required. The new wall surfaces will provide a good substrate for graphics. There may be a desire for additional low walls on the first floor as part of the exhibit design. The new fire stair and elevator will be also be very simple and industrial. The new open grand stair will be concrete and steel. The existing concrete slabs will be repaired and then carpet installed in some locations such as the classrooms and amphitheater to help with acoustics.



Proposed First Floor Plan showing possible egress bridge.

Code Compliance

It is the intent of NJNLT to adaptively renovate the existing Crowley Marine Terminal structure into a new Center. While it is a change in use of an existing building as defined by the Code, we do not believe that the New Jersey Department of Community Affairs will allow the use of the New Jersey Rehabilitation Subcode as the basis for the design decisions since the structure is not currently an enclosed building. Rather, it will be necessary to meet all of the New Construction Code requirements.

We believe that the building can be designed to comply with the requirements of the Code except for the following two items:

- Remote egress from First Floor:
  Since the structure can only be accessed from grade on one side, it is not possible to provide two at-grade remote exits. One option is create a boardwalk that can serve for both observation and for egress that will take visitors from the end of the building back to land. The boardwalk must be a minimum of 10’ away from the building. The boardwalk may need to have snow melt incorporated if building is open during winter months. Another option is to use the stairs as the remote egress and have visitors exit the stairs to the roof and then go down the ramp. The existing ramp is a 1:10 slope which is not accessible by code but it possible to modify the walking surface of the ramp to allow a 1:12 slope, which would meet the accessible requirements of the Code. Both of these options will require working with the authority having jurisdiction (AHJ) to determine how to safely address the egress requirements of the building.
- The design shows the existing ramp to the roof level being incorporated into the new design. The construction of the existing ramp is not code compliant. It is not considered accessible due to its slope, but also the code prohibits a rise of more than 30” vertically without a landing. As noted above, the walking surface of the ramp can be modified to ensure that the ramp is Code compliant. The Trust will need to work with the AHJ to ensure that they agree with this design approach.

Existing shipping terminal with loading indicated on beam.

New Structural Work

The terminal is well-suited from a structural point-of-view for its intended adaptation to an environmental center. The live load capacity of the lower two levels exceeds the 100 psf live load required by the Code, and the live load capacity of the top level is in the range of 300 psf (this level formerly supported truck traffic), so it will allow some flexibility in the introduction of the roof garden.

The structural slabs will require minor repairs both to repair the existing concrete finish and to provide a more uniform slab in color and surface. In addition, the existing exposed concrete will be prepared prior to being repainted. The proposed design is respectful of the composite design of the steel girders. All new large openings (stairs, elevators, duct work, etc.) should be designed to fit between the large girders. Heading off or modifying the large girders would be cost-prohibitive so the final location of the stair and elevator will need to be coordinated within the structural grid of the slab. The girder lines are spaced at 19'-4" o/c (the end bays are 21'-0") and the girders are 24" wide so the final design of an opening in the slab will have a maximum width of 17'-0" to avoid modifications to the girders. All openings in the final design will need to be reviewed and approved by a structural engineer.

All smaller openings in the slab for ductwork, pipes, etc should be cored, not saw-cut to avoid over-cutting of the slab. The final locations of these penetrations should also be reviewed with the structural engineer.

Waterproofing/moisture protection of the slab and framing should be of primary importance in the rehabilitation plan to protect these components from further deterioration.

New Building Systems

If the project proceeds in 2017, the new mechanical, electrical, and plumbing systems will be designed and installed according to the following codes adopted by the State of New Jersey.

- International Building Code – 2015, NJ edition (IBC w/ NJ edits from 3.14)
- National Standard Plumbing Code – 2015
- National Electrical Code (NFPA 70) – 2014
- ASHRAE 90.1 – 2013 (Commercial; Energy Conservation Code)
- International Mechanical Code – 2015
- International Fuel Gas Code – 2015
- Life safety Code (NFPA 101) – 2015
- National Fire Alarm Code (NFPA 72) - 2013

The applicable codes will need to be adjusted based on when the project is implemented.

Heating Ventilating and Air Conditioning (HVAC)

The building will be divided into five HVAC zones, each served by a high efficiency Ground Source Heat Pump (GSHP) with two speed compressors. Heat pump units will be furnished with ECM fans, integrated controls and insulated enclosures.

Ventilation requirements and latent loads will be handled by a packaged dedicated outdoor air supply unit (DOAS) located in the second floor mechanical room. The DOAS unit will a have total (sensible and latent) energy recovery wheel that will recovery energy from the building general exhaust.

There will be a geothermal well field (identified in the photograph on Page 13) installed for the facility. The well field capacity will be 60 tons, and consist of 30 wells, 350 feet deep, six inch diameter, 20 feet apart, with HDPE piping. The well field piping will be routed to supply and return manifolds in the first floor mechanical room. Supply water pumps will also be located in the mechanical room which will circulate the condenser water from the well field to ground source heat pumps at each zone and the Dedicated Outdoor Air System (DOAS). An alternative to drilling 350 foot deep wells is to construct a horizontal well field. A horizontal well field site would occupy 3 to 4 acres rather than less than an acre but there might be a potential construction cost savings of approximately 30% depending on requirements/need for site remediation. If geothernmal is not an option due to cost effectiveness or inability to install, the heating and cooling systems would be electric.

A new direct digital control system (DDC) will be provided for the building. The control system shall operate the DOAS unit, WSHPs, and miscellaneous equipment. The DDC system will enable and disable all packaged equipment with factory controls. The DDC system shall capture alarms, status, points, and display temperatures and humidity levels throughout the building. The system will be web based accessible through any internet connected computer.

Plumbing

As noted in the existing conditions section, there is no potable water on the island and it would be very expensive to run water piping from New Jersey to the island. The Code requires that all buildings have potable water. It is therefore proposed that potable water would be achieved by one of three methods; drilling a well to a non-contaminated aquifer, harvesting rainwater with approval of the AHJ or trucking water to the site in a similar manner as used by Crowley. For the second two options, potable water will be stored in an above ground, 3,000 gallon tank placed on the site (identified in the photograph on Page 13).

Rainwater harvesting is one potential source of potable water. Harvested rainwater can be treated to a potable level through the use of sediment filters, carbon filters, and ultra- violet (UV) disinfection units, making it suitable for all indoor water needs--including drinking water. The purification system will use ultraviolet germicidal light to purify and disinfect rainwater safely and quickly, without the use of heat or chemicals. A challenge with rainwater harvesting for potable use, however, is obtaining local municipal acceptance. In researching this option, we were able to locate a company in Virginia called Rainwater Management Systems that can provide a rainwater harvesting system for both greywater and potable water. The technology for harvesting greywater for toilets has been around for a number of years but it is relatively new technology to harvest rainwater for potable water for a public building. Harvesting rainwater for potable water has been used on a residential scale. In addition, we can not locate any standards in the IBC code adopted by NJ that would allow this approach for providing potable water. The Trust would therefore need to seek a variance to have this approach approved by New Jersey Department of Community Affairs, which administers and interprets the building code.

We would suggest that this approach be further investigated. The company's website is https://www.rainwatermanagement.com/ and they are completing a project in Seattle using rainwater harvesting for both greywater and potable water. The link to the project is http://greenbuildingelements.com/2015/02/21/net-zero-case-study-bullitt-center-water/. Unfortunately, the potable water system has not yet been approved by the City of Seattle, but, hopefully the system will be approved and there will be other examples in place when the design for the Center proceeds.

With both approaches, potable rainwater will be pumped from the storage tank to the building using pumps utilizing the latest constant pressure, variable speed pump technology to provide a continuous water flow to fixtures under any condition. The pumping system control system, complete with touch screen display monitor, will be fully integrated into the design conditions of the project with a calendar and real time clock for automatic operations. The controller is a "smart" device allowing Building Management System integration as well as the ability to adjust the system parameters as site conditions change.

If the Trust cannot get approval from NJ Department of Community Affairs, potable water will be supplied to the storage tank via a third party "bulk water delivery provider".

An electric water heater will supply hot water throughout the building. An alternative to electric hot water would be solar hot water. There is a concern with this approach when the hot water does not have a regular hot water use as the attendance at the center will fluctuate by day and time. It may be hard to size a solar system for peak or anticipated loads that are very infrequent. We could have one sink hooked up to a solar hot water heater a part of the exhibit or we could consider the use of batteries to store the power source until needed. While this approach is not viable or cost effective today, changes in technology may make this a viable alternative in the future. The distribution piping system shall be provided with a circulating pump return system, designed to ensure hot water at point of use within maximum four seconds, at full flow. The recirculation pump will be controlled by an aqua-stat with a time clock override.

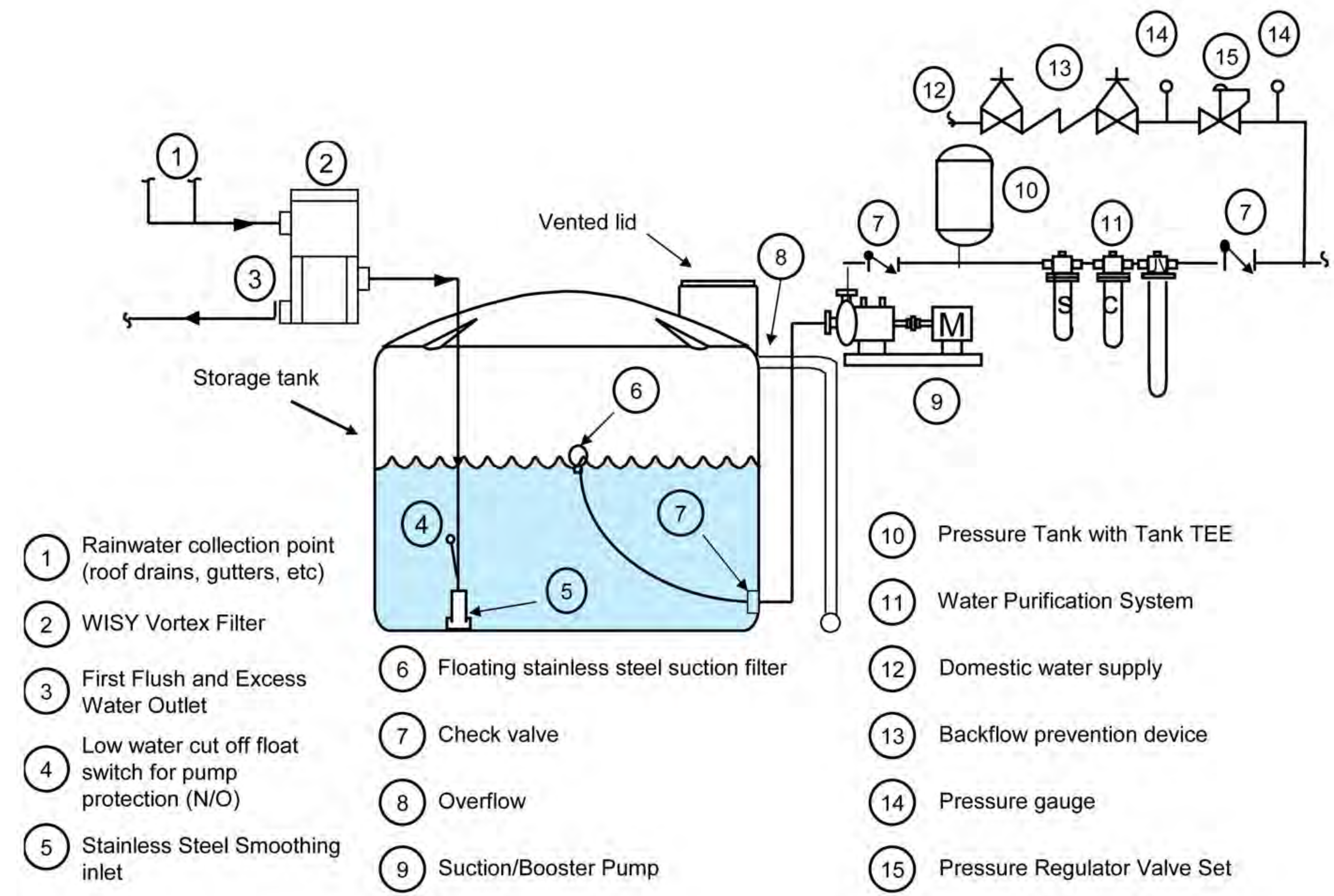
Risers for domestic cold water, domestic hot water, recycled water, sanitary waste and sanitary vent will be located within the footprint of the toilet core and will serve the fixtures at each floor. Fixtures will be low consumption tank type for all water closets and will be floor mounted. Provisions will also be made for lavatories, water closets, urinals, and electric water coolers to be ADA compliant. Floor drains will be located in each toilet room and floor sinks/drains will be provided in all mechanical rooms and adjacent to equipment requiring drainage.

Since there is no existing sanitary piping on the island, new sanitary drainage will be piped via a new 4-inch sanitary main to a new septic system constructed on the site. The alternative to installing a septic system would be to use composting toilets. The architect/engineer would need to review with NJ DCA as composting toilets are not usually installed inside a building. In searching for examples, there appears to be only one example: The Bullitt Center in Seattle, Washington, http://www.bullittcenter.org/2012/06/14/composting-toilets-at-the-bullitt-center. We also found a company that helps with design of composting toilets who should be consulted if this is determined to be a viable approach. The companies website is http://clivusmultrum.com/products-services.php

Storm piping will be routed from roof drains to a rain water storage system for irrigation, toilets and potential potable water use. The storm connection to the utility will be sized to handle the full capacity of the roof area, in the event the rain water storage system is filled to capacity. The rain water storage system will consist of a single tank, or modular tanks, with exterior locations to be determined in design development. The tank(s) capacity will be sized for the amount of fixture flushing and potable water required for the building in an average month. The system will include a single rain water filtration/pump/control package. The system may also need to have extra capacity if the AHJ does not allow the sprinkler system in the building to be supplied from river water.

Electrical

The existing electrical service can be reused and would provide adequate power to the new Petty Island Environmental Center. The existing oil-filled pad-mounted 300KVA, 480V, 3 phase transformer will be kept to serve the new electrical and mechanical loads. The power will be distributed throughout the facility from a new 277/480 volt, 3-phase, 4-wire, 225 ampere panelboard located in the first



Rainwater Harvesting System diagram.

floor electrical room which will feed lighting throughout the building, other 277/480V loads, and feed one 112.5KVA, 120/208V, 3-phase transformer located in first floor electric room to feed two (2) 120/208V panelboards, one located on each floor level in the building.

New branch circuit receptacles will be provided in accordance with National Electrical Codes requirements and specialized needs. All feeder and branch circuits will utilize copper conductors with THHN/THWN insulation. Metal-clad cable may be used where concealed in ceilings, walls, and partitions. All interior exposed conduit systems will be EMT.

Lighting throughout the administrative areas will consist of a mixture of dimmable 6" LED recessed downlight fixtures. Lighting illumination levels will be designed according to IESNA recommendations for activity type. Lighting power density will be reduced to levels required by ASHRAE standards by utilizing high-efficiency LED fixtures and drivers, and by spacing the fixtures appropriately.

The method of lighting control will alternate between line voltage wall mounted 0-10V dimming vacancy sensors and 1, 2 and 3 relay room controllers that control the lights based on the switching device's signal. The switching devices will consist of wall mounted low-voltage dimming switches and ceiling mounted low voltage dual-technology occupancy sensors, which function as manual on, automatic off. In larger areas, such as the classrooms, ceiling-mounted vacancy sensors will be used, along with manual low voltage dimming switches for override of the vacancy sensors.

There will be track lighting designed for the exhibit areas and a combination of track, down and special lighting for the classrooms. In the utilitarian back of house areas, the lighting will consist of 4' LED industrial strip lights. Lighting controls in all mechanical and electrical will utilize 20A, 120-277VAC, single-pole toggle switches. GFCI Receptacles will be provided in all utilitarian rooms.

Lighting fixtures, receptacles, HVAC equipment, and all other loads will be grounded by means of a green-insulated equipment grounding conductor installed in the equipment power supply conduit and originating at the supply panel ground bus. Receptacles will be installed, one on each wall, of each office and convenience receptacles throughout the rest of the space. One (1) ground fault circuit interrupter (GFCI) type receptacle will be located in each restroom above the countertop. Break room refrigeration and cooking equipment will be powered as required.

Lightning Protection System

The Risk Assessment Guide within NFPA 780 classifies the environmental center as a moderate risk for damage via lightning. It is recommended that a lightning protection system be provided as part of this project. The lightning protection system will be comprised of air terminals and down conductors connected to a ground ring on the upper roof canopy. It is not recommended to install lightning protection around the perimeter of the building where the roof garden will be constructed. The lightning protection system will be bonded to the existing building grounding system.

On-Site Renewable Energy

The building is not located in a part of the country where a reasonable payback period for wind power can be expected for the following reasons.

- Average wind speed at Philadelphia International Airport is about 11mph (5 m/s)
- The U.S. Department of Energy (DOE) considers regions with average annual wind speeds of 6.5 meters per second (m/s), or 14.5 miles per hour (mph), to be suitable for wind development.
- Small wind turbine installation costs $3,000 to $5,000 for every kilowatt of generating capacity. According to the DOE, a wind turbine rated 5 to 15kW would be required to make a significant contribution to a typical building that uses 10,000 kilowatt-hours of electricity per year).
- In addition, there is a concern for the migratory birds flying into the blades of the wind turbines.

We are therefore not recommending the use of on-site wind power due to its current economic viability but one could consider the construction of a bird friendly wind power apparatus on the roof of the building as part of the exhibit design.

As an alternative or back up to reusing the existing electrical service, one could consider the use of on site photovoltaic (PV) power generation, a renewable energy source. This energy source would be sustainable and would meet the needs of the present without compromising the ability of future generations to meet

Partial site plan showing location of proposed solar array.

their needs. Harnessing solar energy does generally not cause pollution. With the introduction of net metering and feed-in tariff (FIT) schemes, building owners can now "sell" excess electricity, or receive bill credits, during times when they produce more electricity than what they actually consume. There are no moving parts involved in most applications of solar power. There is no noise associated with photovoltaics.

The majority of today`s solar power systems do not require a lot of maintenance. Solar panels usually only require cleaning a couple of times a year. Solar energy is an intermittent energy source. Access to sunlight is limited at certain times (e.g. morning and night). Predicting overcast days can be difficult. This is why solar power is not our first choice when it comes to meeting the base load energy demand. Energy storage systems such as batteries will help smooth out demand and load, making solar power more stable, but these technologies are also expensive.

Space would need to be allocated for electrical equipment to support the PV panels. This would include inverters, disconnect switches, and cable splice boxes. Inverters can be in the form of a large central inverter for the entire system or smaller distributed inverters that could even be located on the roof near the PV arrays.

The new environmental center location of Petty's Island site has sufficient land area for the construction of a photovoltaic (PV) field. Based on using 3'x 5' photovoltaic solar panels producing 200 Watts each, we propose utilizing 1000 panels to provide 200kW of power to our building which effectively would approximate a net zero situation. The solar array field would be approximately 200 by 600 feet.

Existing fire pump building.

Existing fire pump at the shipping terminal.

Communications

All communications wiring shall be run from all voice/data locations back to utility demark located in mechanical room on first floor. Television outlets will be provided in exhibit areas and classrooms.

Fire Protection/Fire Suppression

The building will be fully sprinklered. The system will be designed as a wet pipe sprinkler system in accordance with NFPA 13. It is proposed that the existing island diesel fire pump system will be re-used. It is the intent to seek approval from NJ Department of Community Affairs to continue to use river water as the water source for the new sprinkler system.

Fire Alarm System

The building will be protected by an addressable fire alarm system panel. The initiating devices will include manual pull stations at the exits and in the means of egress as required, and sprinkler system waterflow switches. The supervisory devices include sprinkler system tamper switches, fire pump conditions, and duct-type smoke detectors in the HVAC system as required by NFPA 90A. The notification appliances include wall mounted horn/strobes and strobes throughout the building

Other safety design features include automatic shutdown of the HVAC system in accordance with NFPA 90A. An alpha-numeric remote annunciation panel will be located near the main entrance. The fire alarm system will be connected to a central station via a digital alarm communication transmitter (DACT).

Area shown shaded is area of paving to be removed by Crowley.

Landscape/Site Features

Petty's Island was primarily used over the past century as a petroleum storage and refining operation and a marine terminal. On the marine terminal portion of the island used by Crowley Maritime, the vegetation has been cleared and large sections have been paved over for parking, storage of trailers and an office complex. The plan above depicts the areas of asphalt that are to be removed by Crowley when they terminate their operations at the end of 2017. When most of the Crowley parking lot is removed, it will be reforested. Once CITGO removes the oil storage tank farm and other refinery equipment from other areas of the island, those areas will be restored to grassland habitat.

Parking / Driveway

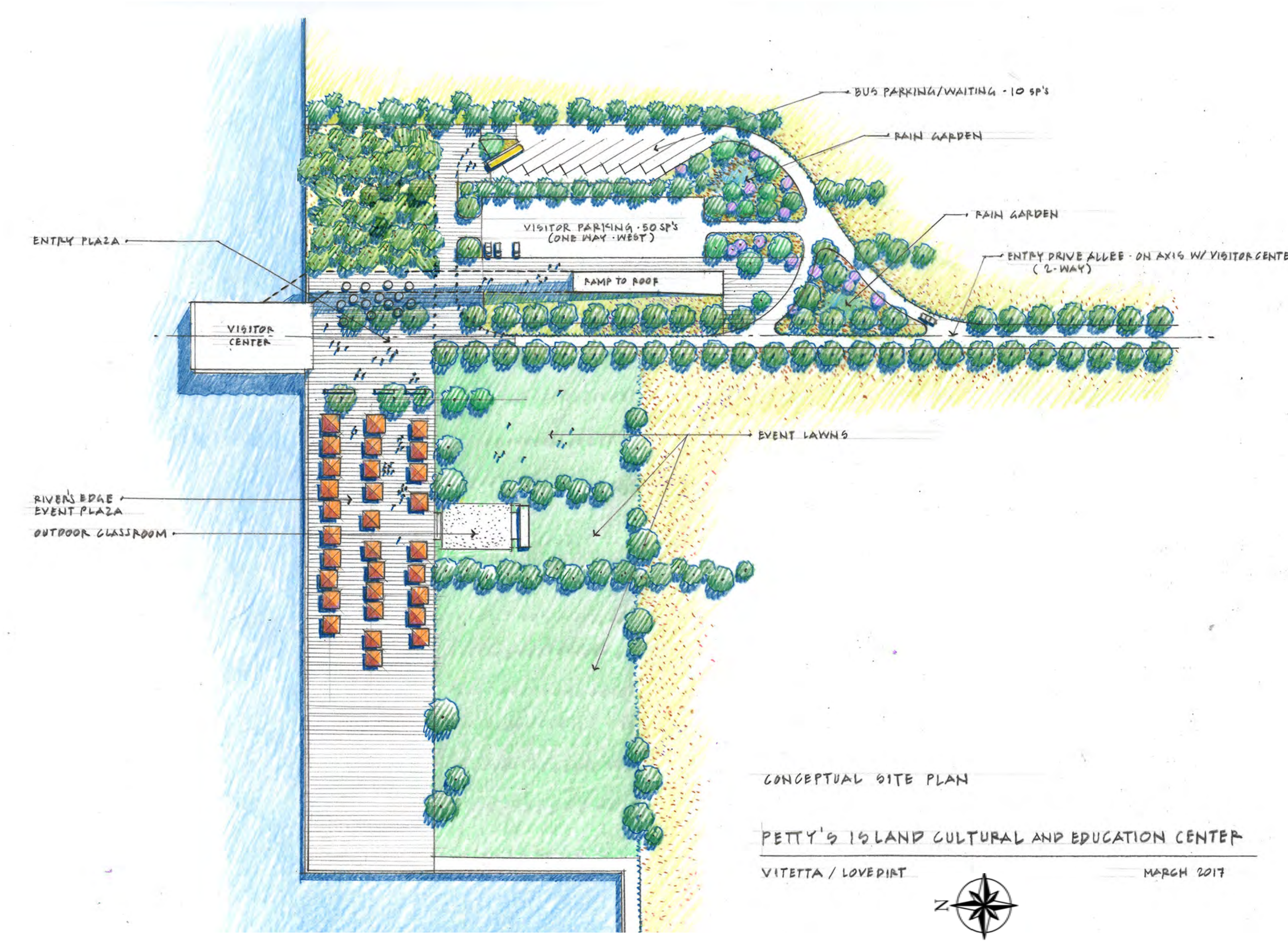
The design shows the main drive on access with front entrance to the new environmental center. While we have designed the new parking to accommodate 10 buses and 50 cars located on east side of main drive, one of the long-term goals of the project would be to require cars to park in Pennsauken, NJ and use a jitney or tram to bring visitors to the building. The proposed site layout allows for an open view of visitors center approach with a a drop-off and turnaround for the buses and cars. The limited paved areas will be graded to drain into bio-swales.

Entry Courtyard / Gathering Space

It is proposed to retain the existing paved area adjacent to river for event space. This location has been selected along the river's edge for the optimal views of the river and Philadelphia. The design shows a shaded seating for gathering. The space will be flexible to accommodate groups of various sizes with an adjacent softer planted area for variety of uses.

Exterior Classroom

The program shows an exterior classroom constructed within a Crowley or similar shipping container to accommodate 40 participants. The design also shows additional gathering spaces set in landscape and as noted above an adjacent event lawn and plaza for variety of uses.



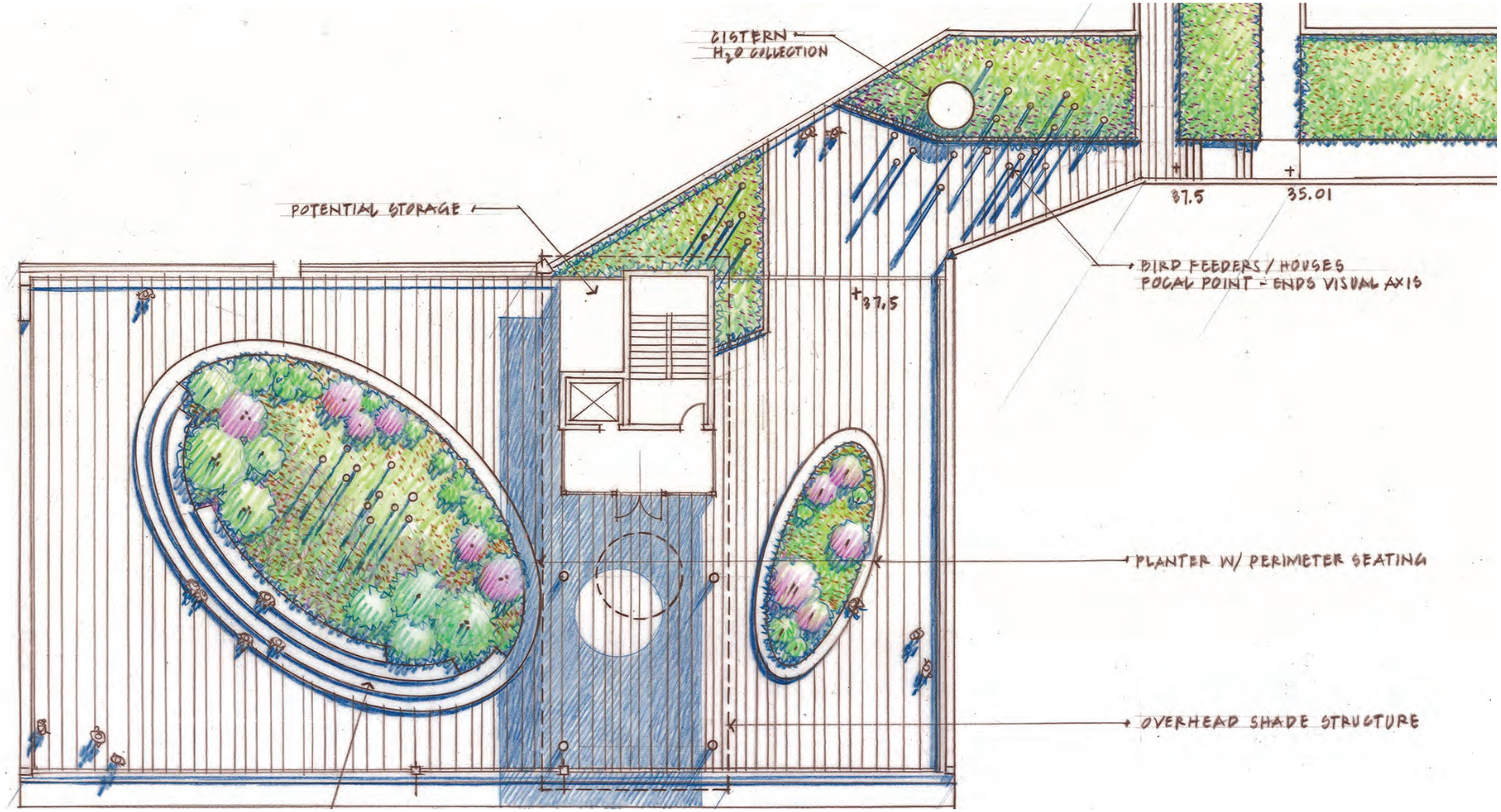
Green Roof

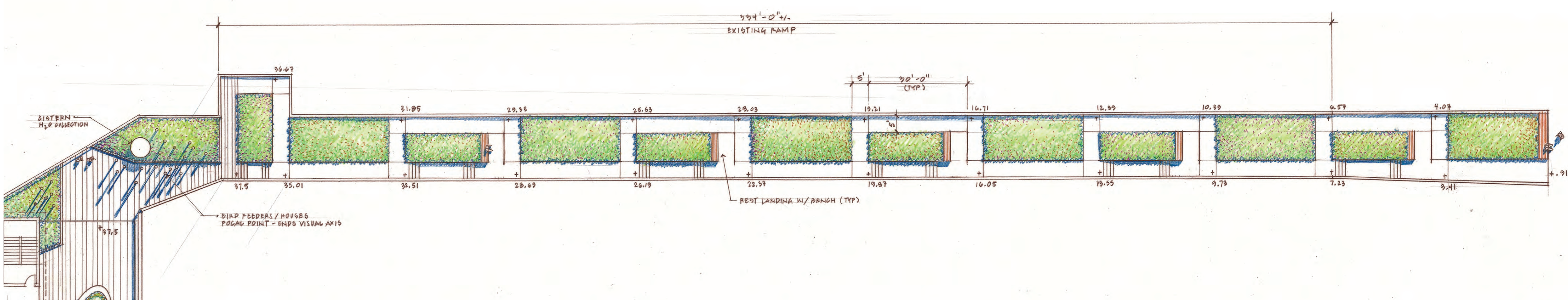
The design shows adapting the roof surface to allow for a green roof with access via a new interior stair, an elevator or the existing ramp. The size of the roof can accommodate seating for two separate groups. The two seating options are a tiered seating around a vegetated "berm" that can accommodate 20+ visitors and allows for views from higher elevation. Due to loading limitations of the roof structure, the berm will need to be constructed of a layered foam fill to soil load. The foam fill would be covered with 3 feet of soil. The planters would be raised precast concrete also providing seating on the perimeter walls and tiers. An alternative material would be recycled wood. The design of an irrigation system for the planters would need to be designed in a future phase of the project.

- Seat wall constructed of either precast concrete or recycled wood around vegetated area for 20+ visitors
- Rainwater collection for irrigation
- Bird Houses displayed
- Wind Turbine Display
- Views across site to City & River

Green Ramp

- Non-accessible ramp secondary access to roof (1:12 or 8.33% climb)
- Vegetation breaks up switchback style path
- Stairs with railings along south side as an alternate path
- Pollinator gardens for display


CISTERN
H2O COLLECTION
POTENTIAL STORAGE
37.5
35.01
37.5
BIRD FEEDERS / HOUSES
FOCAL POINT - ENDS VISUAL AXIS
PLANTER W/ PERIMETER SEATING
OVERHEAD SHADE STRUCTURE


334'-0"+/-
EXISTING RAMP
CISTERN
H2O COLLECTION
36.67
5'
30'-0"
(TYP)
31.85
29.35
25.53
23.03
19.21
16.71
12.89
10.39
6.57
4.07
37.5
35.01
32.51
28.69
26.19
22.37
19.87
16.05
13.55
9.73
7.23
3.41
+.91
REST LANDING W/ BENCH (TYP)
BIRD FEEDERS / HOUSES
FOCAL POINT - ENDS VISUAL AXIS
37.5

Recommended Plants for Site Plan Areas:

These are recommended plants for landscaped site plan areas. Areas on the island being restored to forest or grassland will be surveyed and evaluated to determine what plants are most appropriate for restoration purposes.

Large and Small Trees:

Acer rubrum (Red Maple)
Amelanchier (Serviceberry)
Betula nigra (River Birch)
Betula populifolia (Gray Birch)
Carya glabra (Pignut Hickory)
Carya ovata (Shagbark Hickory)
Cornus florida (Flowering Dogwood)
Corylus americana (American Hazelnut)
Diospyros virginiana (Persimmon)
Fagus grandifolia (American Beech)
Ilex opaca (American Holly)
Juniperus virginiana (Eastern Red Cedar)
Liquidambar styraciflua (Sweetgum)
Liriodendron tulipifera (Tuliptree)
Magnolia virginiana (Sweetbay Magnolia)
Nyssa sylvatica (Blackgum)
Pinus rigida (Pitch Pine)
Pinus strobus (White Pine)
Pinus virginiana (Virginia Pine)
Platanus occidentalis (American Sycamore)
Quercus alba (White Oak)
Quercus coccinea (Scarlet Oak)
Quercus palustris (Pin Oak)
Quercus phellos (Willow Oak)
Quercus rubra (Northern Red Oak)
Rhus typhina (Staghorn Sumac)
Salix nigra (Black Willow)
Tilia americana (American Basswood)

Large and Small Shrubs:

Cephalanthus occidentalis (Common Buttonbush)
Clethra alnifolia (Coastal Sweetpepperbush)
Cornus sericea (Red Osier Dogwood)
Hamamelis virginiana (Witchhazel)
Ilex verticillata (Winterberry)
Ilex glabra (Inkberry)
Itea virginica (Virginia sweetspire)
Lindera benzoin (Northern Spicebush)
Myrica pensylvanica (Northern Bayberry)
Photinia melanocarpa (Black Chokeberry)
Physocarpus opulifolius (Common Ninebark)
Prunus maritima (Beach Plum)
Rhododendron maximum (Rhodoendron)
Rhododendron periclymenoides (Pink Azalea)
Rhododendron viscosum (Swamp Azalea)
Spiraea alba (White Meadowsweet)
Vaccinium corymbosum (Highbush Blueberry)
Viburnum acerifolium (Mapleleaf Viburnum)
Viburnum dentatum (Southern Arrowwood)
Viburnum nudum (Possumhaw)
Viburnum prunifolium (Blackhaw)

Perennials / Grasses:

Andropogon virginicus (Broomsedge Bluestem)
Asclepias incarnata (Swamp Milkweed)
Asclepias tuberosa (Butterfly Milkweed)
Aster novi-belgii (New York Aster)
Athyrium filix-femina (Lady Fern)
Calamagrostis canadensis (Bluejoint Grass)
Chelone glabra (White Turtlehead)
Danthonia spicata (Poverty Oatgrass)
Dennstaedtia punctilobula (Hayscented Fern)
Dryopteris marginalis (Woodfern) Eupatorium (Joe Pye Weed)
Helenium autumnale (Sneezeweed)
Helianthus angustifolius (Swamp Sunflower)
Iris versicolor (Blueflag)
Lobelia cardinalis (Cardinal Flower)
Oenothera fruticosa (Evening Primrose)
Osmunda cinnamomea (Cinnamon Fern)
Osmunda regalis (Royal Fern)
Panicum virgatum (Switchgrass)
Phlox subulata (Moss Phlox)
Polystichum acrostichoides (Christmas Fern)
Schizachyrium scoparium (Little Bluestem)
Sisyrinchium (Blue-Eyed Grass)
Thalictrum thalictroides (Rue Anemone)

SOURCES:

1. Herpetological Associates, Inc. "Spring 2010 Plant and Wildlife Inventory." Jackson, New Jersey. July 1, 2010
2. Lammey & Giorgio. "Petty's Island / Cultural and Education Center Final Report." Haddon Township, New Jersey. October 3, 2103
3. New Jersey Audubon. "Petty's Island Preserve." Bernardsville, New Jersey. 2014.
4. The Native Plant Society of New Jersey. "Plants from the USDA Database."

Cost Estimate

	AREA/SF/QTY	UNIT	UNIT PRICE	COST
Building				
Demolition			ALLOW	$ 150,000
Structural Repairs			ALLOW	$ 100,000
Exterior				
Aluminum/Glass	8,900	SF	200	$ 1,780,000
Aluminum/Glass Doors	7	EA	2,000	$ 14,000
Metal	3,400	SF	65	$ 221,000
Roof Membrane	7,000	SF	25	$ 175,000
Decking	6,445	SF	20	$ 128,900
Railings	338	LF	40	$ 13,520
Interiors				
Partitions	9,475	SF	22	$ 208,450
Ceilings (est 1/3 of flooor area)	4,700	SF	12	$ 56,400
Interior Doors	11	EA ROOM	2,500	$ 27,500
Toilet Rooms	4	EA ROOM	6,000	$ 24,000
Fire Stair	1		ALLOW	$ 30,000
Elevator	1		ALLOW	$ 100,000
Monumental Stair	1		ALLOW	$ 60,000
Carpet	1,286	SY	40	$ 51,444
Concrete	2,450	SF	12	$ 29,400
Boardwalk				
Boardwalk- deck, pilings, rails			ALLOW	$ 150,000
Building Systems				
Mechanical	14,000	SF	35	$ 490,000
Plumbing	14,000	SF	15	$ 210,000
Electrical	14,000	SF	20	$ 280,000
Fire Detection	14,000	SF	5	$ 70,000
Fire Protection	14,000	SF	10	$ 140,000
Interior				
Furnishings			ALLOW	$ 60,000
Exhibits			ALLOW	$ 200,000
Building Sub-total				**$ 4,769,614**

	AREA/SF/QTY	UNIT	UNIT PRICE	COST
Site				
Site Improvements Utilities				
Demolition			ALLOW	$ 50,000
Solar Array	2	watts	200,000	$ 460,000
Geothermal	8,000	well	30	$ 240,000
Rainwater Collection			ALLOW	$ 10,000
Rainwater Collection/Potable			ALLOW	$ 30,000
Sitework- landscape				
Remove existing asphalt (not removed by Crowley)			ALLOW	$ 50,000
Site Clearing			ALLOW	$ 50,000
Silt Fencing			ALLOW	$ 25,000
Grading/Earthwork			ALLOW	$ 60,000
Paving				
Parking Lot/Car/5 ADA- Asphalt	50	per stall	2,500	$ 125,000
Parking Lot/Buses	10	per stall	5,300	$ 53,000
Roads around parking				
Asphalt (includes milling of existing asphalt and reusing existing gravel base)	1,800	LF	150	$ 270,000
Event Area/Plaza/Courtyard				$ -
Existing Paving with new Asphaltic coating	87,500	SF	2	$ 175,000
Crushed Gravel w/metal esdge (Exterior Classroom Area)	3,150	SF	6	$ 18,900
Structural Elements				
Exterior Classroom- Repurposed Shipping Container	1	EA	ALLOW	$ 80,000
Tool Shed	1	EA	ALLOW	$ 4,000
Ramp Improvements (green roof/Planting Beds/Handrail)	1	EA	ALLOW	$ 450,000
Overhead Shade Structure (green roof) wood	2,240	SF	120	$ 268,800
Tiered seating - Large (green roof)	430	LF	400	$ 172,000
Tiered Seating (small- Green roof)	100	LF	300	$ 60,000
SitePlantings				
Large canopy Tress - 6 " caliper	82	EA	900	$ 73,800
Small Canopy Trees -2" caliper	56	EA	450	$ 25,200
Approach Gardens at Building Entrance (native plantings- no irrigation)	600	SF	6	$ 3,600
Horticulture Ramp Gardens (native and non-native- irrigation)	5,150	SF	6	$ 30,900
Green Roof Gardens (intensive ornamental display- irrigation)	2,200	SF	6	$ 13,200
Existing Meadows- supplement w/native plantings (low intensity - no irrigation)	40,000	SF	1	$ 40,000
Lawns (medium intensity- no irrigation)	100,000	SF	1	$ 100,000

	AREA/SF/QTY	UNIT	UNIT PRICE	COST
Site Furnishings				
Benches	12	EA	1,500	$ 18,000
Shade Umbrellas with seating	30	EA	3,000	$ 90,000
Composting Toilets	2	EA	13,000	$ 26,000
Bicycle Racks	1	EA	2,000	$ 2,000
Drinking Fountain (ADA accessible)	2	EA	4,000	$ 8,000
Recycling Trash receptacles	8	EA	700	$ 5,600
Bird Feeders (green roof)	20	EA	200	$ 4,000
Stormwater Management				
Vegetated Swales	3,000	SF	4	$ 12,000
Rain Garden	7,500	SF	5	$ 37,500
Basins/Cisterns	1	EA	ALLOW	$ 50,000
Irrigation	320	SF	50	$ 16,000
Exterior Lighting				
Parking Lot (12 ft post fixtures with photocell, 60 feet apart)	9	EA	2,000	$ 18,000
Entrance Path (low-level)	20	EA	600	$ 12,000
Sitework- Sub-total				**$ 3,237,500**
PROJECT HARD COSTS SUB-TOTAL				**$ 8,007,114**
Soft Costs & Contingencies				
Consultant Design Fee @ 8%			0.08	$ 640,569
Consultant Construction Admin Fee @ 5%			0.05	$ 400,356
Design Cost + Hard Cost Sub-total				$ 9,048,039
DPMC Management Fees 8% of Total Budget			0.08	$ 723,843
Project Cost + DPMC Fees Sub-total				$ 9,771,882
Contingency				
Design (Budget + Fees)			0.10	$ 904,804
Construction (Budget)			0.10	$ 800,711
Project Costs + Contingency Sub-total				$ 11,477,398
UCC Permit Estimate Plan Review Fee based on $7,600,000 construction budget				$ 76,300
UCC Permit/Inspection Fee based on $7,600,000 construction budget				$ 76,300
OVERALL PROJECT SUB-TOTAL				**$ 11,629,998**
Escalation to midpoint of Construction (estimated at 2021)			0.03	$ 1,427,638
General Conditions @10%			0.10	$ 1,163,000
Overhead & Profit @15%			0.15	$ 1,744,500
Bond & Insurance @2.3%			0.02	$ 267,490
PROJECT TOTAL				**$ 16,232,625**

APPENDIX: Concept Design Options

	Option 1
Classrooms	1,040
Exhibits	62,250
Reception	370
Vestibule	3150
Offices	630
Observation Deck (not including roof)	1,240
Restrooms	635
Mechanical	485
Storage	Outside Building

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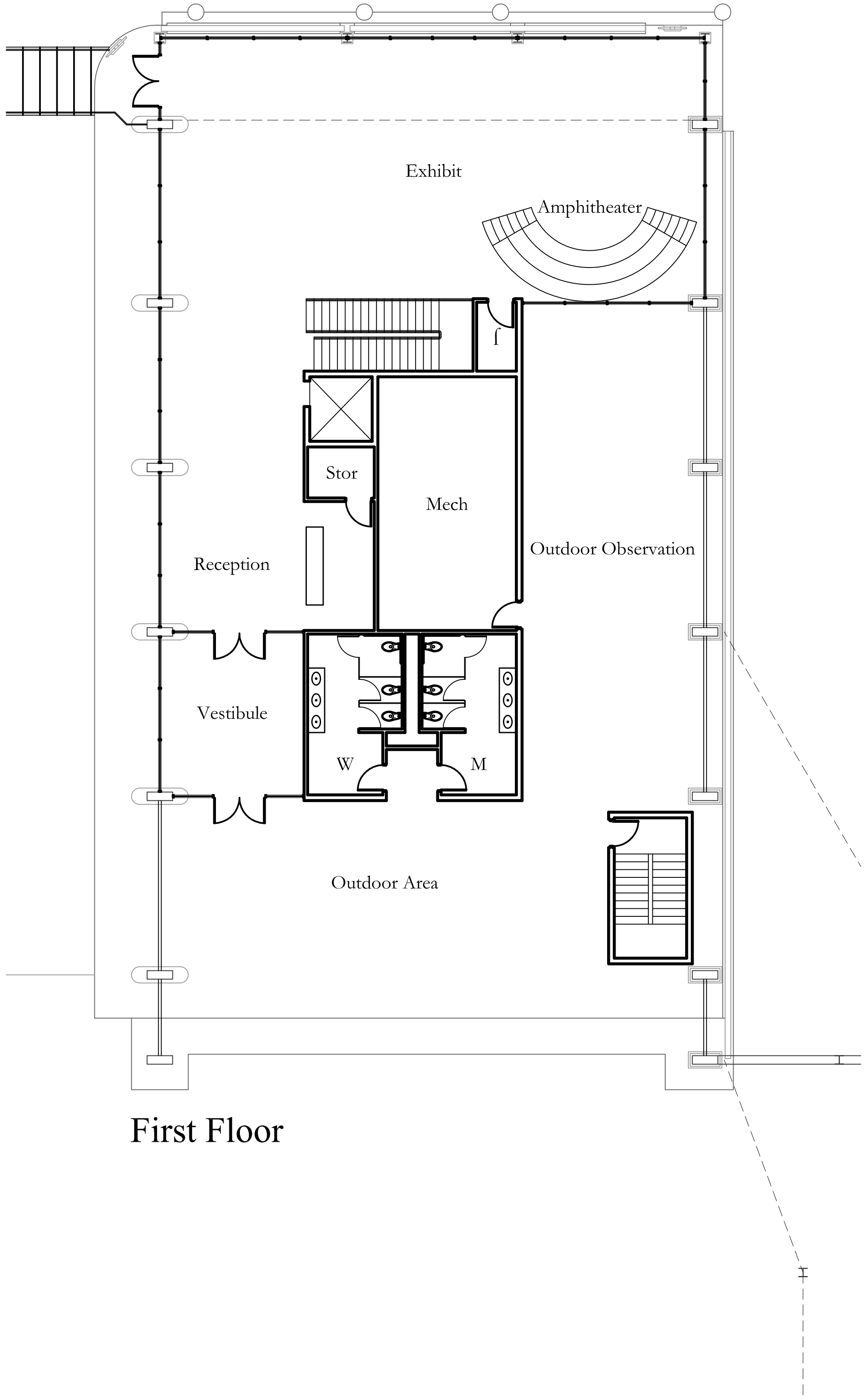
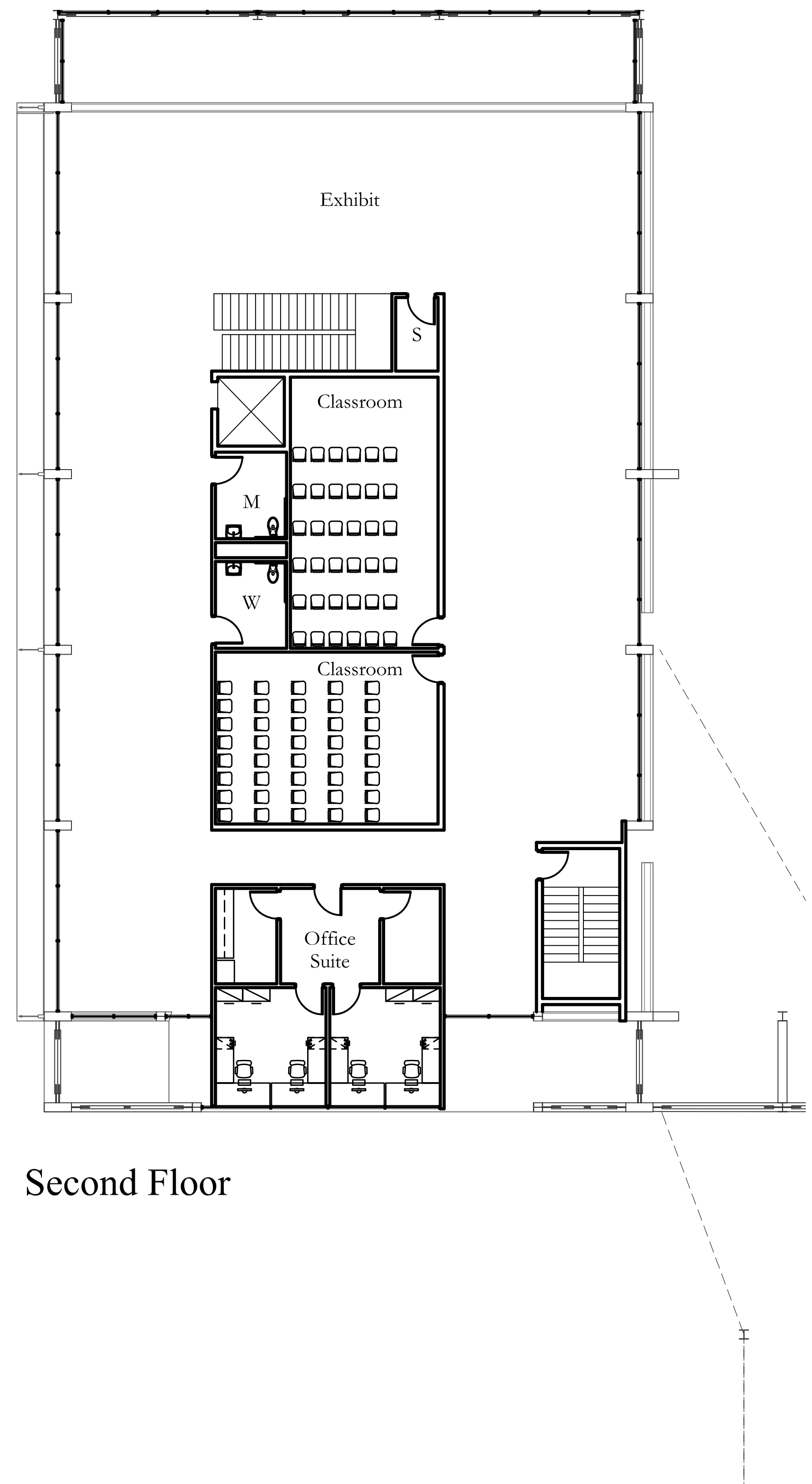
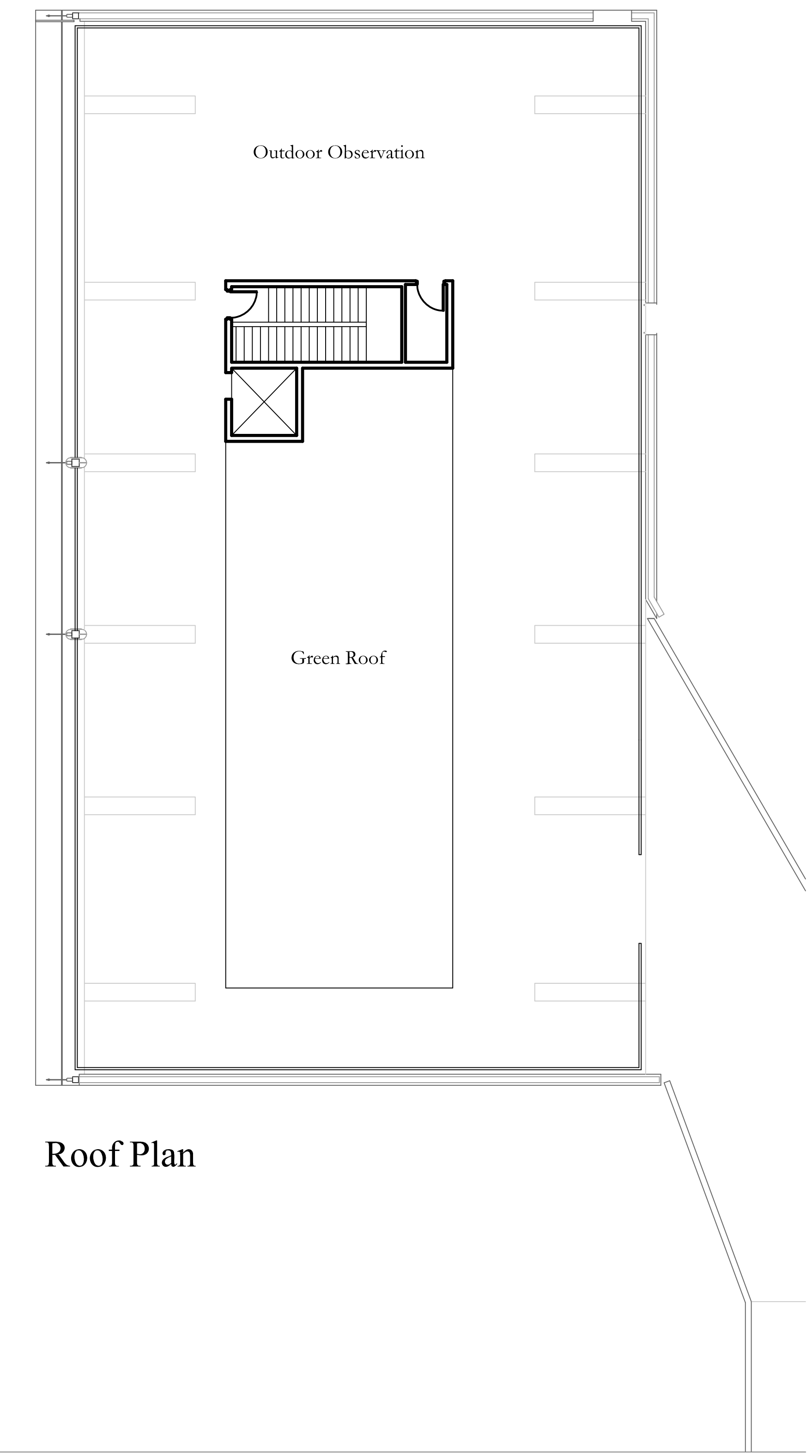


First Floor



Second Floor



Roof Plan

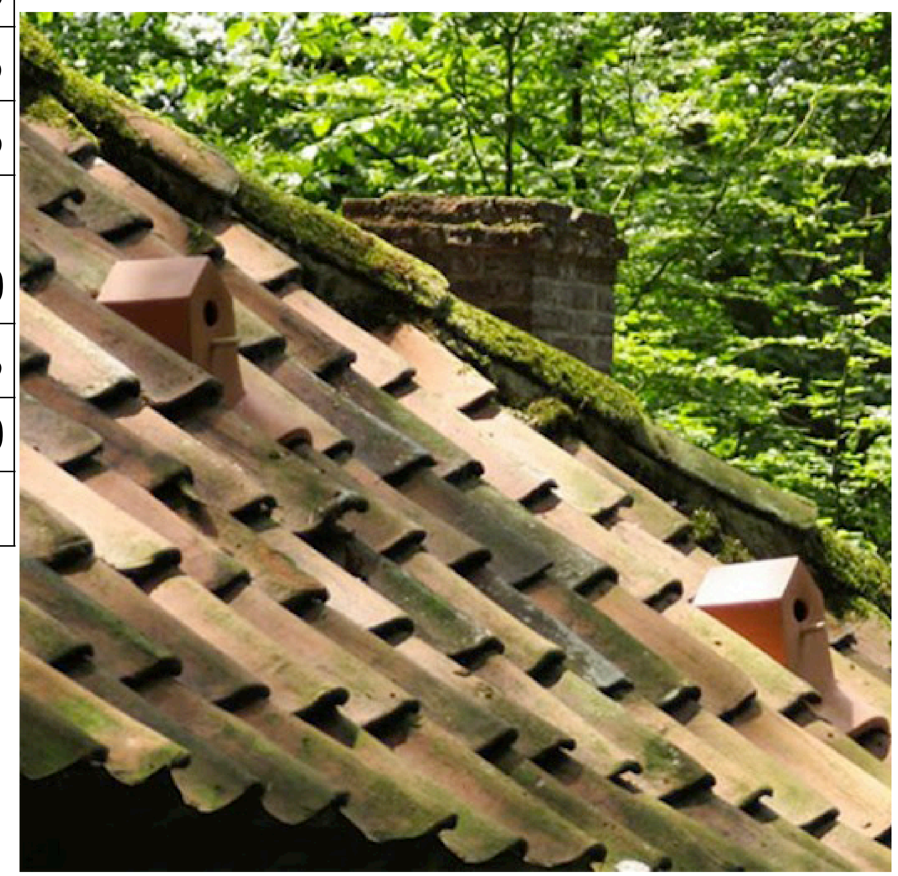
VITETTA
February 2017

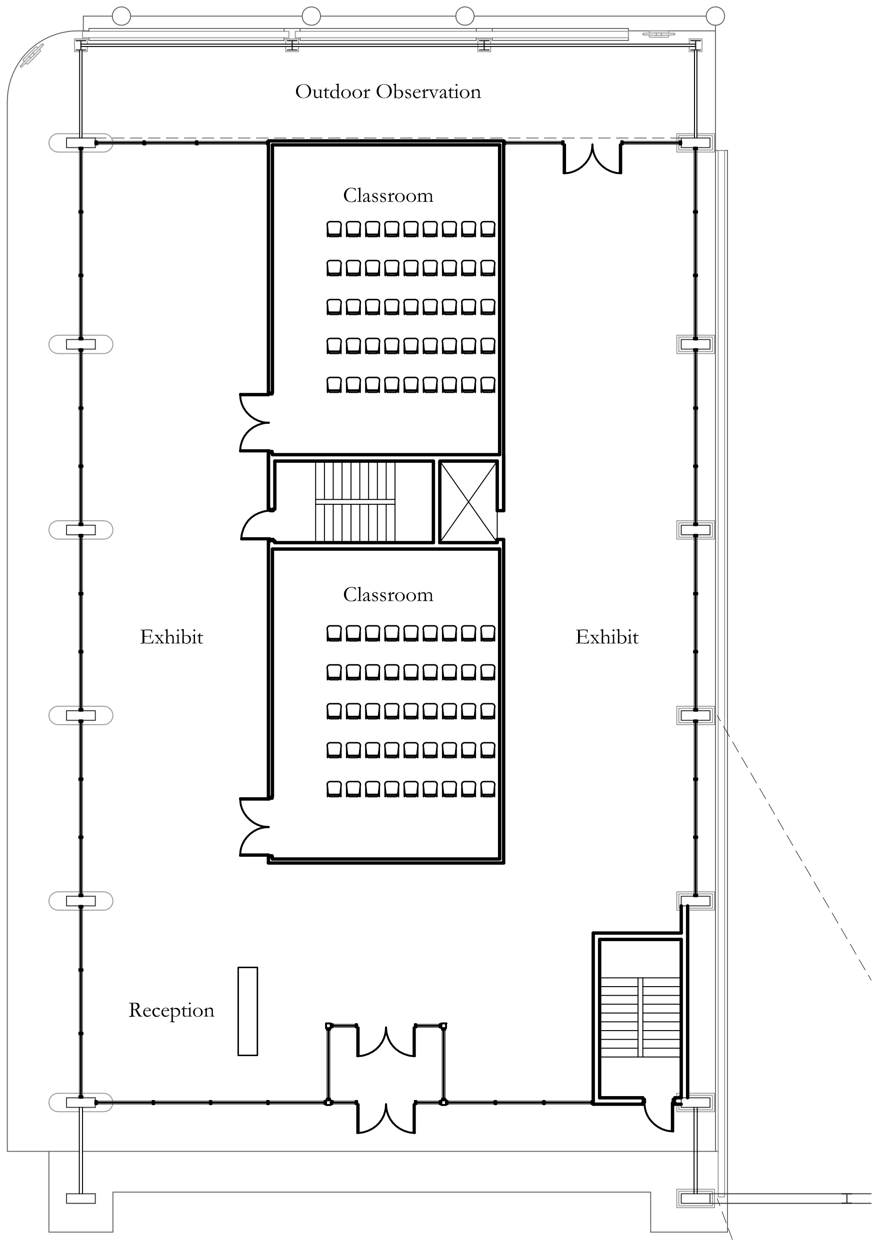
Petty's Island Visitor's Center

Schematic Design Option
Scale: 1" = 20'-0"

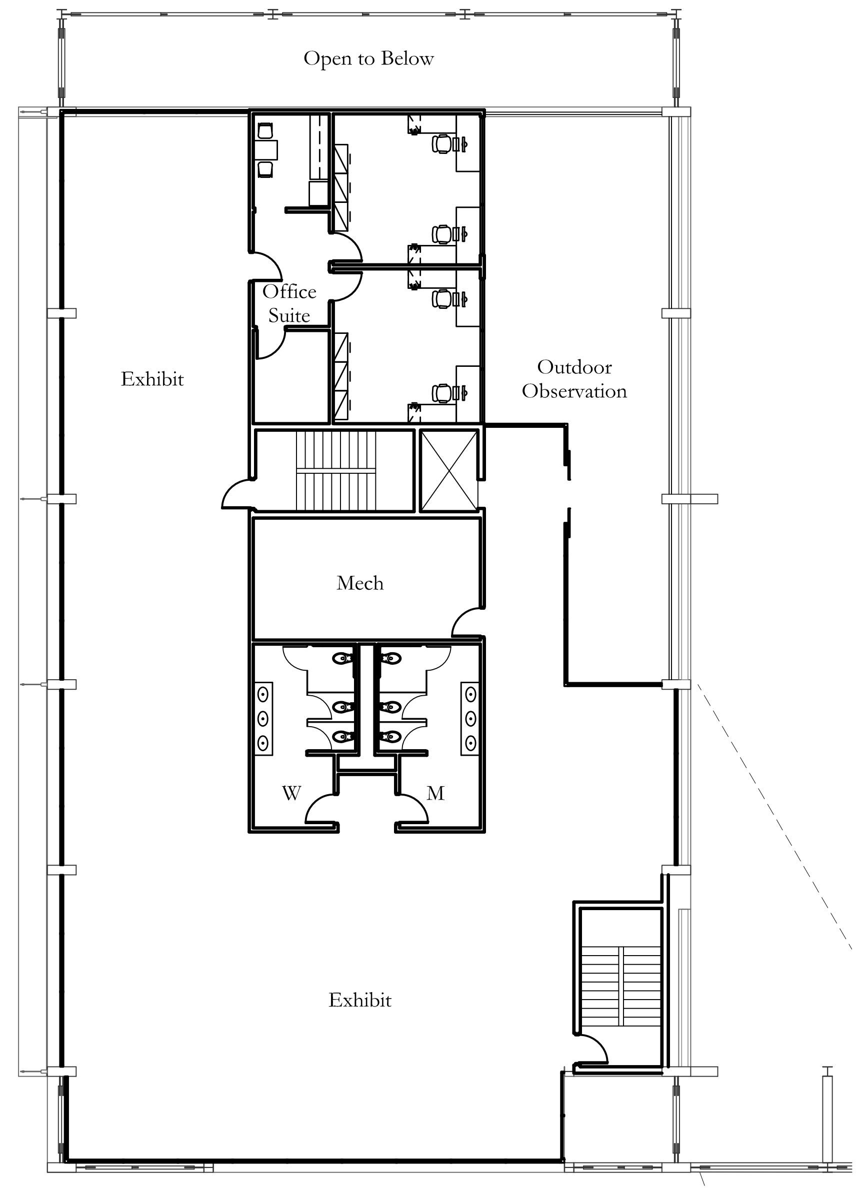
1

	Option 2
Classrooms	1,575
Exhibits	2,095 / 1,595
Reception	510
Vestibule	180 / 165
Offices	765
Observation Deck (not including roof)	900
Restrooms	453
Mechanical	300
Storage	Outside Building

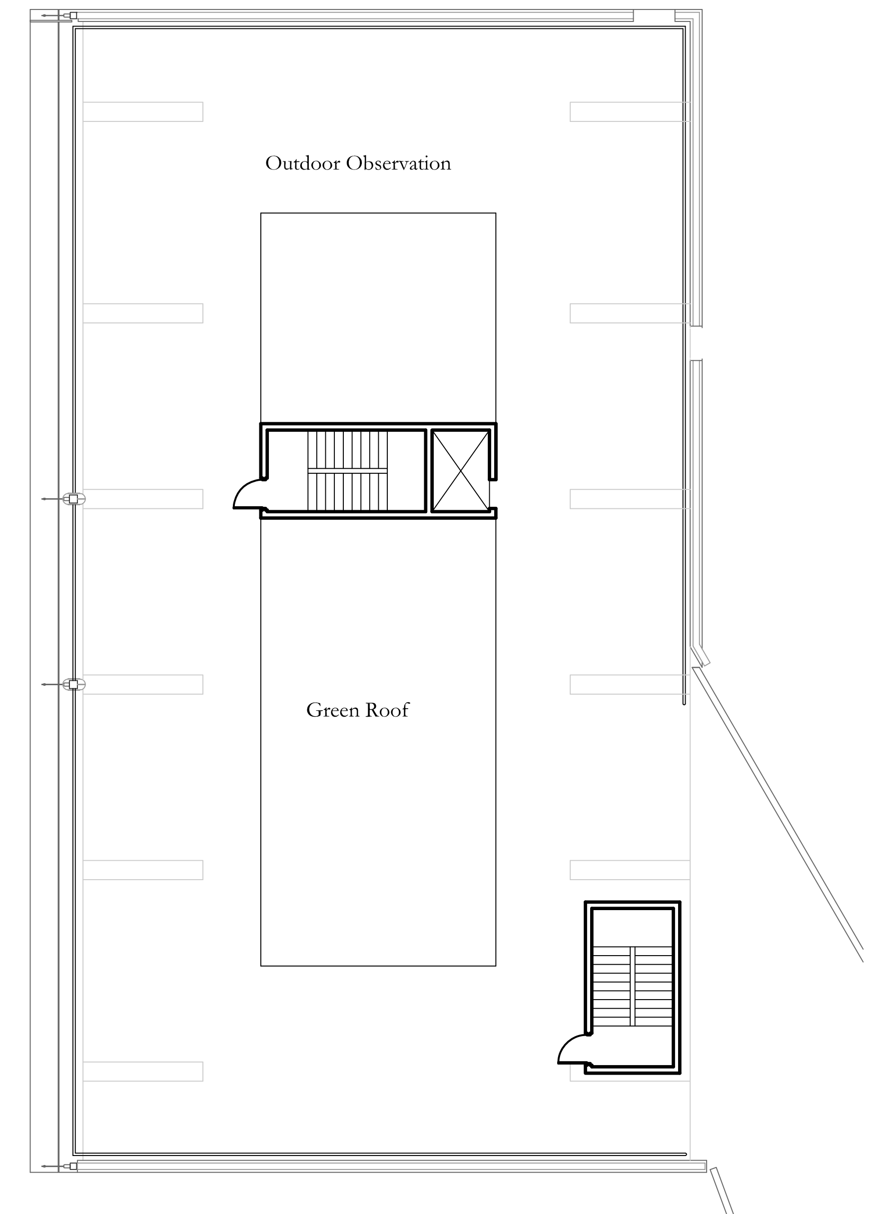




First Floor



Second Floor



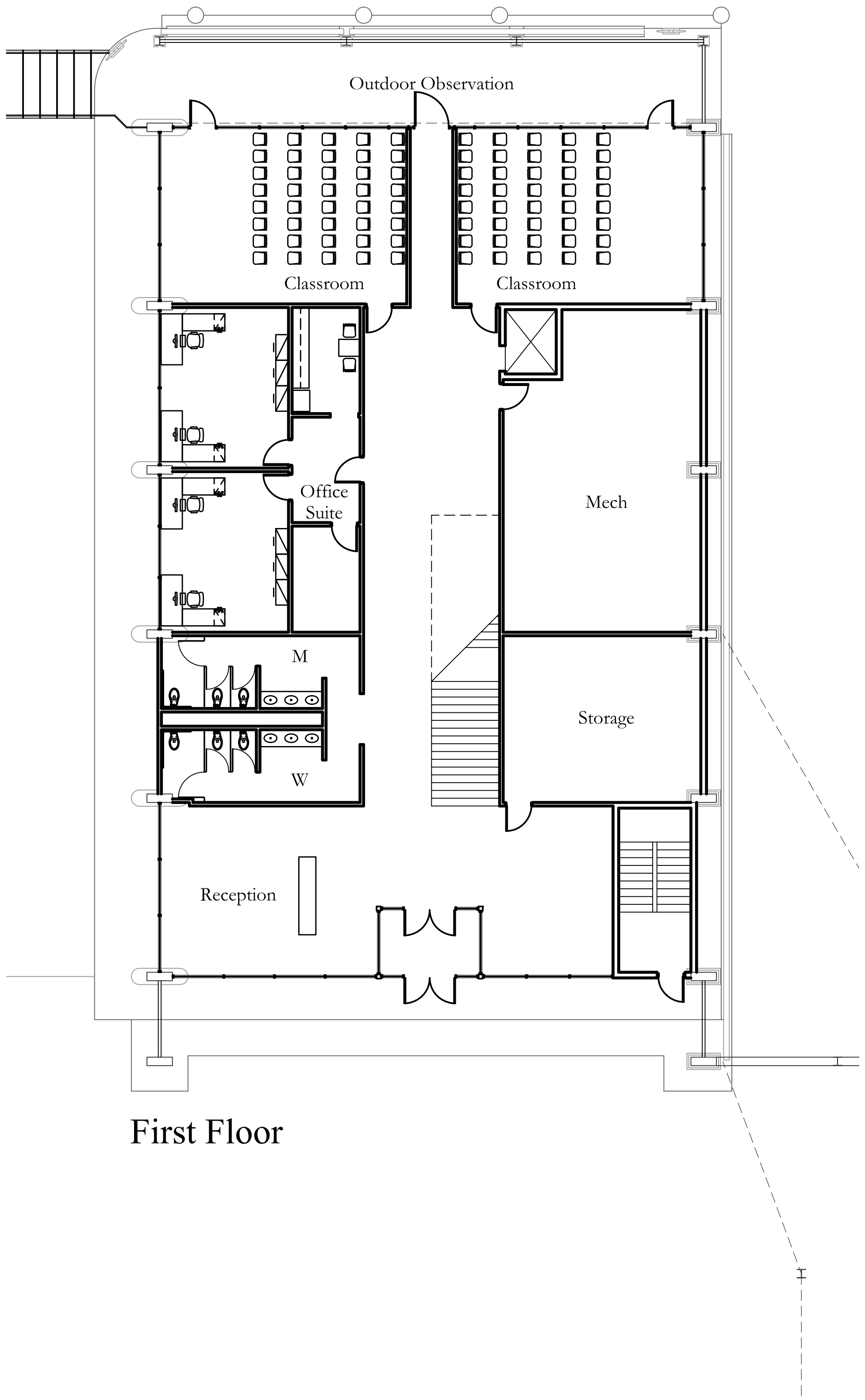
Roof Plan

VITETTA
February 2017

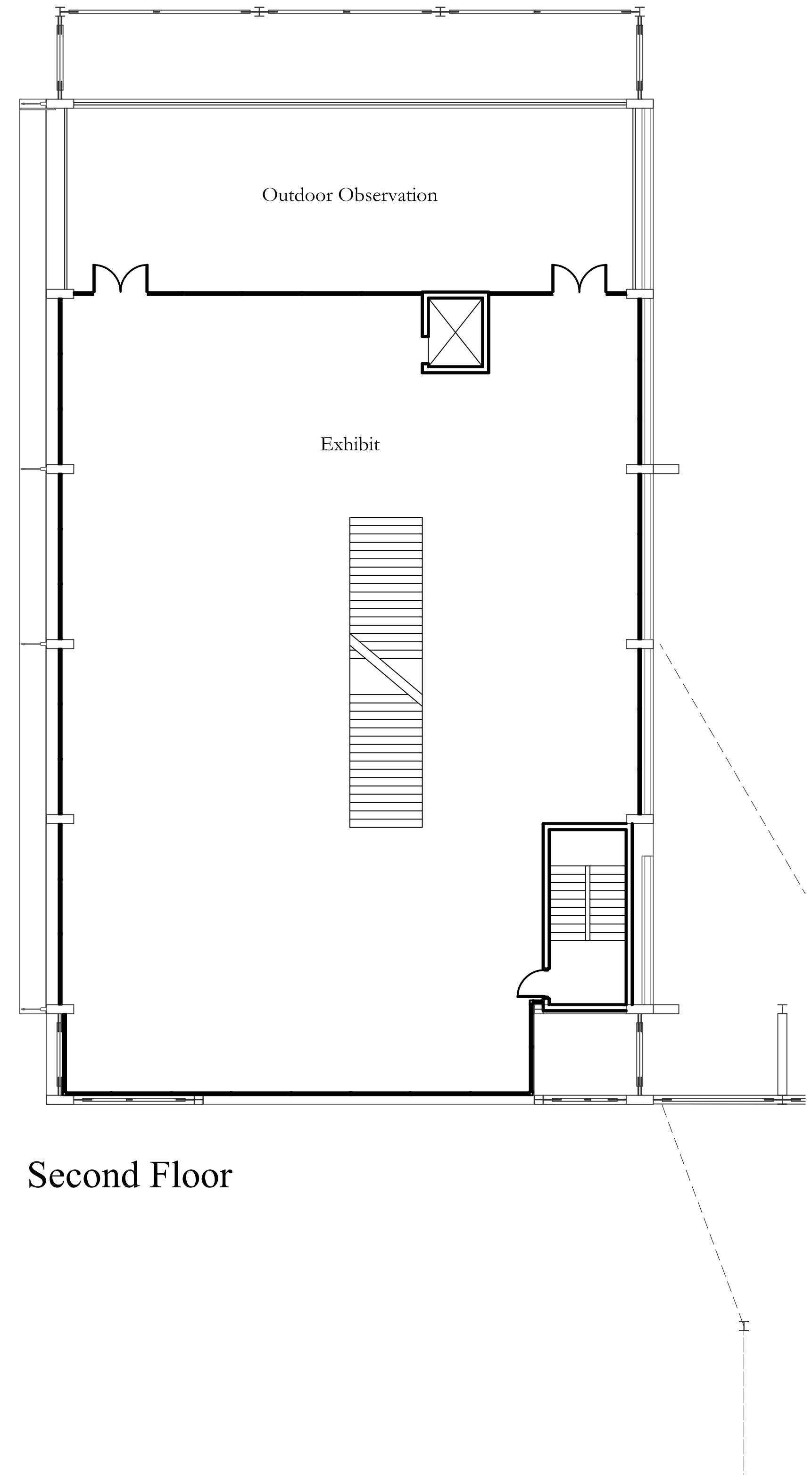
Petty's Island Visitor's Center

Schematic Design Option
Scale: 1" = 20'-0"
2

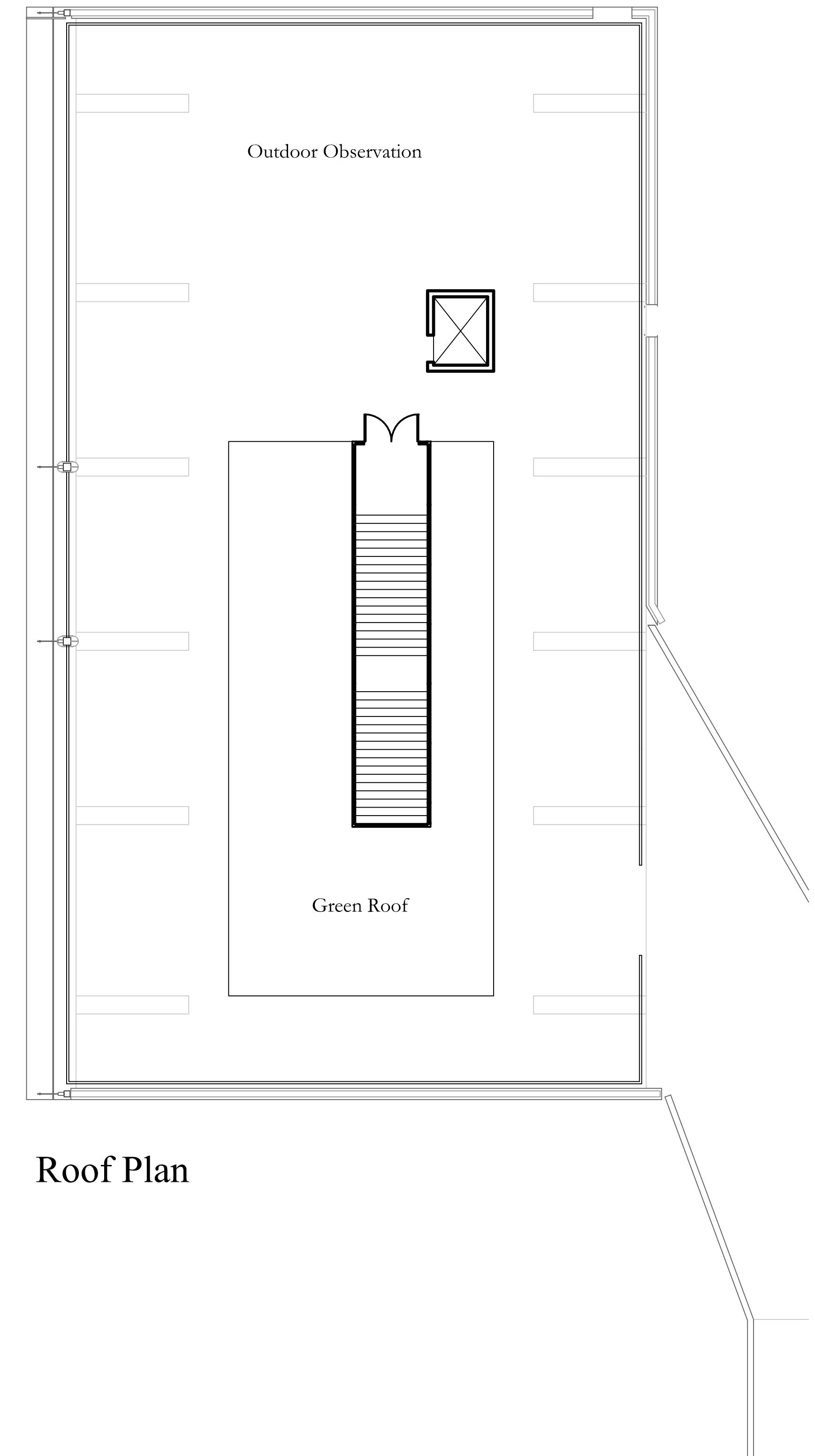
	Option 3
Classrooms	1,275
Exhibits	[illegible]
Reception	465
Vestibule	[illegible]
Offices	890
Observation Deck (not including roof)	1,850
Restrooms	450
Mechanical	825
Storage	440



First Floor



Second Floor



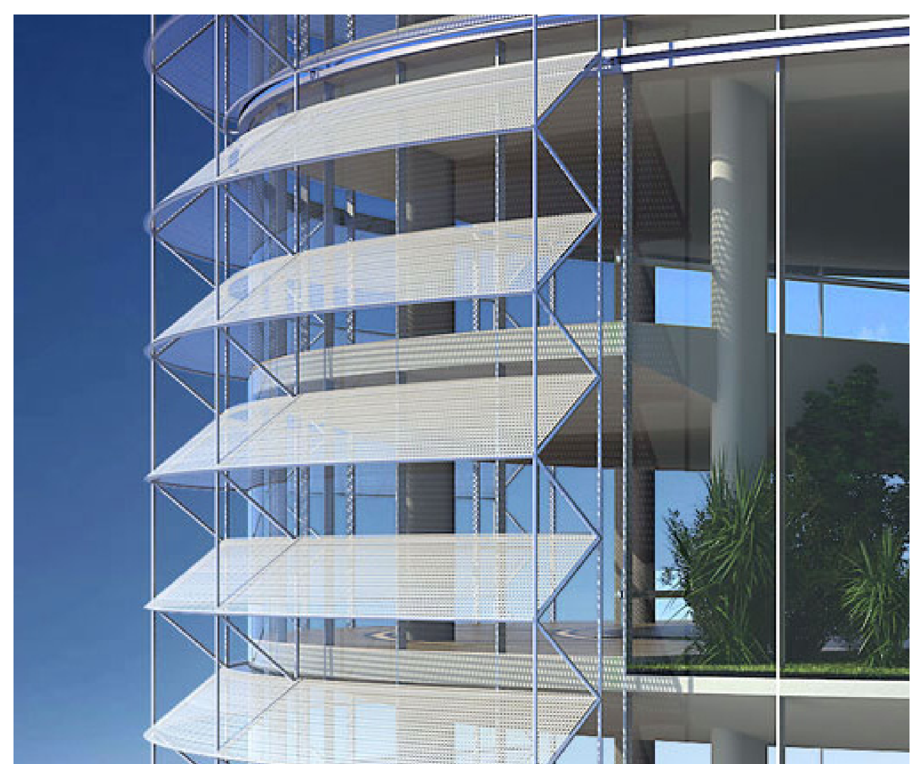
Roof Plan

VITETTA
February 2017

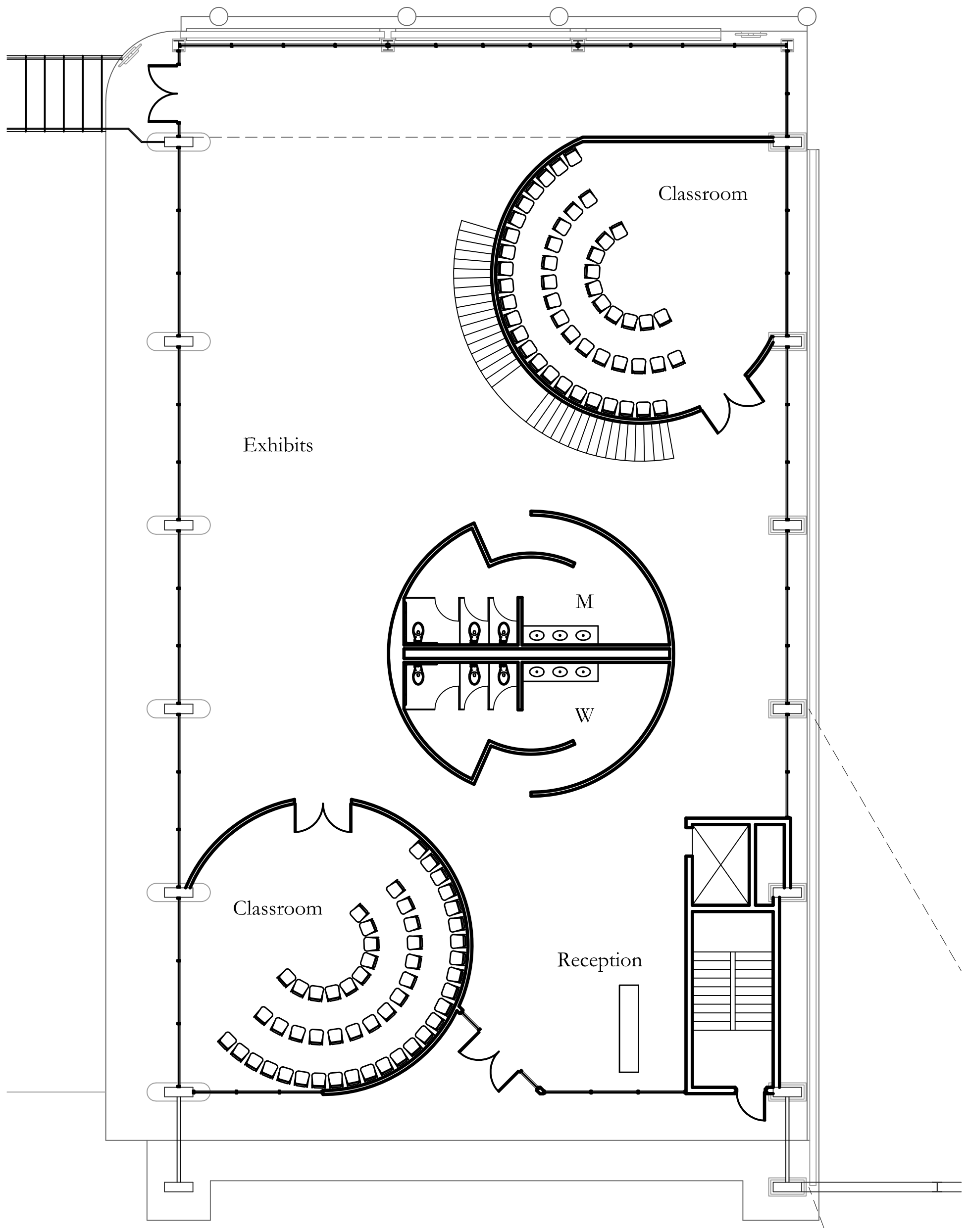
Petty's Island Visitor's Center

Schematic Design Option
Scale: 1" = 20'-0"
3

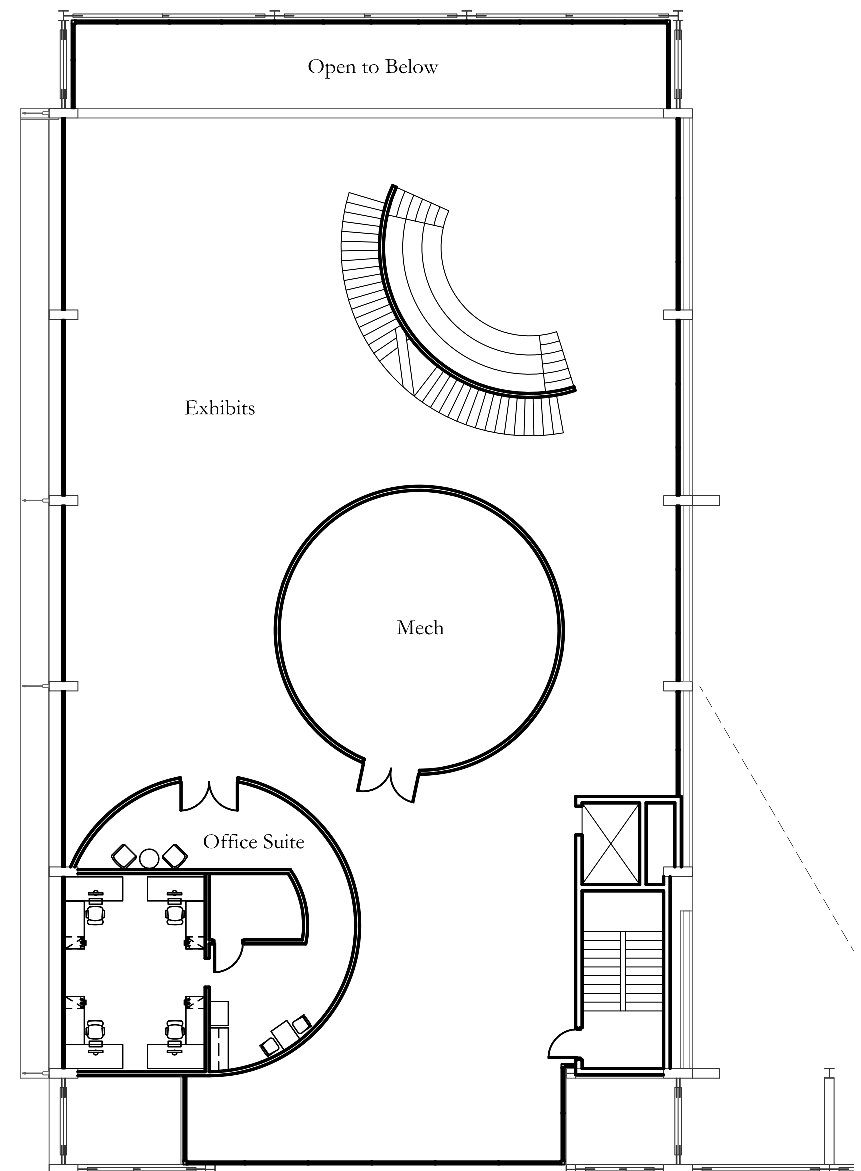
	Option 4
Classrooms	1,490
Exhibits	8,580/2,880
Reception	290
Vestibule	100/1000
Offices	755
Observation Deck (not including roof)	0
Restrooms	670
Mechanical	670
Storage	Outside Building



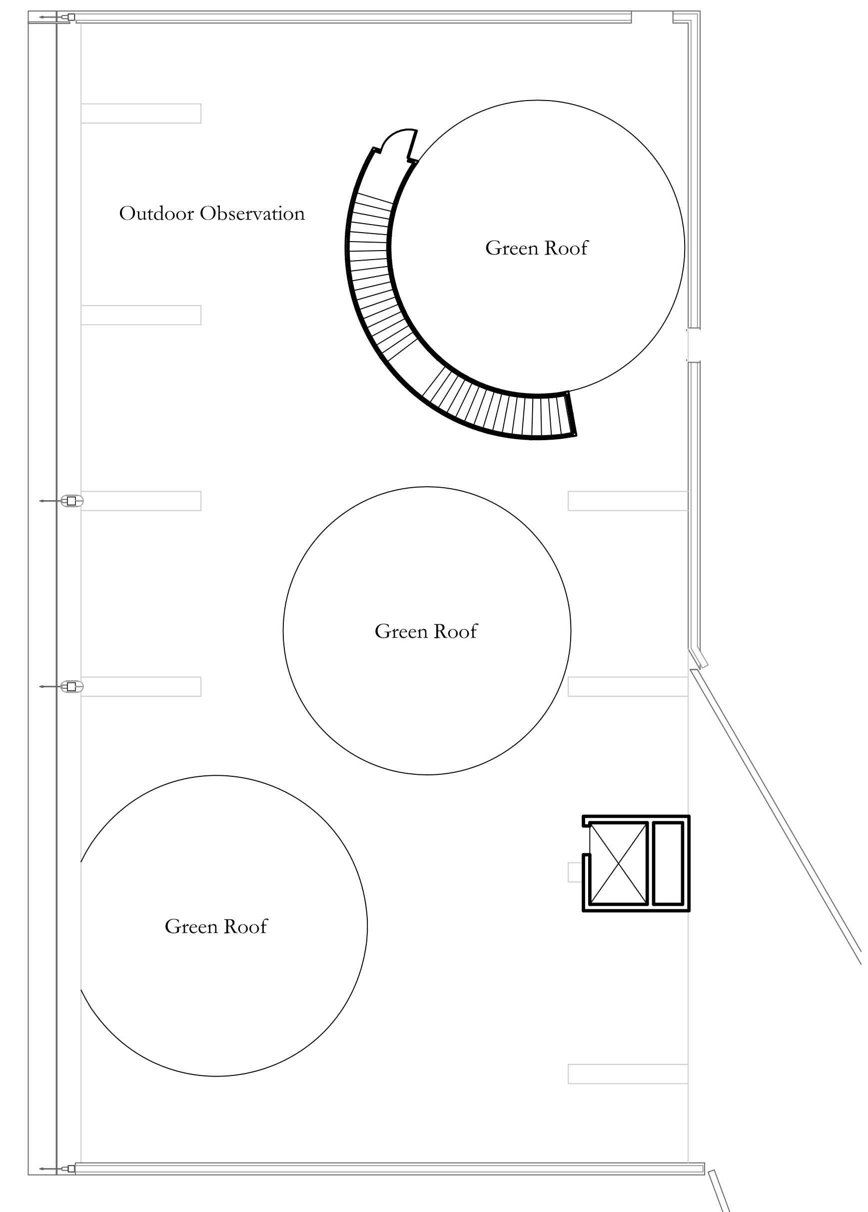
Petty's Island
Environmental Center Concept Design



First Floor



Second Floor



Roof Plan

VITETTA
February 2017

Petty's Island Visitor's Center

Schematic Design Option
Scale: 1" = 20'-0"

4