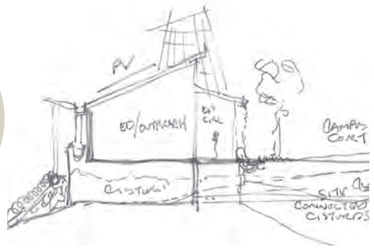
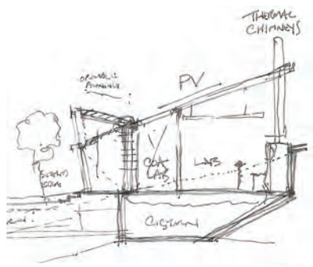
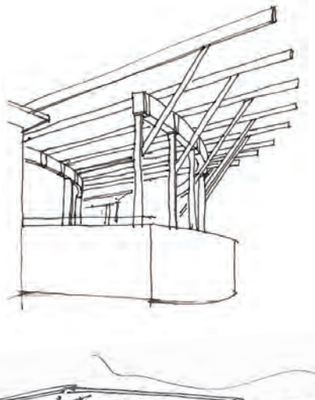
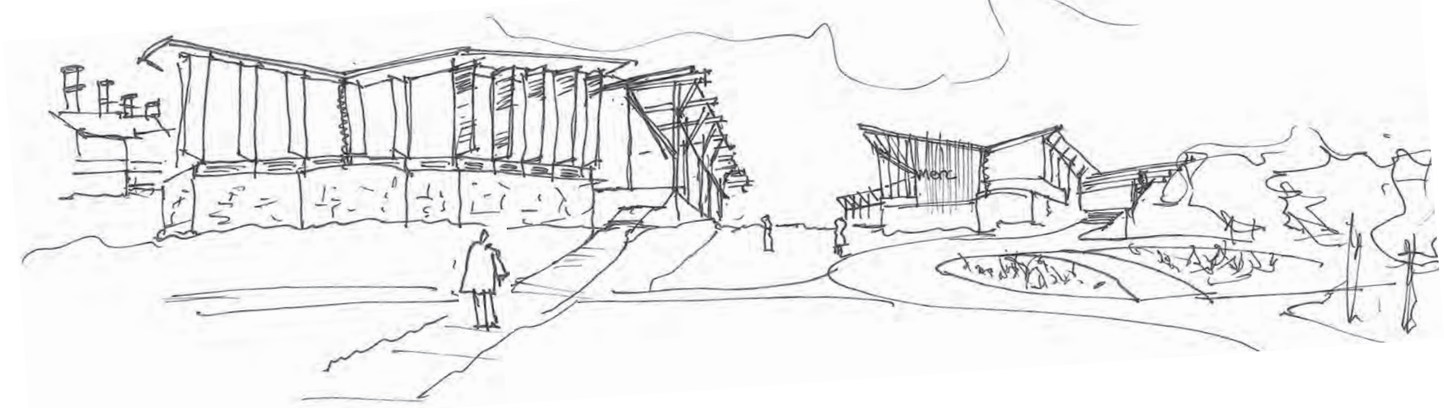
mrec









marine research and education center/master plan and program

national park service: salt river bay national park and ecological preserve/joint institute for caribbean marine science

july 29, 2011
Lord•Aeck•Sargent

.intro

01

table of contents

scheme 2: view of laboratory and outreach buildings

1.1 mission statement

The Salt River Bay Marine Research and Education Center (MREC) is a multidisciplinary partnership of academic, government and civic institutions working together to understand how to best protect, conserve and sustain tropical and subtropical marine ecosystems within the United States Virgin Islands and the Caribbean region.

The MREC, operated by a consortium of four public universities within a national park, provides the means for researchers, resource managers, educators and students to collaborate on issues affecting marine ecosystems, while increasing public awareness of the economic and cultural heritage through scientific studies, student education and science-based resource management.

The National Park Service (NPS) embraces the establishment of the MREC in the Salt River Bay National Historical Park and Ecological Preserve (SARI) to aid and support the park's mission to better understand and manage the over 30,000-acres of submerged lands within park management authority. The Joint Institute for Caribbean Marine Studies (JICMS) views the MREC as an opportunity to expand its research and education programs into the U. S. territory in the Caribbean, encourage collaboration among the JICMS universities and especially the host university, the University of the Virgin Islands, and support the science and research needs of its partners.

The MREC will provide a platform for the NPS and JICMS to conduct research and provide education programs in proximity to the resources being studied, and to do so in a campus environment that creates opportunities for synergies and collaborations among all of the researchers, educators and resource managers who will use the facility.

scheme 3: view of dock facilties

scheme 4: view of wetland and entry forecourt

MREC project site

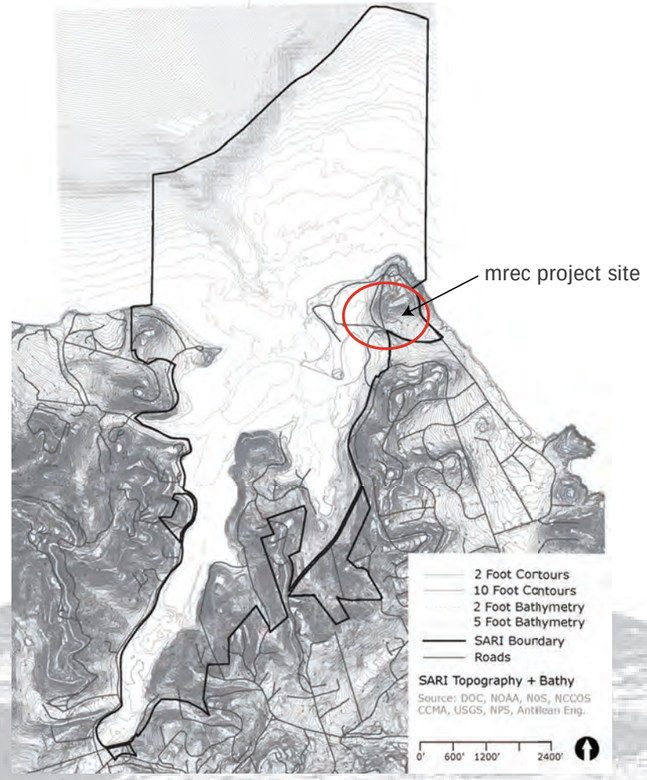
1.2 executive summary

The Salt River Bay National Historical Park and Ecological Preserve (SARI) is located on the north shore of St. Croix in the US Virgin Islands. The Park was created in 1992 in an effort to both protect the habitat within the park, as well as to study the resources within it; both natural and historical and from the ridge of the mountains to the deep water reef ecosystems. Located in SARI, the Marine Research and Education Center (MREC) will enable the NPS and its partner organizations to fulfill their mission to provide public educational opportunities about and in the marine ecosystems while engaging the local community. It will also allow for the study of the marine environment on a site that offers full immersion access to the fields of research. In 1989 Hurricane Hugo shut down the Fairleigh Dickinson University West Indies Lab (WIL) eliminating a functional center for long term research of the marine environment for academic and government studies. The MREC, through partnership, will provide this center for marine research to meet the National Park Service's goals of marine science research, education and stewardship. This partnership is made up of the National Park Service and four universities with world class marine research programs: University of the Virgin Islands, University of North Carolina Wilmington, University of South Carolina, and Rutgers University.

Of notable importance to the research capacity of the project and central to its research programs (and by extension its education programs) will be the presence of reliable power and high quality sea water. Together these combine to allow the core research to proceed.

The MREC's proximity to the marine resource for research and teaching, its small footprint on the land and its capacity to demonstrate sustainable construction make it an important resource itself. To this end, the project has been registered as a Living Buildings Challenge project, a rating system that aims to create regenerative buildings by requiring that buildings produce (or collect) at least as much water and electricity as they use, as well as other strict environmental impact requirements. The selected site on the east side of the Park offers abundant opportunity for the design of a project that is a national leader in sustainability. To start this process, for this Master Plan is only the first of many steps to bring the MREC to fruition, the NPS, JICMS and Office of Insular Affairs (OIA) have collaborated with the design team to fundamentally rethink what it means to build a building in a tropical climate for marine education and research. This process questioned standard building and operational norms to achieve a Program and Master Plan that lays the ground work for a successful MREC that restores the site and minimally impacts the environment.

The Master Plan contains a summary of SARI's history and background information on the MREC, as well as the project goals by which the success of the project will be measured. A detailed site and climate analysis follows, putting in context the nature of the site, the environmental challenges it faces and the potential resources available on the site. Following the history and analysis, the body of the Master Plan contains a detailed program of the MREC and a functional analysis of the program. The Master Plan is then documented with both narratives and drawings. A proposed schedule and cost estimate follows this section.



MREC site c.1950, prior to development

site today
(from hamilton drive)

BACKGROUND

2.1 salt river bay national historical park and ecological preserve

In 1992, Congress designated Salt River Bay National Historical Park and Ecological Preserve (SARI) to “preserve, protect and interpret ... nationally significant historical, cultural and natural sites and resources ... with particular emphasis on the preservation of both the cultural and natural resources and long-term scientific study of terrestrial, marine and archaeological resources” (Public Law 102-247).

The location and capabilities of the Salt River Bay Marine Research and Education Center (MREC) make it an important site from which to support research and monitoring in the parks. Research undertaken at the MREC will provide a rare opportunity to compare current ecosystem trends with the historic baselines of the coral reef research undertaken between the late 1960s and late 1980s.

SARI is a protected natural area that exhibits many of the region’s important ecological relationships. Salt River Bay is an estuary, where fresh and salt waters mix. The diverse terrestrial environment is dominated by shrub land as a result of centuries of manmade alterations on the land, 2,000 years of human history, and non-native planting. Much of the flora is adapted to dry conditions. The mouth of the bay, with its undersea canyon and coral covered walls, opens to the sea, and falls away into the Virgin Islands Trough.

SARI contains a combination of marine, estuarine, and terrestrial habitats, including coral reefs, seagrass beds, an undersea canyon, and the largest remaining mangrove forest within the U.S. Virgin Islands.

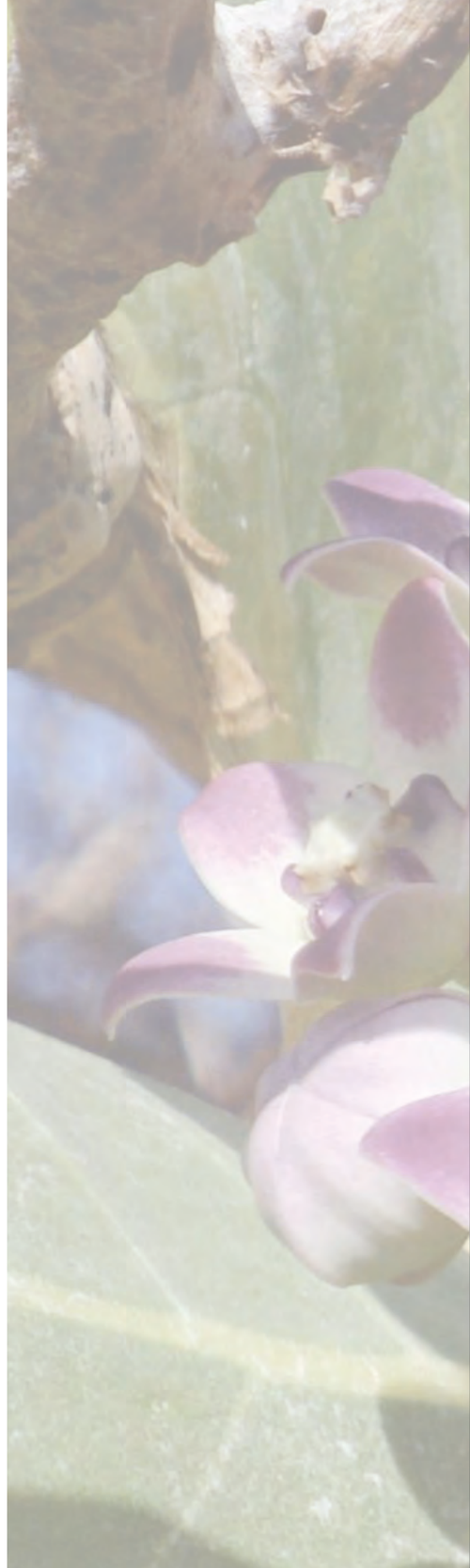
The dynamic relationship between land and bay is ecologically important. Endangered hawksbill turtles feed and rest along the coral canyon walls. Snappers and grunts hide among coral reefs by day and feed in seagrass beds by night. Threatened green sea turtles and queen conch thrive on turtle grasses.

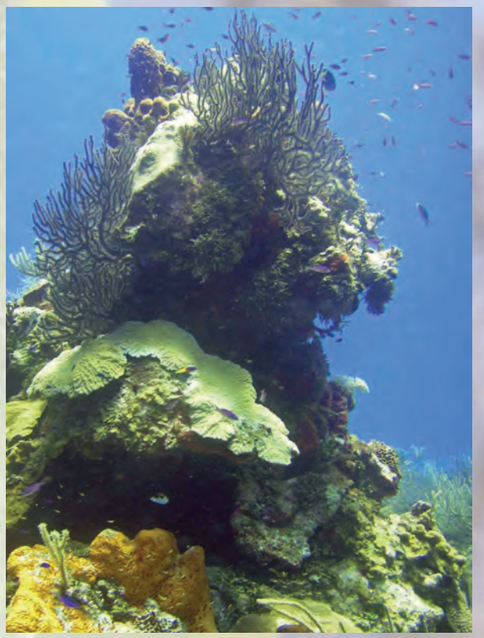
Coral reefs have built up in the Caribbean during the past 13,000 years. More than 400 species of reef fish are known in near-shore waters. Coral reefs may support one-third of all fish species globally and possibly a total of a half-million animal species.

Researchers at the MREC will provide the three existing NPS units on St. Croix, plus the proposed NPS units (Estate Castle Nugent, with four to five miles of shoreline on the south coast of St. Croix, and Hamilton Grange and Associated Sites) and The Government of the Virgin Island’s (GVI) St. Croix East End Marine Park (the first marine park), with the capacity to study and respond to climate change, sea level rise, ocean acidification, coral diseases and other threats, and guide them in the recovery of threatened coral reef resources and fisheries restoration.

With the listing of elkhorn and staghorn coral as threatened species in 2006, Buck Island Reef National Monument (BUIS) provides more than 5,000 acres of critical habitat for these species, as well as critical foraging area and nesting beaches for the four species of sea turtle, including one of the few recovering hawksbill sea turtle nesting populations in the world.

The MREC will enable the St. Croix NPS units to fulfill their mission guided research management of critical resources and to provide public educational opportunities in the marine environment and engage the local community in this effort.





view across SARI to the west from proposed building site

2.2 project background and history

St. Croix, U. S. Virgin Islands (USVI) provides a rich environment for tropical marine research, especially on coral reef ecosystems.

Marine research activities began on St. Croix in the late 1960s, providing some of the oldest available data on coral reefs. Some of the world's leading marine researchers gathered these data at two former marine laboratories on St. Croix: Fairleigh Dickinson University's West Indies Laboratory (WIL) on the northeast end of St. Croix and the National Oceanic and Atmospheric Administration's (NOAA) National Undersea Research Program's habitats, first the "Hydrolab" and then the "Aquarius," which operated at Salt River Bay for more than 10 years.

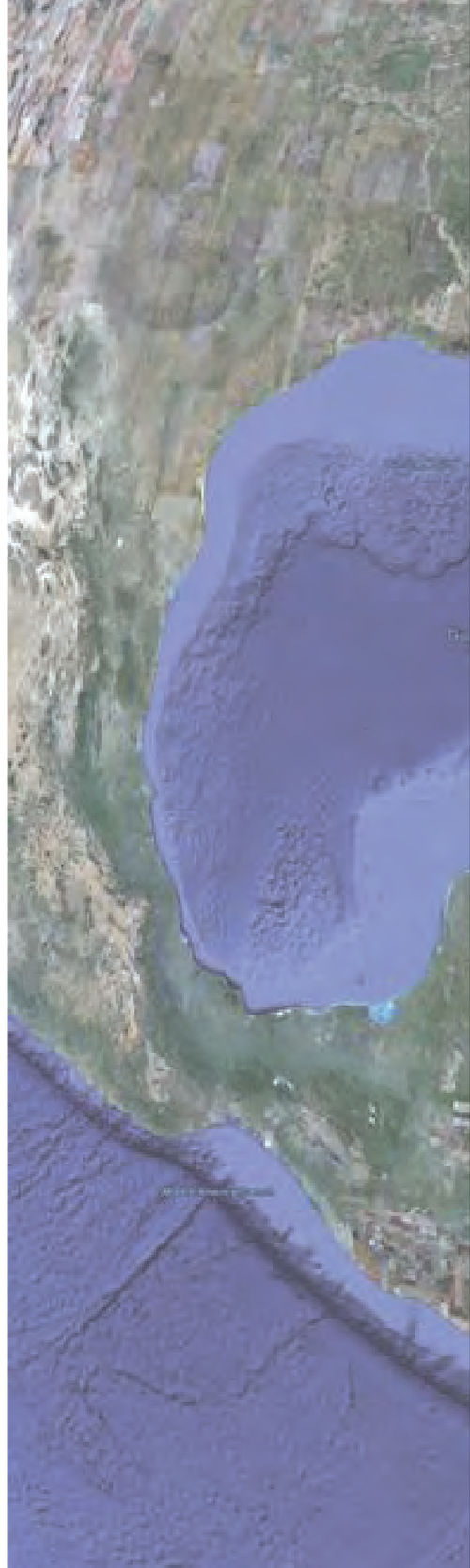
The scientific records generated by investigators at these two facilities are rare for their duration, quality and documentation of reef conditions prior to the massive changes that occurred in this ecosystem beginning in the 1980s.

Under a cooperative agreement with NPS, WIL produced the first marine research and assessments at Buck Island, established in 1961. Through this agreement, WIL mapped, inventoried and investigated the ecology, function, status and trends of Buck Island marine resources, including its coral geology, reef fisheries, marine invertebrates, sea turtles, oceanography, and coral reef habitats. Over time, Buck Island Reef became one of the best documented and studied marine ecosystems in the Caribbean and a premiere field school for hundreds of WIL students each year.

This historic database provides an unparalleled record to guide, and against which to measure, present and future management actions. For example, WIL's documentation of the degradation of St. Croix's marine resources beginning in the 1980s was used in 2001 to support the expansion and designation of Buck Island Reef as a marine protected area.

The data are also invaluable in guiding the recovery of the acroporid corals, with 5,000 acres of coral reef designated as critical habitat. These examples illustrate just some of the significant ways in which NPS and the park units on St. Croix have benefited from the capacity to conduct marine research on the island.

The closure of both marine research facilities following Hurricane Hugo reduced the park's capacity to conduct marine research in the park and terminated some of the long-term marine research on St. Croix. Restoring this capacity will support the study and management of St. Croix's critical marine protected areas: serve NPS inventory, monitoring and research needs, and support science-based park management in St. Croix for over 30,000 acres of National Park submerged lands.



Florida

St. Croix

NPS Outreach program in action

2.3 origin of partnership

In the wake of the closure of the WIL and NOAA facilities, the Department of the Interior (DOI), with staff from NPS Christiansted National Historic Site (CHRI), Buck Island Reef National Monument (BUIS), and Salt River Bay NHP & EP (SARI), the Office of Insular Affairs (OIA), and representatives of educational institutions that participated in research at WIL, recognized the need to restore St. Croix's marine research capability.

In 1999, the Department of the Interior (DOI) entered into a Memorandum of Understanding (MOU) with the Joint Institute of Caribbean Marine Studies (JICMS) to: (1) aid in the understanding of the marine environment, including coral reef ecosystems; (2) promote marine education and public awareness; and (3) assist in the development of appropriate public policy within the Caribbean.

Through the MOU, the partners agreed to accomplish these goals by:

- Fostering collaborative research programs to understand and sustain management the coral reef ecosystems of the Caribbean;
- Providing support for marine education programs for school children and adults in the U.S. Virgin Islands;
- Fostering cooperation with other government, institutional and private organizations to better understand marine issues in the Caribbean; and
- Enriching the learning experiences and opportunities for the University of Virgin Islands and other university students.

The MOU documented the JICMS's desire to establish "a marine research and educational facility within the USVI, including research laboratories, classrooms, a lecture hall, teaching aquarium, boats and diving equipment, distance learning equipment, and housing for students, scientists and visitors." The facility would serve undergraduate and graduate students in a variety of marine education and research programs supported by the JICMS universities.

Initial efforts to develop the MREC focused on re-establishing a facility at the former WIL site, on what is now private property. When that effort failed due to land owner's lack of commitment to rebuild the facilities in 2000, other potential sites were explored, but land prices and the need for appropriate ocean access precluded acquisition.

In 2001, NPS acquired 73 acres within the Salt River Bay NHP & EP. Also that year, Buck Island Reef National Monument (BUIS) was expanded from 880 to more than 19,000 acres and became one of the first fully protected ("no-take") marine protected areas (MPA) managed by NPS. These acquisitions further underscored the park's need for increased science-based marine resource management.

Given the combination of global and local threats to coral reefs and NPS's new management responsibilities, NPS approached the Office of Insular Affairs (OIA) and JICMS about partnering to build the MREC on the newly-acquired parkland at Salt River Bay.

Salt River Bay is a site of extensive cultural significance and is an important archaeological area for the indigenous prehistoric settlements, with remains of two pre-historic villages and a ball court established more than 2,000 years ago. On November 14, 1493, Christopher Columbus's party came ashore at Salt River Bay. It is the only site now in U.S. territory visited by Columbus's party during either voyage.

SARI is one of the few NPS units that are co-managed; NPS shares the management responsibilities with the Government of the Virgin Islands, an arrangement that includes oversight of more than 600 acres of mangrove estuarine bay, coral reefs, and a submarine canyon.

In 2003, St. Croix East End Marine Park was established as the Virgin Islands' first territorial marine park. It encompasses 60 square miles, including five square miles of no-take areas off the northern and eastern coasts of St. Croix and abuts the south side of BUIS. Combined with the NPS units, these marine park areas protect one of the largest coral reef ecosystems in the Caribbean.

In 2004, recognizing the many benefits of the marine laboratory and the value of locating it in the park, OIA provided a $200,000 grant from its Coral Reef Program to conduct a Feasibility Study of sites around Salt River Bay that could support the MREC concept. The study, completed in 2006, found that the 73-acre site on the east side of the bay was the most feasible for this project. OIA subsequently awarded NPS an additional $120,000 to conduct an Environmental Assessment of the preferred alternative, a document that was completed in June 2008, with a Finding of No Significant Impact (FONSI) signed in February 2009.

Following completion of the OIA- and NPS-funded assessment of the feasibility of the MREC from the park standpoint, the JICMS began working with NPS on all aspects of the project through the Partnership Construction Process. In 2009, the JICMS began to develop a Strategic Business Plan to define the MREC's programs and operations.

The MREC will provide the opportunity to expand and strengthen the University of the Virgin Islands' undergraduate and graduate marine studies programs by providing research and internship experiences for students that are not available currently on St. Croix. All of the educational programming at the MREC would help to support the training of the next generation of NPS staff and Virgin Islands resource conservation managers.

In 2009, OIA provided $1.25 million to NPS and the JICMS to support the MREC project. This funding, augmented by the JICMS, will continue to support the project through pre-design.

the partnership and local community

2.4 vision and goals

The Joint Institute for Caribbean Marine Research is a consortium of four public universities that are combining resources in support of a research and education foundation that will operate the MREC in partnership with the National Park Service.

The JICMS was formed to address concerns over the future of coral reef ecosystems in the Caribbean, including:

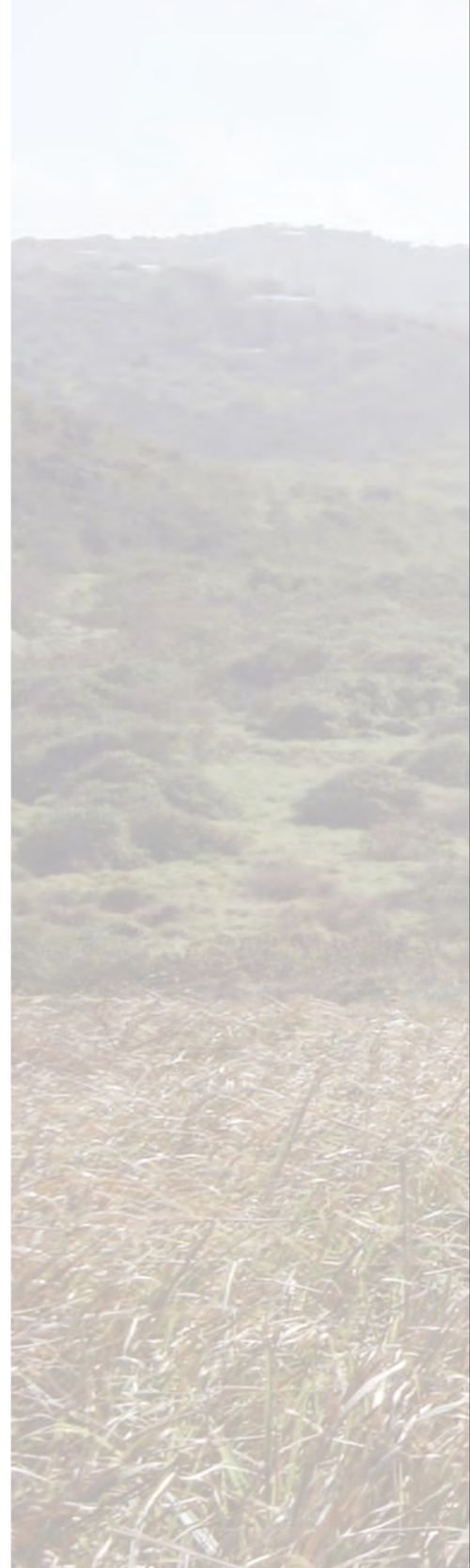
- Population growth and its negative impact on the region's limited resources
- Living resources that have been heavily affected by over-fishing and habitat destruction
- Declining coral reef ecosystems
- Limited marine education programs

vision

Although more than 4.2 million acres of coral reef submerged lands are under U.S. jurisdiction, few have been properly studied to assess their overall health, and evidence is overwhelming that coral reefs and associated ecosystems are deteriorating at a rapid rate throughout the world.

In response to these concerns, the JICMS seeks to:

- Foster understanding and proper management of coral reef and other tropical and sub-tropical marine ecosystems by initiating a comprehensive long-term research and education program in the U. S. Virgin Islands;
- Foster public awareness of the importance of coral reefs and other marine ecosystems from economic, aesthetic and global health standpoints though educational programs for students and the general public;
- Share information and research and to form partnerships with other nations within the Caribbean and adjacent regions with common interests and problems in the marine environment;
- Support and expand research capacity within St. Croix and the USVI in archeology, anthropology, human ecology, history, Caribbean studies and other fields.



goals

The project team early on in the programming process of the project collaborated on a list of goals for the MREC. These goals have been and will continue to be used to help determine future decisions and to focus the mission of the MREC. The list of stated goals is divided into two sections. The first list is overall project goals that include sustainability targets, educational ideals and overall project aspirations. The second portion of the list is a series of goals focused on the research portion of the project and what it will take to make the lab a unique and invaluable resource for the study of our marine environment.

overall goals

- The project shall support the marine components of the NPS/VI Vital Signs program.
- The project shall promote and support the SARI mission as defined in the legislation that created the Park.
- The project shall be constructed within the available construction funds.
- The project shall be designed as passively survivable (passively survivable should include storm surge, climate change, etc) and shall only have components necessary (dock, etc) in the 100 year flood plain.
- The project landscaping, siting and construction shall consider historic and prehistoric uses of the site.
- The project shall provide the Park and partners opportunity to conduct extensive landscape vegetation restoration as part of construction and infrastructure design, sustainability and planning.
- The structure shall be designed for a 49 year lifespan.
- The project shall be constructed with technologies that are appropriate for the remote nature of the site, its educational goals and to support the type of marine science being performed (more than a field station, less than a full institutional lab).
- The project shall serve to reenergize the scientific community in the Caribbean and give them a home base.
- The project shall provide a variety of housing types for the variety of long and short term stays to expose students to marine science.
- The project shall provide some storage for scientific and historical records/artifacts.
- The project shall be designed sustainably and shall exceed performance of a code compliant building by 50% and achieve 3 pedals of the Living Building Challenge certification system, including the Water and Energy Petals.
- The project shall be a local attraction and engage the local community.
- The project shall minimize the use of fossil fuel.
- The project shall reduce the construction impacts on energy use with local materials and modular construction.
- The project shall be constructed to minimize impact to the site.
- Create a unique facility.

lab goals

- The project shall enhance research collaboration, cooperation, coordination and capacity by sharing resources and personnel to meet St Croix greater marine research/monitoring goals.
- The project shall provide high quality sea water for lab use.
- The project shall be designed so that electricity is reliable and available.
- The project shall be designed to allow for a variety of research configurations and possibilities.

.site

03

SALT RIVER BAY TODAY

HOVENSA Refinery

3.1 existing conditions and resources

.1 process

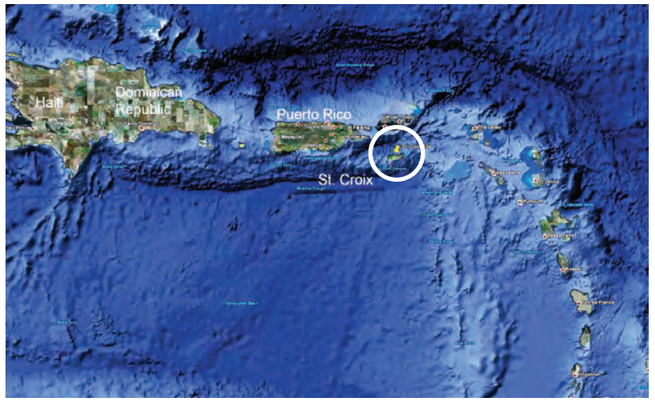
A key goal of the MREC is the demonstration of environmentally-responsible, sustainable development. And a key element of sustainability is that a building should be 'of its site': the design should be developed in response to local environmental challenges and in harmony with local conditions.

A 2005 survey identified air quality and sewage as the environmental areas of greatest concern to St. Croix residents. St. Croix is home to the HOVENSA Refinery, the second largest oil refinery in the United States and among the 10 largest oil refineries in the world. Just this year, 2011, the EPA began a 3-month study of air pollution in response to community concerns about the health impacts of airborne chemical releases from the refinery. Additional air quality threats are posed by the Richmond power plant near Christiansted, which produces electricity using oil-fired generators.

Highly publicized raw municipal sewage discharges have caused periodic fish kills and beach closures. The majority of homes on St. Croix are served by septic systems. Due to poor soil conditions, steep slopes, and limited regulations, untreated effluent from failing septic systems also poses an environmental challenge, both to human health as well as the marine ecosystems that are the focus of the MREC.

Erosion and sedimentation resulting from stormwater runoff caused by poor soils, steep slopes, and conventional development further stress the marine ecosystem. And the services conventionally provided by municipal systems in other locations are much more expensive and less reliable on St. Croix. There is very limited freshwater supply from 'conventional' sources. There is little ground water and municipal water from a desalinization plant is energy-intensive and expensive. Municipal electricity is among the most expensive in the United States, and the supply is unreliable with frequent, unpredictable interruptions which pose a particular challenge in a research environment where reliability is critical.

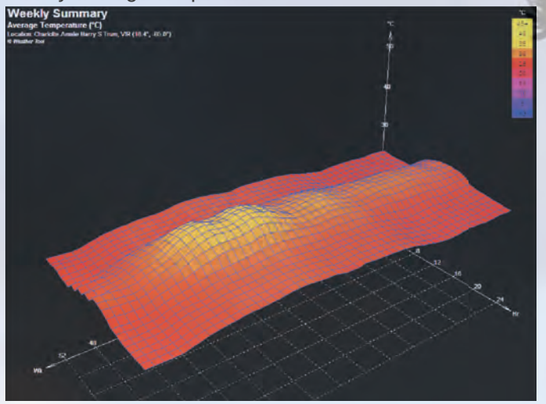
So an environmentally responsible facility on St. Croix should be designed to directly address the local environmental challenges of air pollution; water pollution (both from sewage and stormwater); limited water supply; and dirty, expensive, and unreliable electricity. This project aims to become an example of sustainability and conservation in practice for the territory.



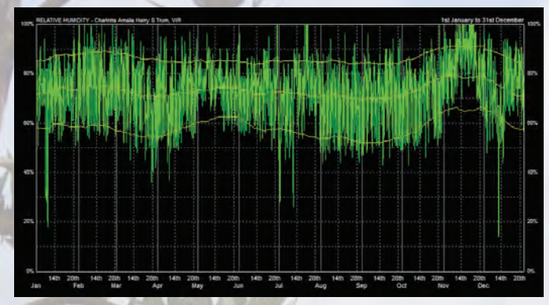
.2 location

St. Croix is part of the U.S. Virgin Islands located in the Caribbean Sea, approximately 1,135 miles Southeast of Miami, Florida and approximately 94 miles Southeast of San Juan, Puerto Rico with a tropical climate – both hot and humid. Two weather data stations were used for the climate analysis, one a buoy located in the bay off the coast of the project site in St. Croix and the other 41 miles North in St. Thomas.

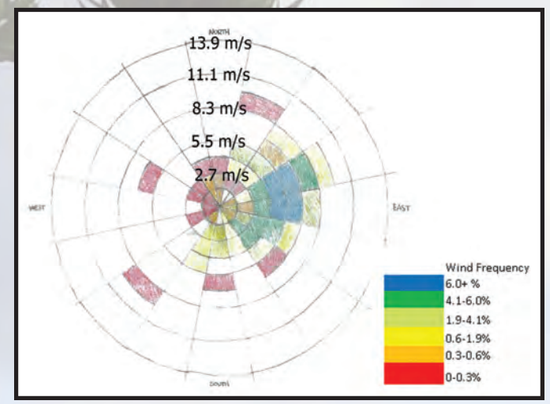
weekly average temperatures



relative humidity



wind rose



.3 climate analysis

A sustainable building should respond to local environmental challenges and strive to harness the local climate conditions and cycles to meet building needs in an environmentally-responsible manner. An analysis of local weather data and trends to identify opportunities and challenges posed by the local climate.

temperature

The average dry bulb temperature of St. Croix is 82°F, with temperatures remaining relatively constant throughout the year with a typical swing of ± 10°F. As shown in the Weekly Summary of Average Temperature graph for the site—which plots weeks of the year in the x-axis, time of day in the y-axis, and temperature in the z-axis—there is very limited seasonal variation in temperature with modest diurnal temperature swings (day-night).

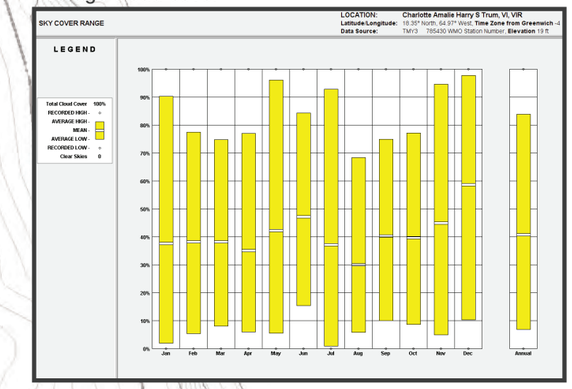
humidity

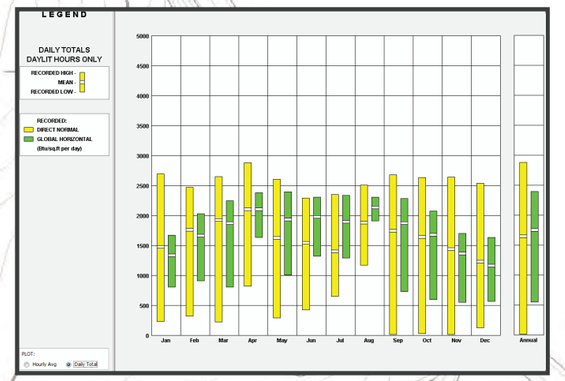
The relative humidity in St. Croix also has fairly limited seasonal variation, averaging approximately 70-percent and generally staying between a low of about 60-percent and a high of 90-percent as illustrated in the plot of annual relative humidity (shown in green).

wind

This wind rose diagram plots the annual frequency of wind speed and direction, with the prevailing winds predominantly from the east and southeast and velocities most commonly in the range of 3-6 meters/second. Orienting openings to the east and west will provide the best opportunity for natural cross ventilation. This analysis also suggests that the frequency and velocity of the wind is substantial enough for the production of on-site wind energy, particulary from small-scale microturbines.

average cloud cover



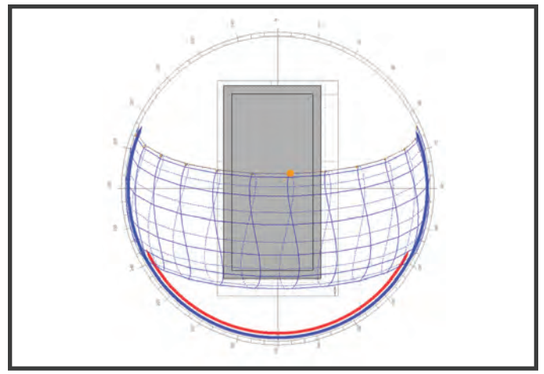


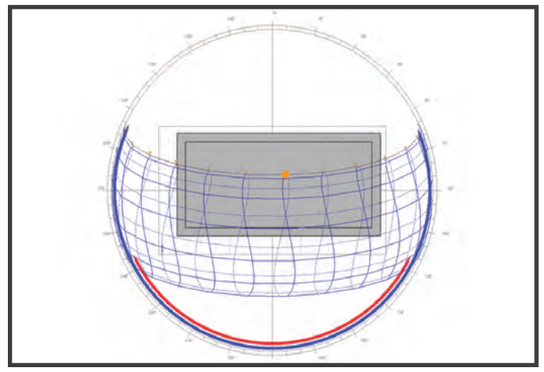
solar radiation

solar radiation and cloud cover

The solar radiation on site is relatively high, averaging 5.4 kilowatt-hours per square meter per day, with only 40-percent average annual cloud cover, which is conducive to collecting solar energy with both photovoltaics (solar-electric panels) and solar thermal technology (solar hot water), but will require proper building and sun shade orientation in order to avoid unwanted heat gain in the spaces.

less preferrable building orientation

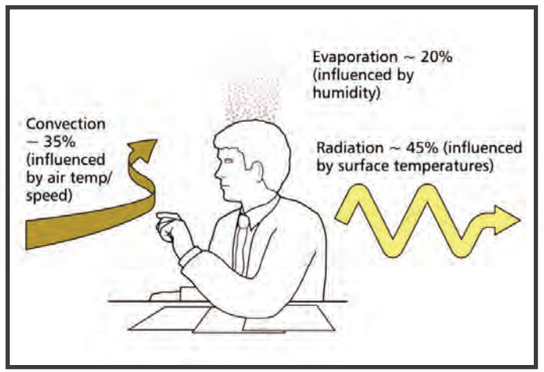




preferrable building orientation

sun path and building orientation

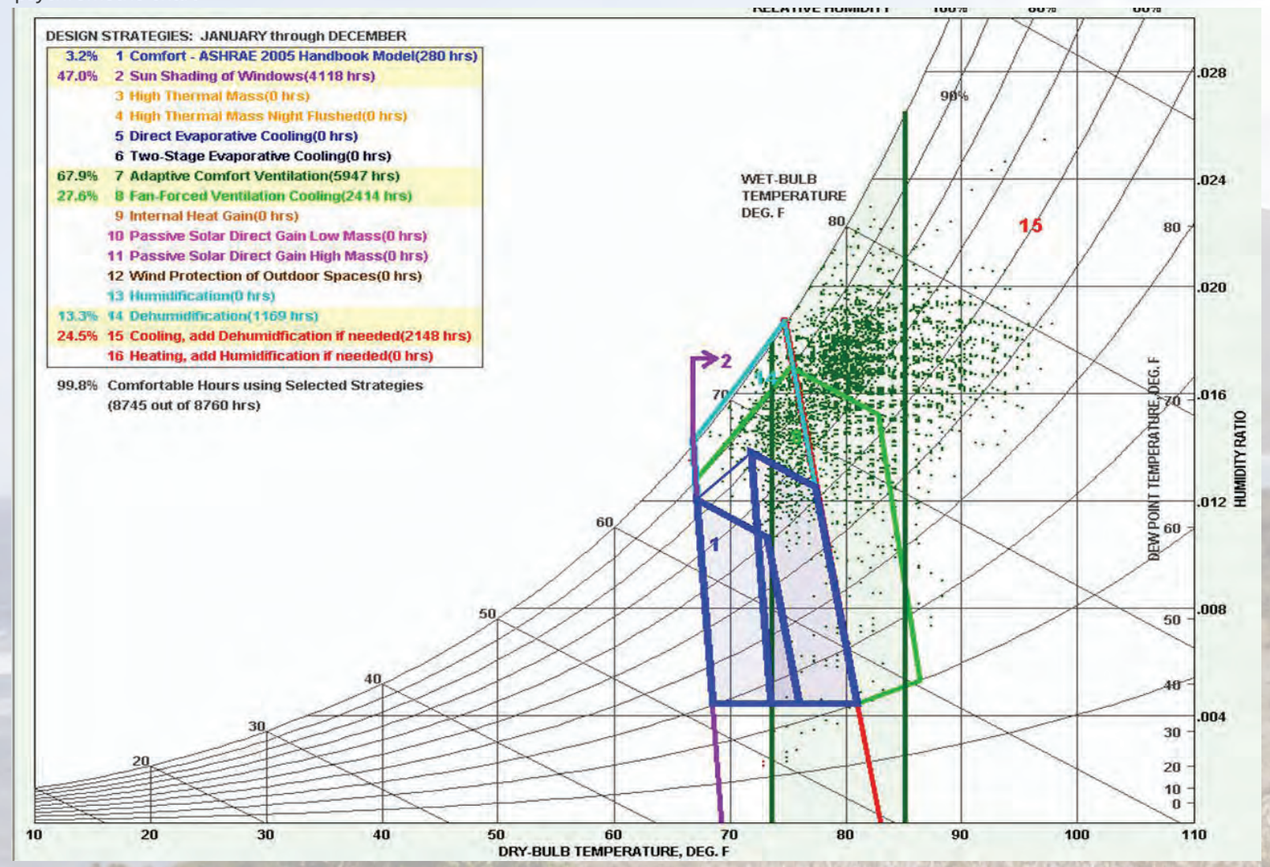
Based upon the annual temperature and solar radiation data, and the annual sun path at the building site, a building oriented on an east-west axis will most effectively avoid undesirable solar heat gains. As indicated in the orientation analysis images, with minimal overhangs this orientation effectively shades the building facades, while a north-south orientation would result in greater solar heat gains. The ideal east-west axis for passive solar is at variance with the ideal north-south axis for natural ventilation, and the ideal sustainable design solution will seek to balance these competing opportunities.



comfort analysis

Human comfort is governed by temperature, thermal radiation, humidity, and air speed. Buildings are designed to provide shelter and comfort; conventional building typically provides conditions for human comfort through heating, ventilation, and air conditioning system (HVAC) fed by fossil fuel energy, while a more sustainable building seeks first to maximize passive design opportunities through harnessing free local climatic resources.

psychrometric chart

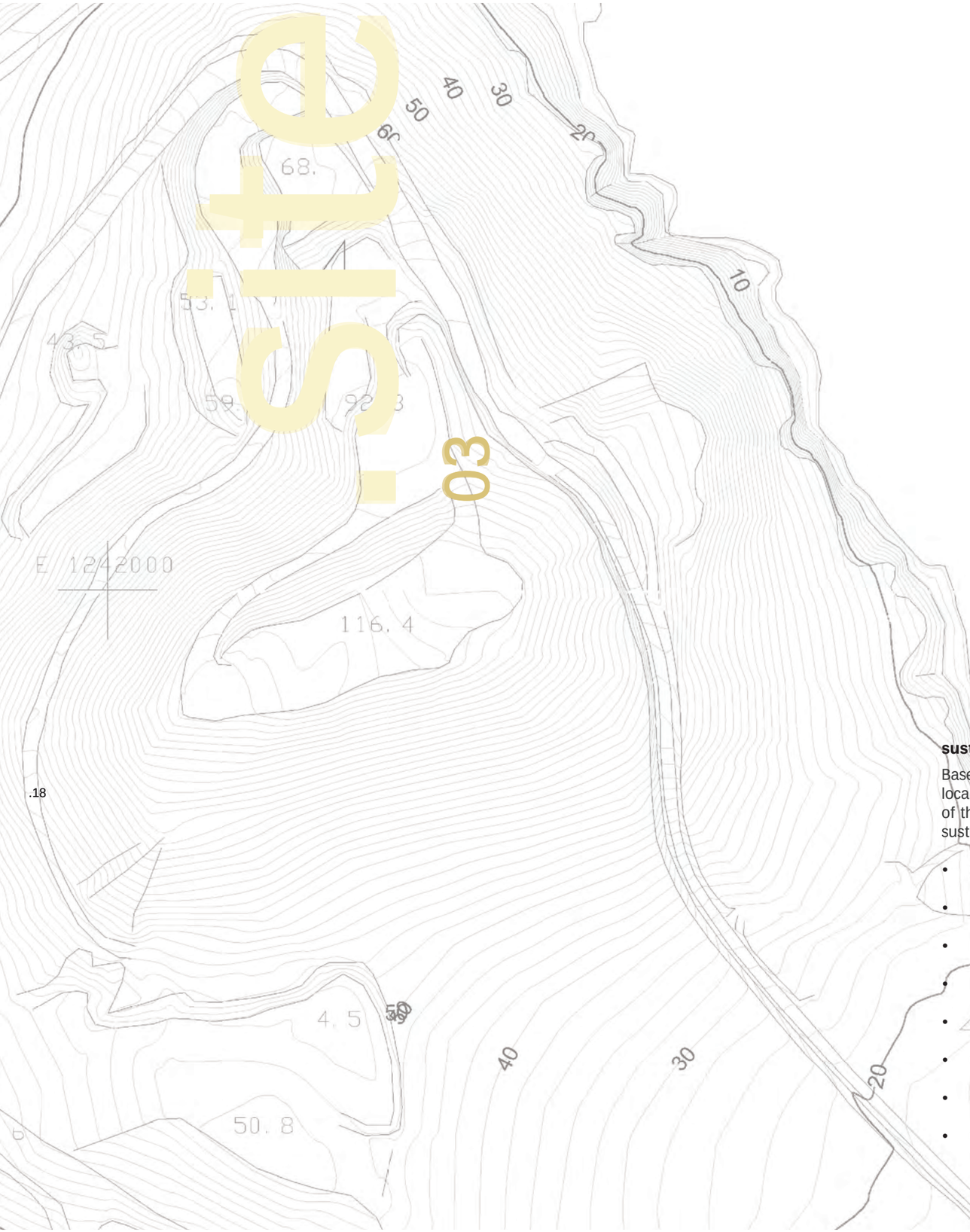


A Psychrometric Chart provides a graphic representation of human comfort conditions, plotting dry-bulb temperature, wet-bulb temperature, and relative humidity. On the chart above, the annual hourly temperature and humidity conditions are represented by a dot, with those falling within the adaptive comfort zone—a comfort model which takes into account seasonal temperature variations and occupants tendency to adapt both expectations and clothing based on the outdoor temperature—shown in green and those falling outside of that zone, conditions which require cooling, heating, and/or dehumidification to meet thermal comfort, shown in red. In naturally ventilated spaces where occupants can open and close windows, their thermal response will depend in part upon the outdoor climate and will therefore have a wider comfort range than buildings with centralized HVAC systems and no operable windows.

As indicated, with the provision of operable windows for natural ventilation alone, comfort conditions are met by the local climate conditions approximately 68-percent of the time, and supplemental cooling and/or dehumidification required during hotter periods which fall outside of comfort conditions.

With the addition of passive design strategies, such as proper building solar orientation, sunshading, and enhanced ventilation (such as ceiling fans) the building design can be optimized to essentially eliminate the need for supplemental heating and significantly reduce the need for energy-intensive dehumidification and supplemental cooling.

site 03



thermal mass and shaded glass

sustainable design opportunities

Based upon the local environmental challenges, the local climatic conditions, and the program requirements of the MREC, the following key regionally-appropriate sustainable design strategies were identified:

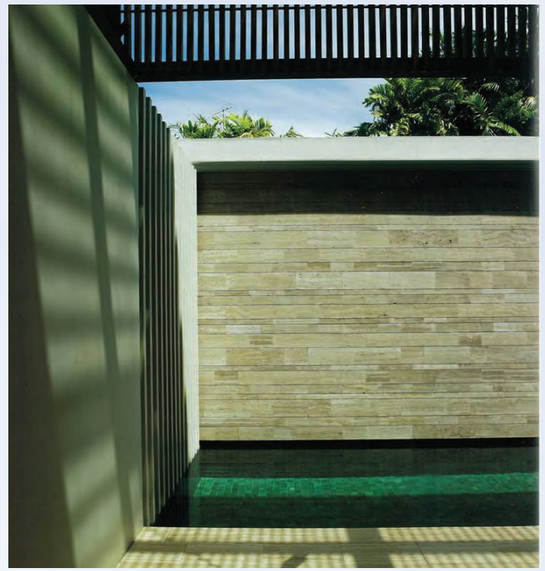
- Cooling-load avoidance
- Natural ventilation / multiple conditioning zones
- Passive solar heating
- Natural daylighting
- Onsite water collection and storage
- Onsite renewable energy and storage
- Solar hot water
- Onsite wastewater and stormwater collection and treatment
- Historic vernacular design solutions (developed prior to the widespread use of fossil fuel energy, historic building precedents often provide successful precedents for regionally-appropriate design strategies)

project conditioning zones

One further strategy for reducing cooling and dehumidification energy requirements is the reduction of the amount of space within the facility requiring tight temperature and/or humidity controls through strategic programming. The MREC program contains both museum storage and laboratory spaces which have both temperature and maximum relative humidity requirements of 60 percent (i.e. requirements beyond occupant comfort), and dehumidification will require a large amount of the total project energy use to meet the requirements of these spaces.

partially underground cistern

above ground cistern



shading with pool to cool the air

Rather than conditioning the entire project to meet the most restrictive requirements, three “Project Conditioning Zones” were developed based upon the unique temperature and humidity requirements for different program elements within the MREC, allowing a diversity of criteria:

Zone M: The most stringent requirements, required only for Museum Object Storage

- Temperature: ambient to 72° Fahrenheit, ±3° Fahrenheit (no heating)
- Humidity: 45% to 60% (dehumidification and cooling)
- Pressurization: positive
- Outside air: 5% fresh air (95% recirculated air)

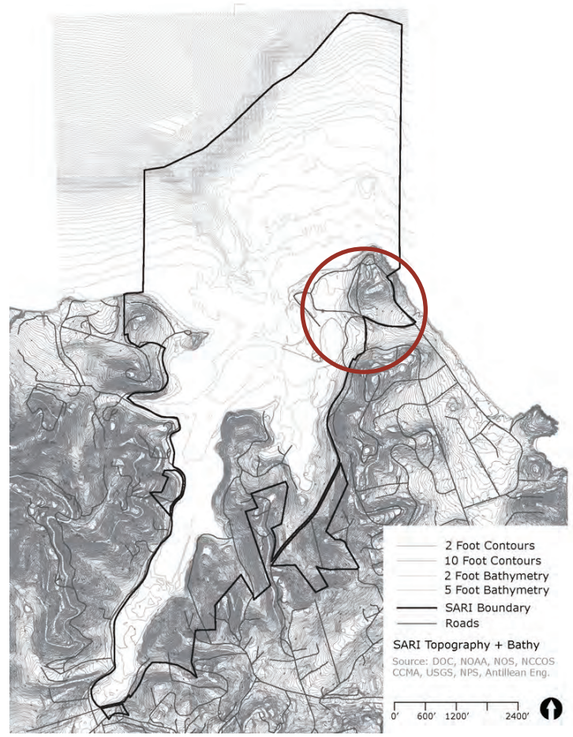
Zone A: Controlled environment (labs, offices, theater, object cataloging, director’s house, food storage and battery room)

- Temperature: ambient to 78 degrees Fahrenheit (no heating)
- Humidity: ambient to 60% (dehumidification and cooling)
- Pressurization: positive
- Outside air: 15% fresh air (85% recirculated air)

Zone C: Environments with shading and screens or open environments (labs, lab support, meeting room, storage, classroom, lobby, reception, community space, touch tank, clean preparation, living accomodations, food preparation, boat dock/dive operations, maintenance, loading dock)

- Temperature: ambient (no heating or cooling)
- Humidity: ambient (no dehumidification)
- Pressurization: neutral (no directional airflow)
- Outside air: 100% fresh air (full natural ventilation)

site 03

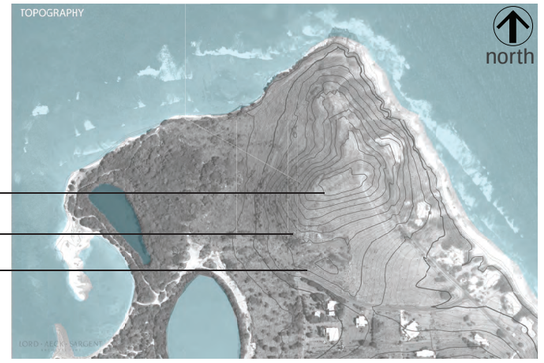


site boundary and topographical survey of SARI

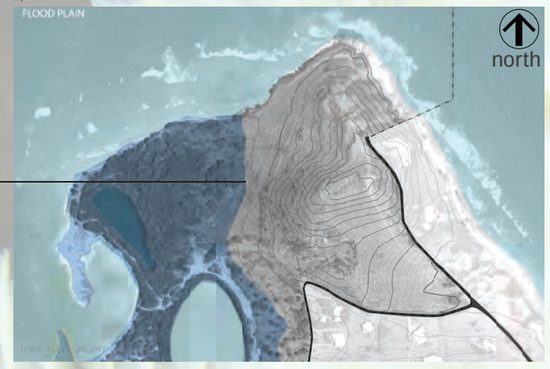
.4 topographical analysis

Most of the site was disturbed during a 1960's development that was never completed. The eastern portion of the site which is above the flood plane is distinguished by a large hill on the eastern edge of the property with steeply sloping sides to the north and west, and a more gradual 'saddle' formed to the south and more gradual topography adjacent to the flood plain to the west. To minimize ecologically-intrusive (and expensive) grading activities required to develop steep slopes, efforts have been focused on development within the gently sloping areas adjacent to the flood plain and the saddle area to the south of the hill. The slopes support east-west building orientation well.

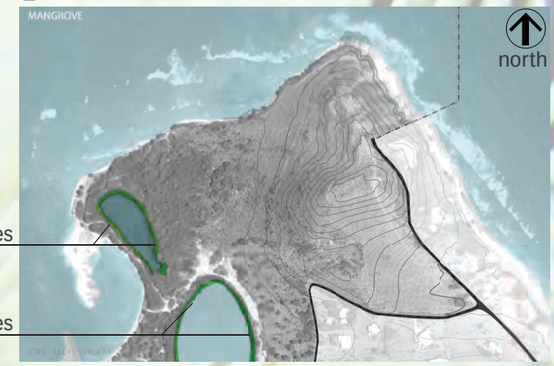
topography

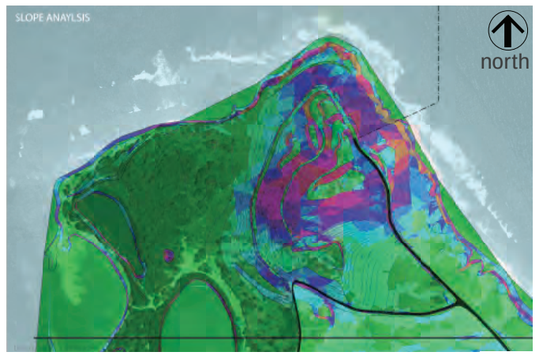


flood plain [in blue]



mangrove [in green]

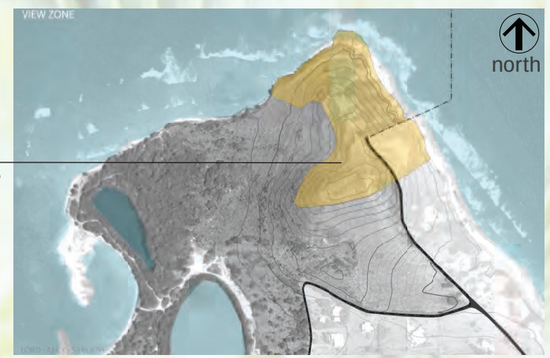




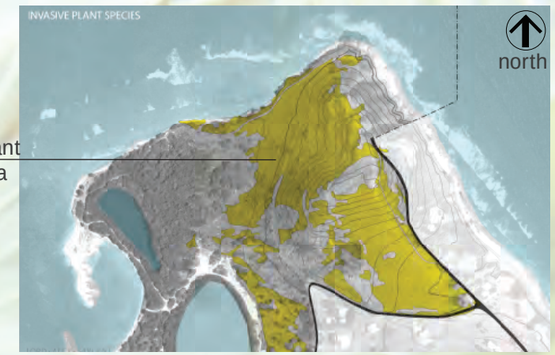
slope analysis [purple as steepest slope]

steepest

flattest



protected view zone [in yellow]



invasive plant species [in yellow]

.5 protected areas/buildable limitations

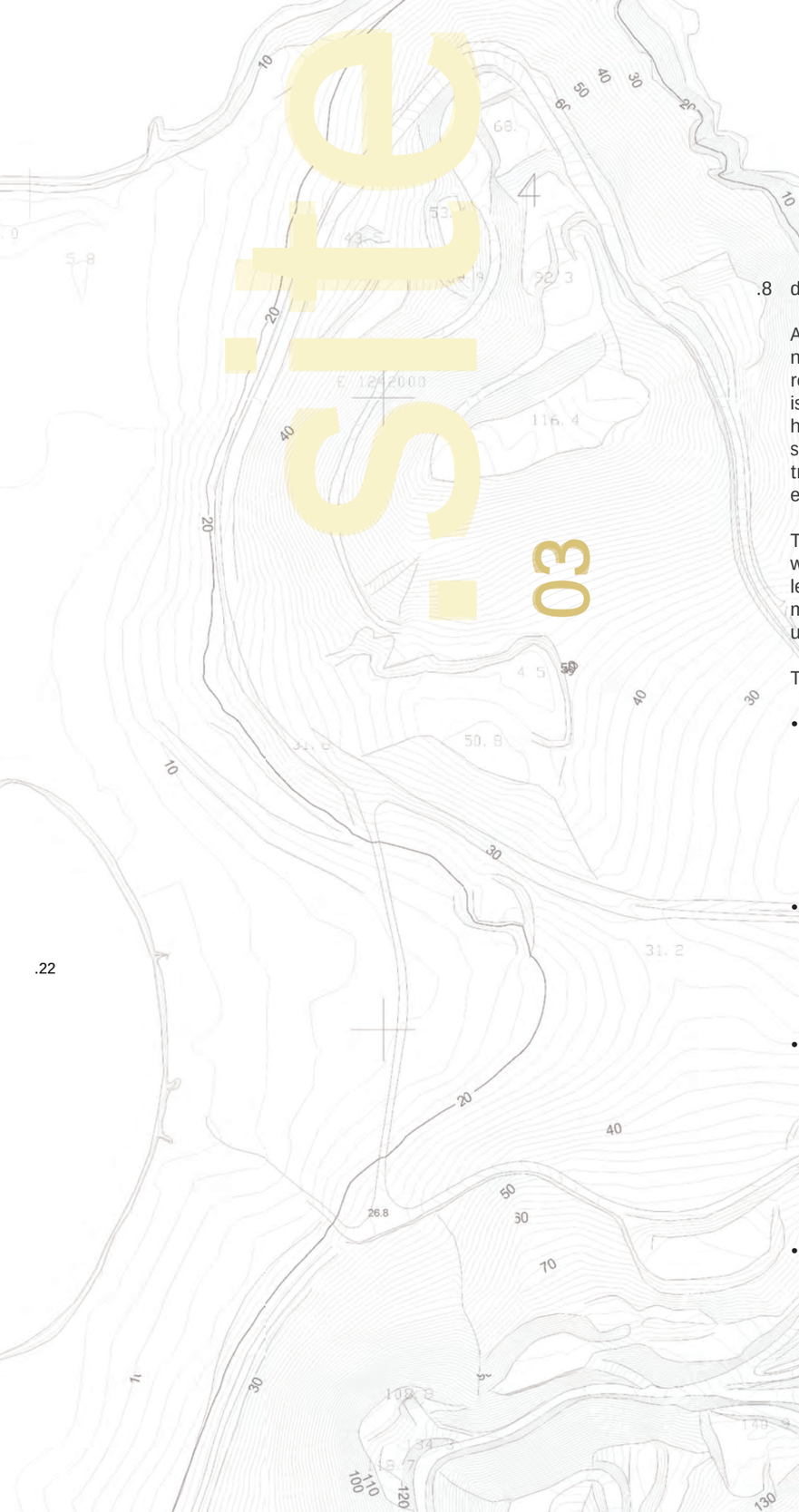
The northeast portion of the site is a prominent hillside sloping to shore and part of a natural view shed which is to be preserved. The western portion of the site is largely within the flood plain and also features ecologically sensitive mangroves. This limits the desirable building area to the eastern portion of the site between the hill to the west and floodplain to the east.

.6 geotechnical analysis

Minimal geotechnical analysis is currently available (see landscape architecture portion of this report for detail). A thorough geotechnical analysis will be conducted during subsequent project phases.

.7 vegetative analysis

The project site above the flood plain has been extremely degraded by invasive plant species. Restoration with native plants will offer an opportunity to not only reduce the negative impact of building but also provide a restorative ecological impact. Please refer to the landscape restoration section of the appendix for further detail.



.8 development capacity of the site

As the design team, the JICMS and the NPS analyzed the selected site for the MREC, a fundamental question needed to be addressed. What is the development capacity of the site? This question is important for many reasons: first, since the proposed site is within the boundaries of the SARI park, minimizing the impact to the Park is of great importance. Since the site was previously developed, it is considered a grey field (meaning a site that has had previous disturbance on it but has not necessarily been so polluted that it can be noted as a brown field site), so building on it in an appropriate way will be a restorative act and not a destructive one. This is especially true given the state of the site having been abandoned partway through the development of a commercial enterprise, prior to the formation of SARI as a National Park.

The second reason the development capacity of the site is important is the team needed to be sure that the site was capable of supporting the proposed program and population. The project's program is aligned with the SARI legislative mandate to study and preserve the historical and natural resources of the Park, and to further that mission the project has ambitious sustainability goals that include net zero annual electricity use and net zero water use (meaning the project produces and/or collects at least as much of each of these resources as it uses).

To evaluate if the proposed program exceeds the site's capacity, four criteria were assessed.

- Can the proposed student population be supported by the water available on site based on annual rain fall? Based on an average annual rain fall of 40.3" per year and a current program area of about 60,000 sf, the project can capture a total of 1.2 million gallons of water. The water use needs for the project show about 600,000 gallons of rain water capture are required based on the average daily usage. The USVI local code requires a minimum of 370,000 gallons. Based on this information, the site water capacity or the net zero water use goal are not limiting factors for the project at this time, but this is subject to the ultimate capacity of the cisterns.

- Can the proposed functions be accommodated reasonably with the amount of solar energy available for harvest on the site? Based on the current projection of 770,000 kWh per year of electricity being required and the available solar radiation on the site, photovoltaic panels covering about 30,000 sf will generate the required power. As such, we do not see power generation or net zero power consumption are not limiting the project at this time.

- Does the allowable population offer financial sustainability for the partner JICMS group to allow the project to sustain itself? Based on preliminary business plan models, the facility needs a minimum of 32 paying undergraduate students to keep the facility in good financial order, but the partner group had mentioned that more would be desirable. As such, the program shows 40 undergraduate students with the balance of the housing capacity being aimed at more senior groups (graduate students, post-doctoral researchers, etc). As such, this criterion allows for the business plan to function as adequate student populations are accounted for. The number of students could grow if needed, but the site impact and water and power impacts would need to be reviewed accordingly.

- Does the number of students needed for this financial sustainability prevent restorative action across a majority of the site? In looking at the East Site of SARI for the MREC, a 73 acre peninsula was selected because of its previously disturbed nature and its potential for access (please refer to the Environmental Assessment date June 2008 for the MREC for additional detail). The current proposed development impacts about 7 acres of this site allowing for restoration of a majority of the peninsula. In addition, due to the nature of the proposed construction, the area inside of the 7 acres will also be restorative with native vegetation and full storm water mitigation. This criterion is the most limiting of the 4, as enlarging the development footprint further would push the MREC to be bigger than the EA allotted for. As such, the development footprint should be considered the determining factor for maximizing the development of the site.

wind turbine

photovaltaic panels

water supply cistern

stormwater collection cistern

.9 sustainable design metrics

Several of the overall goals articulated earlier in this report are related directly to sustainability. Design for passive survivability, restoration of the compromised landscape, and reduction in fossil fuel use, for instance, are project goals related to sustainability. Addressing local environmental challenges and designing in harmony with the local climate as outlined in the Existing Conditions and Resources section are also inherently sustainable approaches.

Beyond these more general goals and priorities, green building rating systems can provide an effective, holistic framework for both addressing the environmental impacts of building design and construction as well as setting concrete performance targets to inform the design. The now-familiar Leadership in Energy and Environmental Design (LEED) Rating System, and the emerging Living Building Challenge will be utilized to set specific sustainable design and high-performance metrics for the MREC project.

LEED rating system

The project will pursue Platinum level LEED certification under LEED for Building Design + Construction Rating System. This is this highest level of LEED certification attainable. The LEED Rating System is a point-based system with credits organized around 5 broad environmental categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. The general methodology is to set a 'conventional practice' baseline for a given credit, against which performance over conventional practice is compared. For instance, water efficiency as measured against conventional practice. Aside from a limited number of prerequisites, credits are optional and project teams select the desired path to achieve a targeted score based upon project constraints and priorities. A LEED Scorecard outlining the preliminary strategy for platinum certification is included in the Appendix.

living building challenge

The Living Building Challenge takes an alternate approach to sustainability, emphasizing a 'do good' approach over a 'be less bad' approach. It is comprised of 20 "Imperatives" organized around 7 sustainability topics, or "Petals": Site, Water, Energy, Health, Materials, Equity, and Beauty. Unlike LEED's optional credits, the Imperatives, such as net zero annual energy use (the building must get by on its annual solar income), are selected with the intent of forcing designers and building owners to fundamentally rethink the assumptions and processes of designing and the goal of creating deep green, 'living buildings' which do not exceed the carrying capacity of their site and which become a regenerative part of their ecosystems.

The project will utilize the Living Building Challenge as a design guideline with a sustainability target of achieving "Petal Recognition" for a minimum of three petals including the Water and Energy Petals. The project will collect all of its potable water from rainfall. The project will treat and reuse all waste water on site. The project will meet its energy needs with on-site generated renewable energy (photovoltaic, solar thermal, and wind) including back up to provide emergency power for critical operations and research. The project will create comfortable, productive spaces without conventional air conditioning systems using natural ventilation, dehumidification, and passive cooling design. The project will feature climatically- and culturally-appropriate design strategies which harness plentiful natural resources (sun and wind) while valuing limited resources (water). The project will serve as a model of regionally-appropriate sustainable design and construction for building occupants, visitors, and the broader community. The project will promote a car free living by using vans and buses only to leave the MREC and electric carts and walking to move around the site.

MREC Space Summary

Program Summary		Description	Total NSF	Total GSF
1.0	**Lab and Lab Support**	Labs and lab support spaces	9728	**14966**
2.0	**Building Administration**	Offices and office support spaces	2654	**3338**
3.0	**Lecture and Teaching**	Classrooms, theater, conference rooms	3052	**4695**
4.0	**Community Outreach**	K-12 education, touch tanks	3,750	**5,769**
5.0	**Collections**	Museum archive/storage, object preparation, object cataloging	1,750	**2,692**
6.0	**Living Accommodations**	Student residences, dining space, staff housing, support for these spaces	12,950	**19,923**
7.0	**Boat Dock/Dive Operations**	Dock, dive operations and support spaces	2,300	**3,067**
8.0	**Maintenance Bldg.**	Other support spaces including fuel bunker, loading dock, etc.	2,550	**4,322**
Building Total:			**38,734**	**58,772**
9.0	**Site Support**	Sea Water Tanks, other site elements	21,650	**25,471**
10.0	**Site**	Parking, outdoor rec, etc.	12,000	**13,333**
Site Total:			**33,650**	**38,804**

=NPS Designated Spaces
=JICMS Designated Spaces
=Shared Spaces

4.1 design program space list

The space list summary displays spaces required to support minimum operation needs of the MREC with the net square footage (NSF) and gross square footage (GSF) totals for each of the eight building program categories as well as the two main site component categories.

Each of the eight building program categories is broken down to show the program spaces within each category and are color-coded to designate NPS, JICMS or shared spaces. This was determined through a collaborative effort between the JICMS, NPS and the design team. This includes the net square footage for each program space, the quantity of those spaces and the total net and gross square footage amounts for those spaces. Additionally, each program space has a conditioning zone specified, either A, C or M as defined on pages 18 and 19.

		Grossing Factor			65%			
Lab and Lab Support			Conditioning Zone	quantity	Size NSF	Total NSF	Total GSF	Notes
1.1	**Lab / Lab Support**							
	1.1.1	Research Labs	A	8	363	2,904	4,468	moduled
	1.1.2	Analytical Lab	A	1	363	363	558	moduled
	1.1.3	Electronics/ROV Lab (2 modules each)	A	1	726	726	1,117	moduled
	1.1.4	Equipment Room	A	1	363	363	558	half module
	1.1.5	GIS Lab (2 modules each)	A	2	726	1,452	2,234	Wall monitors, real-time information, moduled
	1.1.6	Teaching Lab (2 modules each)	C	1	726	726	1,117	Field-based support, flexible layout, moduled
	1.1.7	Wet Lab (2 modules each)	C	1	726	726	1,117	moduled
	1.1.8	Sample Prep	C	2	726	1,452	2,234	Shades exterior space
	1.1.9	Storage	C	1	726	726	1,117	secured cages
	Lab / Lab Support Subtotal					**9,438**	**14,520**	
1.2	**Support**							
	1.2.1	Restrooms, Janitorial		gross				
	1.2.2	Atrium		gross				
	1.2.3	Generator Room		gross				Consider building UPS
	1.2.4	Wall Thickness, Unassigned Storage, Mechanical Rooms, etc.		gross				
	1.2.5	Stock Room	C	2	25	50	76	
	1.2.6	Supply Room	C	1	40	40	61	
	1.2.7	Data Management Room	A	1	200	200	307	may tie in to UVI
	Support Subtotal					**290**	**446**	
Lab and Lab Support						**9,728**	**14,966**	

		Grossing Factor			65%			
Lecture and Teaching			Conditioning Zone	quantity	Size NSF	Total NSF	Total GSF	Notes
3.1	**Classroom / Meeting**							
	3.1.1	Classroom (lab side) (2 modules)	C	1	726	726	1,117	moduled
	3.1.2	Meeting room (2 modules)	C	1	726	726	1,117	
	Classroom / Meeting Subtotal					**1,452**	**2,234**	
3.2	**Theater**							
	3.2.1	Theater w/Seating for 100	A	1	1,500	1,500	2,308	
	3.2.2	AV Room/Storage	A	1	100	100	154	
	Theater Subtotal					**1,600**	**2,462**	
3.4	**Support**							
	3.4.1	Restrooms, Janitorial		gross				
	3.4.2	Atrium		gross				
	3.4.3	Wall Thickness, Unassigned Storage, Mechanical Rooms, etc.		gross				
	Support Subtotal					**0**	**0**	
Lecture and Teaching						**3,052**	**4,695**	

		Grossing Factor			65%			
Building Administration			Conditioning Zone	quantity	Size NSF	Total NSF	Total GSF	Notes
2.1	**Administration Offices**							
	2.1.1	Administration Office (2 dedicated to NPS, 2 shared)	A	4	121	484	745	
	2.1.2	Directors Office	A	1	200	200	308	
	2.1.3	Breakroom/Lounge	C	1	100	100	154	
	2.1.4	Visiting Scientist Office (JICMS)	A	6	121	726	1,116	moduled
	2.1.5	Support offices	A	4	121	484	745	
	Administration Offices Subtotal					**1,994**	**2,322**	
2.2	**Administrative Conference**							
	2.2.1	Meeting Room	C	1	200	200	308	moduled
	2.2.3	Storage	C	1	120	120	185	
	2.2.4	Copy/mail room	A	1	120	120	185	
	2.2.5	Nursing Station/Dive Accident Response	C	1	120	120	185	Locate with access to Dock and entrance road
	2.2.6	Print Room	A	1	100	100	154	
	Administrative Conference Subtotal					**660**	**1,015**	
2.3	**Support**							
	2.3.1	Restrooms, Janitorial		gross				
	2.3.2	Atrium		gross				
	2.3.3	Wall Thickness, Unassigned Storage, Mechanical Rooms, etc.		gross				
	Support Subtotal					**0**	**0**	
Building Administration						**2,654**	**3,338**	

		Grossing Factor			65%			
Community Outreach			Conditioning Zone	quantity	Size NSF	Total NSF	Total GSF	Notes
4.1	**Entrance Functions**							
	4.1.1	Lobby (partial exterior space)	C	1	1,500	1,500	2,308	
	4.1.3	Reception/Info Desk	C	1	150	150	231	
	Entrance Subtotal					**1,650**	**2,538**	
4.3	**Community Space**							
	4.3.1	Community Shared Space (possible exhibits)	C	1	1,000	1,000	1,538	
	Exhibits Subtotal					**1,000**	**1,538**	
4.4	**Touch Tank**							
	4.4.1	Touch Tank	C	1	800	800	1,231	outdoors with cover/screen
	4.4.2	Touch Tank Pump and Support	C	1	300	300	462	
	Touch Tank Subtotal					**1,100**	**1,692**	
4.6	**Support**							
	4.6.1	Restrooms, Janitorial		gross				
	4.6.2	Atrium		gross				
	4.6.3	Wall Thickness, Unassigned Storage, Mechanical Rooms, etc.		gross				
	Support Subtotal					**0**	**0**	
Community Outreach						**3,750**	**5,769**	

Collections			Grossing Factor	Conditioning Zone	quantity	65% Size NSF	Total NSF	Total GSF	Notes
5.1	**Museum / Archive / Catalog**								
	5.5.1	Object Storage- Temporary and Permanent		M	1	1,200	1,200	1,846	Space will be Subdivided by Media (ceramics, paper, natural samples).
	5.5.2	Clean Preparation		C	1	200	200	307	
	5.5.3	Object Cataloging		A	1	350	350	538	
	Museum / Archive / Catalog Subtotal						**1,750**	**2,692**	
5.2	**Support**								
	5.6.1	Restrooms, Janitorial			gross				
	5.6.2	Atrium			gross				
	5.6.3	Wall Thickness, Unassigned Storage, Mechanical Rooms, etc.			gross				
	Support Subtotal						**0**	**0**	
Collections							**1,750**	**2,692**	

Maintenance Building			Grossing Factor	Conditioning Zone	quantity	59% Size NSF	Total NSF	Total GSF	Notes
8.1	**Maintenance Building**								
	8.1.1	Maintenance Building		C	1	900	900	1,525	
	8.1.2	Cart storage/recharging stations		C	1	100	100	169	
	8.1.3	Restrooms		C	2	100	200	339	
	8.1.4	Battery Room		A	1	250	250	424	
	8.1.5	Loading Dock		C	1	200	200	338	Central Receiving for Campus
	Subtotal						**1,650**	**2,797**	
8.2	**Other**								
	8.2.8	Fuel/Hazmat Bunker		N/A	1	200	200	338	
	8.2.9	Plant growth shade house		N/A	1	300	300	508	
	8.2.10	Compost area		N/A	1	200	200	338	
	8.2.11	Recycling storage		N/A	1	200	200	338	
	Subtotal						**900**	**1,525**	
Maintenance Building							**2,550**	**4,322**	

=NPS Designated Spaces
=JICMS Designated Spaces
=Shared Spaces

			Grossing Factor			65%			
Living Accommodations				Conditioning Zone	quantity	Size NSF	Total NSF	Total GSF	Notes
6.1	**Living Spaces**								
	6.1.1	Sleeping Quarters (Undergraduates)		C	40	90	3,600	5,538	
	6.1.3	Restroom/shower		C	10	200	2,000	3,077	
	6.1.4	Sleeping Quarters (Graduate students: w/Living Space, Porch and Kitchenette)		C	12	225	2,700	4,154	
	Living Spaces Subtotal						**8,300**	**12,769**	
6.2	**Staff Housing**								
	6.2.1	Directors House		A	1	850	850	1,308	
	6.2.2	Maintenance Security		C	1	500	500	769	
	6.2.3	Faculty Cottages (w/Living Space, Porch and Kitchenette)		C	2	500	1,000	1,538	
	Staff Housing Subtotal						**2,350**	**3,615**	
6.3	**Cafeteria/Kitchen/Rec**								
	6.3.1	Recreation/Dining Space		C	1	1,000	1,000	1,538	
	6.3.2	Kitchen		C	1	500	500	769	
	6.3.3	Food Prep		C	1	250	250	385	
	6.3.4	Food Storage		A	2	200	400	615	
	Cafeteria/Kitchen/Rec Subtotal						**2,150**	**3,308**	
6.4	**Support**								
	6.4.1	Restrooms, Janitorial			gross				
	6.4.2	Atrium			gross				
	6.4.3	Wall Thickness, Unassigned Storage, Mechanical Rooms, etc.			gross				
	6.4.5	Laundry		C	1	150	150	230	
	Support Subtotal						**150**	**230**	
Living Accommodations							**12,950**	**19,923**	

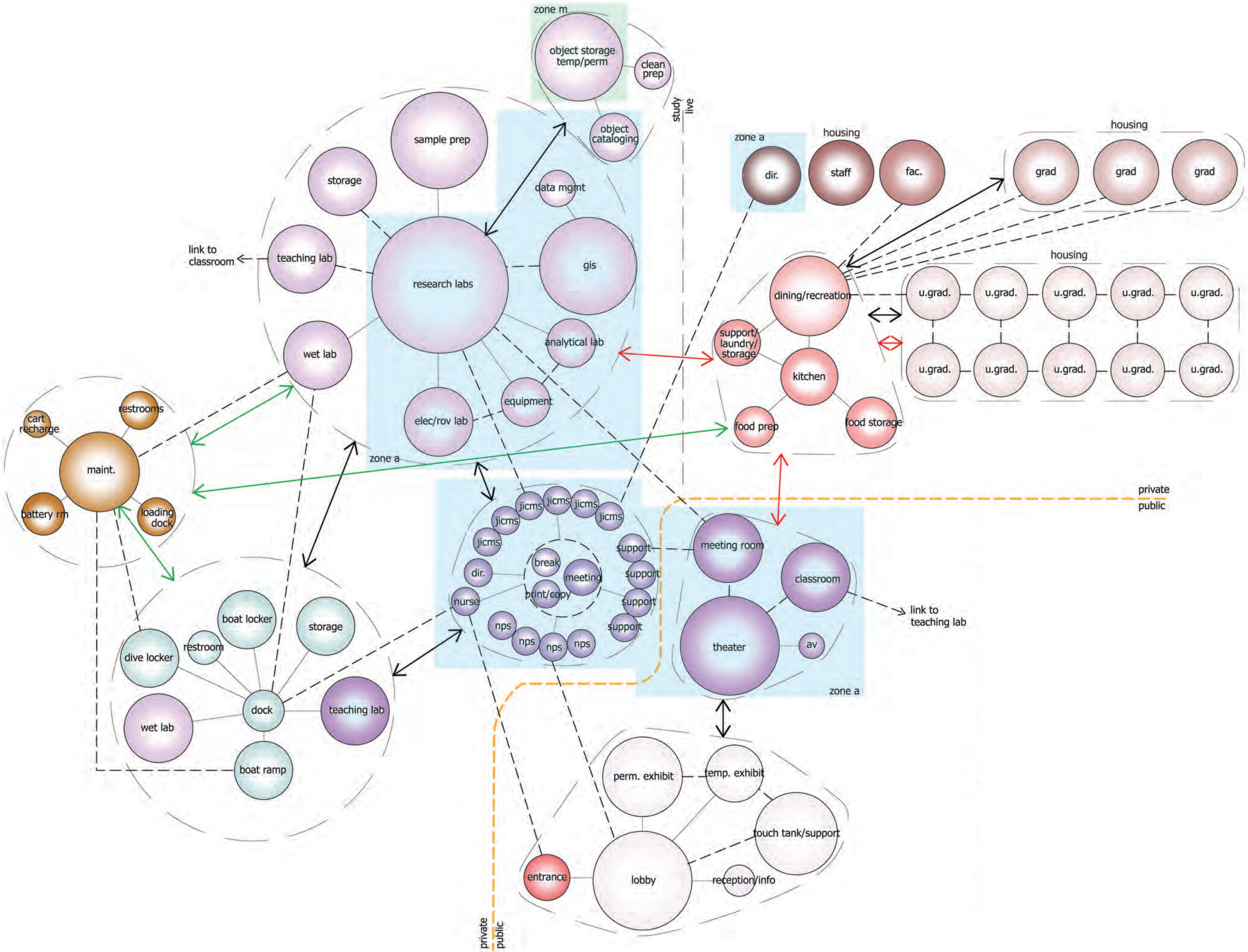
			Grossing Factor			75%			
Boat Dock/ Dive Operations				Conditioning Zone	quantity	Size NSF	Total NSF	Total GSF	Notes
7.1	**Support**								
	7.1.1	Dive Locker		C	1	600	600	800	CA stations, Nitrox, Hi P storage tanks outside, emergency O2 available
	7.1.1.1	Dock Restrooms		C	2	100	200	267	
	7.1.2	Boat Locker		C	1	600	600	800	may combine with Dive Locker, Storage Room, separate areas with chain fence
	7.1.3	Docks (land cover)		C	1	300	300	400	outdoors
	7.1.4	Storage Room		C	2	300	600	800	may combine with Dive Locker, Boat Locker, separate areas with chain fence
	7.1.5	Boat Ramp		N/A	1	0	0		boat ramp with width for 2 boats: one in and one out at the same time.
	7.1.6	Boat Storage		N/A	1	0	0	0	kayak racks and other light craft; can be exterior rack unenclosed but secured.
	Support Subtotal						**2,300**	**3,067**	
Boat Dock/ Dive Operations							**2,300**	**3,067**	

			Grossing Factor		85%			
Site Support			Conditioning Zone	quantity	Size NSF	Total NSF	Total GSF	Notes
9.1	**Other**							
	9.1.1	Filtered Seawater Holding Tank (footprint)	N/A	1	5,500	5,500	6,471	Size based on Seawater Final Report; assumed area is based on 8' deep.
	9.1.2	Raw Seawater Holding Tank	N/A	1	300	300	352	Area Assumes 4' deep.
	9.1.3	Waste Water Treatment Facility	N/A	1	1,200	1,200	1,411	Site Area, not a building
	9.1.4	Seawater Pump House	N/A	1	150	150	176	
	9.1.5	Research Tanks (outdoors)	N/A	1	1,000	1,000	1,176	outdoors (500 sf out of shade)
	9.1.6	Potable Water Cisterns	N/A	1	8,500	8,500	10,000	Could be under buildings or courtyards; footprint may vary by depth; shown area assumes 10' deep
	9.1.13	Future Site Area Designated for Additional Research Tanks	N/A	1	5,000	5,000	5,882	
	Subtotal					**21,650**	**25,470**	
Site Support						**21,650**	**25,471**	

			Grossing Factor		90%			
Site Program			quantity	Size NSF	Total NSF	Total GSF	Notes
10.1	**Parking**						
	10.1.1	Parking for Cars/Vans	25	400	10,000	11,111	
	Subtotal				**10,000**	**11,111**	
10.2	**Other**						
	10.2.1	Outdoor Amphitheater for 50 People	1	2,000	2,000	2,222	
	Subtotal				**2,000**	**2,222**	
Site Program					**12,000**	**13,333**	

4.2 functional diagrams and adjacency studies

The functional diagram and adjacency study are illustrated in the diagram on the following page. Each large dashed circle represents a program category and holds each of the main program spaces within it. The spaces are associated either by a functional connection [close proximity is desired] or a direct, physical connection [adjacency required]. The program categories are linked to each other based on programmatic adjacencies, operational adjacencies, and social connections.



functional and adjacency diagram

4.4 design solutions

.1 precedents

The study of precedent projects is an important component of any design project and in the case of the MREC offers the team a window into the past and present of tropical design solutions and ideas that can translate to architectural strategies for the site and building design of the MREC. The study of these other buildings offers insight into design solutions that have similar aspirations as the MREC; this can be seen from the cultural, sustainable and aesthetic perspectives. The design team looked at historical images of villages, the former WIL facility, other buildings in St Croix, colonial construction, local vernacular construction from housing to labs to institutional work. It was also gleaned from these studies the use of materials and empirically determine their susceptibility to the harsh marine climate on the site. Also included in the study is a series of projects that are in similar climates, but maybe located elsewhere to see what other cultures offer; to this end several buildings in Sri Lanka and Australia were reviewed. The design team has also reviewed some of their own work looking to past NPS projects as well as other work that has related program components. A photographic essay of images showing these precedents was compiled that focused on several key features that have become important to the MREC design.

The components we have identified as important in these images are as follows:

- Siting buildings up on hills to take advantage of prevailing breezes and to build them above the flood plain.

- Grouping several smaller buildings together as a village or campus to maximize the potential for cross ventilation.

- Building into hill sides to work with and not against the site slope found on St Croix. Using this technique also allows the foundation cistern to be placed under buildings creating a cooled, protected and convenient storage location for collected rain water.

- Using deep supported overhangs and colonnades to both protect the interior spaces from sun and rain, as well as allow the use this space as exterior circulation.

- Using stone and concrete to create durable buildings that can withstand storms as well as harsh marine conditions. These materials also offer the benefits of thermal mass which helps keep spaces cool when used in conjunction with proper solar shading.

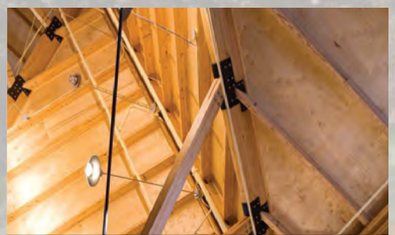
- The use of glued laminated timbers which offers a material of limited combustible nature, is resistant to salt corrosion and is made from smaller pieces of wood sourced from sustainable forestry practices.

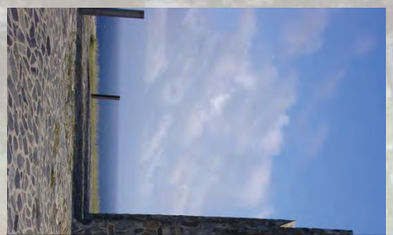
- The use of shades that are oriented either vertically or horizontally (depending on exposure) that can become storm shutters or barriers when needed.

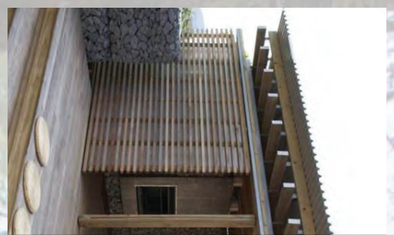
- The use of vertical elements that while historically used as chimneys can be effective in creating passive cooling techniques, such as solar chimneys.

mrec

04







- The use of small interior courtyards that are shaded and offer occupants a shaded condition and allow for greater air movement through buildings as well as increasing access to natural light.
- The use of filtered light through diaphanous materials.
- The use of porous material in lieu of solid material to encourage air movement.
- The use of structural elements to create colonnades that define a rhythm across a site or building.
- Creating paths of protected movement to shield people from the sun and rain.
- Creating warm inviting spaces with large volumes to allow for passive cooling strategies such as stratification, effective daylighting and enjoyment of spaces.
- Not enclosing space (open air) where the program and climate allow.
- Siting buildings sensitively to work with the existing topography.
- To reveal the site in a controlled and designed entry sequence.
- Creating spaces that have an immediate and direct relationship to nature and the environment in which they are located.

mrec

04

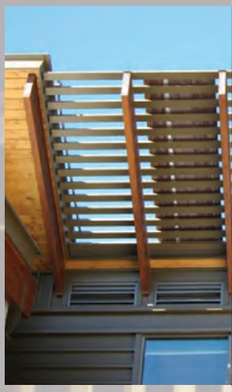
CASE STUDIES

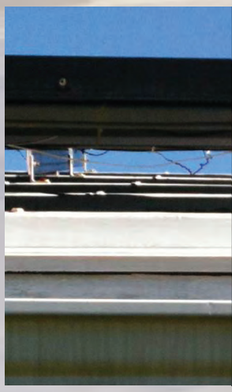
Three projects were selected to look at in greater depth for their relationship to the MREC and its program components. The three projects are:

Blue Ridge Parkway Destination Center
Asheville, NC

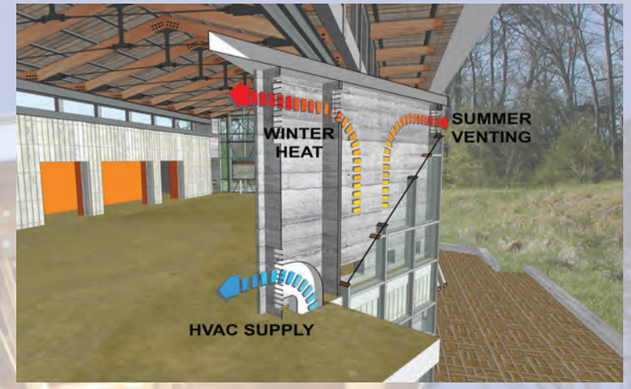
Hawaii Preparatory Academy
Hawaii, HI

The Nature Conservatory St. Croix
St. Croix, USVI





- LEED Gold
- Daylighting
- Naturally Ventilated
- Radiant Heating
- Energy Recovery with Enthalpy Wheel
- Wood Construction
- Large Volume
- Auditorium/Exhibits/Classrooms and Offices
- Integrated Design
- NPS Project



- LBC Project
- Tropical
- Daylighting
- On-site Power Generation
- Water Storage
- Radiant Cooling
- Naturally Ventilated
- Wood Construction
- Science Focused Education

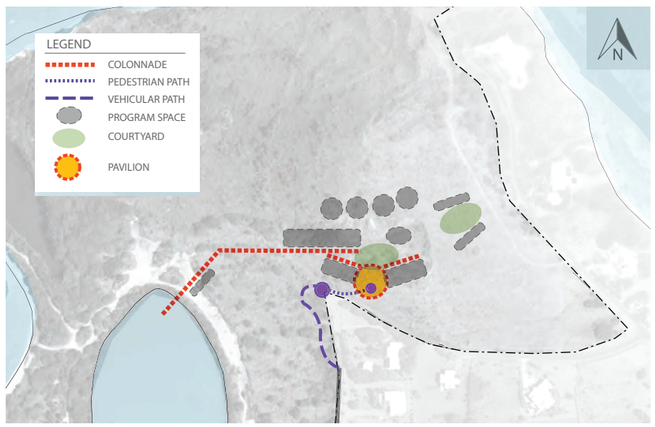
- Tropical, in St. Croix
- Daylighting
- On-site Power Generation
- On-site Sewage Treatment
- Naturally Ventilated
- Thermal Mass
- Public Outreach/Education
- Colonnade
- Deep Overhang
- Solar Hot Water

mrec

04

landscape plan

site parti



.2 master plan

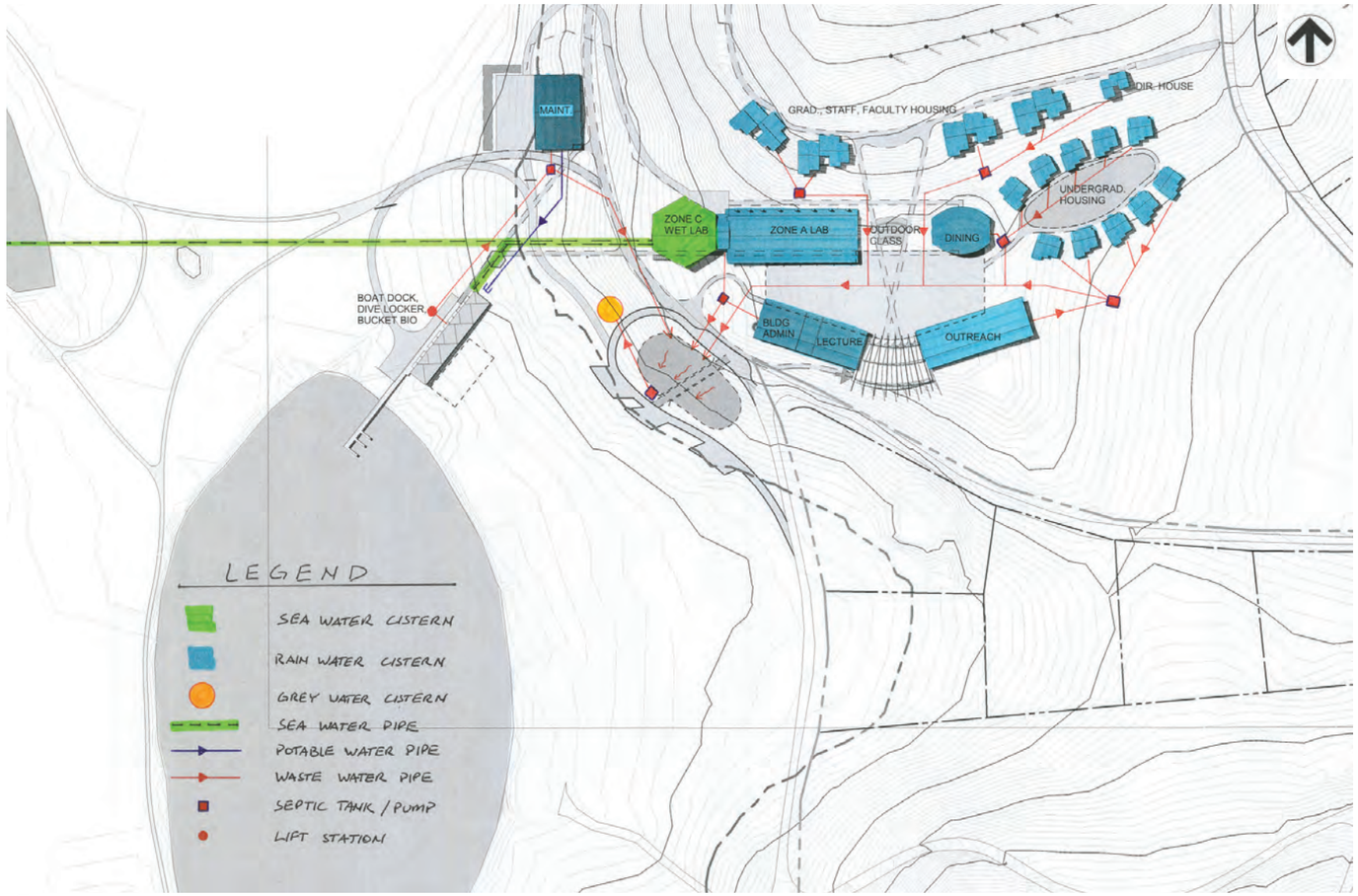
The organizing concept is to create a series of linked colonnades or passageways that tie the visitor and the resident experiences together as they move throughout the site as well as to provide shelter from the sun and rain as part of these paths. The colonnade evokes the rich architectural history of St Croix and the Virgin Islands; it mirrors the experience one has in Christiansted while allowing the development of the buildings to ultimately be of their own time. The colonnade concept also offers a direct strategy for connecting the buildings on the new campus and creating active points of interest along the way to spurn spontaneous interaction between disparate groups occupying the site including researchers, K-12 students and casual visitors.

Upon arrival at the site, the vehicular circulation moves around a constructed wetland that is the precursor to the forthcoming courtyards. This wetland is experienced using a bridge over the wetland offering educational opportunity as well as an informal but organized start to the entry sequence into the MREC. After crossing the wetlands, one follows a path to the east up to an entry pavilion that serves as the lobby and a central gathering space for the project. This space is open air, but has a rhythm of columns and beams overhead to define the space and provide shelter from the sun. Upon arrival at the entry pavilion, the site is revealed to you as the panoramic views from Buck Island and Christiansted in the east and Salt River to the west present themselves. Visitors and students from here have direct access to the Outreach and Education components of the project. To the north the pavilion opens onto the central courtyard where both sides are flanked with colonnades. The southern colonnade offers alternate entry to the Outreach and Education program elements.

rendering of preferred alternative

mrec

04



utility plan

massing diagram

On the north edge of the courtyard, the spine of the center develops as a colonnade connects the courtyard, moving past the lab building connecting it directly to the maintenance building and further down the hill to the lagoon level elements and the dock. This colonnade creates a central location for movement between many of the project's key program elements helping to build a community and allow visitors to easily navigate.

The undergraduate housing units are arranged to define a dedicated courtyard space but leave the east view and windward direction open. Graduate and staff residences are located apart from the undergraduates for acoustic and other privacy reasons; they are higher on the hill. To bring these groups together, the dining pavilion is located centrally to all the housing and serves to help define the north edge of the central public courtyard. The lab colonnade terminates at this focal point for the site's residents and ties the whole site together.


Program Spaces
Laboratory
Lecture and Teaching/Building Admin.
K-12 Outreach
Boat Dock Facilities
Dining/Gathering
Maintenance
Public Entrance
Living Accomodations
Undergraduate
Graduate
Faculty
NPS/Staff
Director
Site Elements
Vegetated Buffer
Greenspace
Greenspace with water collection
Constructed Wetland
Canopy
Pedestrian Walk
NPS Nature Walk
New Road
New Secondary Road
50-Person Ampitheater
Flood Plain Delineation Line
CARIBBEAN SEA

site plan

4.5 project narratives

.1 site

site grading

The Salt River MREC site was dramatically altered during the 1960's and 1970's by failed hotel/condominium development leaving 26,000 square feet of unfinished structure, thousands of cubic feet of construction materials unnaturally sculpted contours and overgrown roads. Significant earthwork and grading will be required to develop the project site and restore the area to more natural topographical conditions.

Generally, the grading design will address vehicular and pedestrian areas, including ADA access requirements, proposed structure locations, stormwater management, and site restoration. The intent of the overall grading and drainage approach will be to utilize the existing topography to the maximum extent possible and provide the least site impact by disturbing only those areas proposed for new facilities or restoration. Because of the minimal amount of soil coverage and shallow underlying rock outcroppings, proposed excavation of existing grades will be minimized where possible.

MREC site looking southeast towards lagoon and SARI

The earthwork needed to construct desired project facilities will be limited to cut and fill operations, largely within 10 feet of existing grade, to create building foundations, roadway and parking areas, walkways and trails, and exterior common areas and park amenities. The need for excavation will include the burial of utility lines and preparation of building and structure foundations. Coordination of the overall site design will be important to maximize the co-location of facilities to further reduce the total area of disturbance and restore drainage and grades.

Additional earthwork will be necessary to perform restorative operations at the site. Previous development activities have degraded the natural landscape and altered the historic watershed characteristics. Over time this has contributed to erosion of the hillside and sedimentation buildup in the lowland areas (mudflats). Restoration of the site will include the reformation of the hillside to reflect historic contours and grading of the lowland areas to provide proper drainage of the affected basin.

A significant portion of the park property lies within the identified 100-year floodplain. Therefore, special considerations are warranted for the placement of facilities in this area. Additionally, any earthwork performed within this area will need to be compensated for to ensure there are no adverse impacts to floodplain capacity. By grading the site such that there is no net loss of flood water storage, associated development impacts will be avoided. Grading within the floodplain is anticipated, however, to support facilities proposed within its limits and provide the desired level of passive survivability.

stormwater management

There are no existing stormwater collection or conveyance systems at the MREC site.

New facilities will result in approximately 60,000 SF of new impervious area associated with building rooftop. Although this area will generate a significant volume of runoff, it will be directed to high capacity cisterns utilized for rain water storage and future use as potable water. Roof structures will be designed to maximize the collection of runoff as this will be the sole source of potable water for the development. It is anticipated, however, that roof collection systems will accommodate some level of first-flush bypass and/or overflow discharge flows. Flow rates and volumes from these sources are expected to be minimal but will contribute, at least occasionally, to the overall runoff from the developed portion of the site.

Another 50,000 SF of area may be needed for roadway, trails, parking, drive aisles, and other associated pedestrian and vehicular circulation facilities. The selection of pavement materials will dictate the level of runoff from these areas, with pervious or semi-pervious surfaces having reduced runoff rates and volumes compared to impervious surfaces. A maximized use of pervious surfaces through vegetated swales and rain gardens are encouraged due to the measurable benefit to runoff quantity and quality.

As stated above the intent of the overall grading and drainage design is to utilize the existing topography to the maximum extent possible to reduce the amount of earthwork needed for development and restoration. The sloping nature of the site combined with the limitations of shallow rock will steer the grading and drainage design away from traditional collection and conveyance systems which primarily utilize inlets and piping. The approach will be to collect and convey stormwater in swales prior to final treatment and discharge. Treatment will occur through the use of various Low Impact Development (LID) techniques including vegetated swales, rain gardens, off-line basins and other similar dry treatment facilities. The overall system will be designed to maximize on-site infiltration and evapotranspiration, while reducing runoff quantity and increasing water quality.

Salt River Bay is a Class B surface water per the U.S. Virgin Islands Water Quality Standards and is subject to Total Maximum Daily Load (TMDL) requirements associated with its current impairment for dissolved oxygen. The stormwater system will address these requirements while following the design direction dictated by the document Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act. Utilizing Option 2 of this document, the stormwater system will ensure there are no post-development impacts associated with stormwater discharges to Salt River Bay. Berming around the proposed sanitary wetland treatment system will be required to prevent inadvertent discharges of this facility to the stormwater system during heavy rainfall events. Additionally, buffers will be provided around existing surface waters, wetlands, and mangroves to further protect these natural features.

A major constituent of the local soil is clay, which reaches its moisture capacity quickly after a rainfall event. This combined with large areas of steep slopes provides for a condition which results in significant sediment runoff to wetlands and coastal waters. Local residents have confirmed this condition citing the rapid change in surface water turbidity after significant rainfall events. The grading and stormwater management design will address existing conditions to control this impact. This is especially important during the project's construction phase. The Territorial Pollutant Discharge Elimination System (TPDES) Program requirements will be adhered to during construction for erosion and sedimentation control. Best Management Practices (BMPs) will be utilized to capture and control stormwater runoff to avoid impacts to sensitive coastal waters during construction. A Stormwater Pollution Prevention Plan (SWPPP) will also be developed for the site to describe in detail the means and methods of addressing erosion and sedimentation control for the property.

landscape components

The landscape components perform to achieve a harmonious relationship between form and function to articulate the needs of all users and site constraints. The goal is to stimulate the senses, facilitate human interaction, increase perception of natural habitat and thus, enhance the sequence of their daily routine.

The design of this site has high expectations because it will produce its own energy and water demand. All of these efforts and elements will be incorporated as an integral part of the landscape.

green parking

The parking is reached after an arrival sequence that should provide a sense of the place that will be visited or will become a temporary home for others. A native tree canopy will provide a visual focus and a marked change of scenery, atmosphere and scale from the road just left behind. The parking itself has a tree canopy that provides enough shade that shield the reflection of the sun and maintain a comfortable temperature.

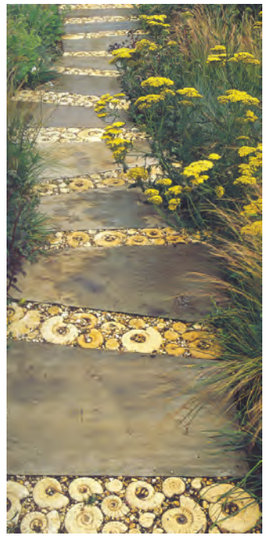
The paving surface of the parking stalls will be a pervious and reliable vegetated surface that controls runoff and also maintains a comfortable temperature. The planting strips will not only screen with native shrubs the parking stalls to preserve the sense of place within a natural reserve, they will also filter runoff before it discharges into the estuary.

pedestrian path

The pedestrian path facilitates moving between different types of activities and the sequential transition between them. Typical design elements such as form, color, texture and visual focus will enhance this transition and Low Impact Development (LID) concepts will be used to reduce runoff velocity, promote infiltration and laminar flow with a minimum load of sediment.

landscape node

The Landscape Node is a confluence of paths that provides the opportunity of human interaction. It is a landscape component that has been highly stereotyped as the plaza or square. For this project it's interpreted as a place to leisurely meet and exchange ideas and or greetings essential for the marine laboratory campus program. The scale and design of these nodes will create the ultimate sense of place within a nature preserve.



This project will provide an opportunity where a plaza (node) functions both as a meeting place and a water reservoir, consistent with the sustainable site practices objectives.

For climate control where a tree canopy is not feasible, shade can be architecturally provided with a trellis and native vines or fruit plants.

native tree canopy

The final selection of natural site components such as vegetation will be derived from the detailed correlation and analysis of existing site conditions and design program variables such as NPS objectives and users' needs, hierarchy of circulation, functional relationships, site constraints and form determinants.

The selection and location of natural elements such as trees among other design objectives shall also consider: solar radiation utilization, energy conservation, relationship to the architecture and plantings that will not interfere with solar or roof water collection.

Trees can be generally categorized by scale and function into canopy trees and understory trees. The division is essentially made between those trees under 20 feet high and trees which are over 20 feet high.

A diverse variety of native trees will be used to provide the desired tree canopy. Consequent with the sustainable site objectives, they will also provide habitat.

native shrubs and ground cover

Shrubs may be arbitrarily divide into 3 categories:

low	up to four feet high
medium	from four to eight feet
high	eight feet and over

The massing of shrubs and ground covers control circulation, define space, provide visual focus, form, color and texture. When selected to provide habitat, no intensive maintenance such as pruning will be recommended.

constructed wetland

The constructed wetland is an essential component to the sustainable site because it recycles wastewater to supply part of the demand of non-potable water. This is an odorless treatment sequence which produces a high quality effluent, a small percentage of which will be used for drip irrigation for new planting, the orchard and vegetable garden.

New planting always requires a minimum amount of water to become established. Especially so during their first year of growth. Conscious of the water limitation we recommend that new planting be established in a sequence of phases.

The selection of wetland plants is not directly related to the quality of the wastewater effluent because their roots only provide a host for the colonies of bacteria that decompose contaminants and are not really part of the wastewater treatment process. Therefore we recommend that the selection of wetland plants not be limited to native types because it provides an opportunity to incorporate a diverse variety of flowering plants whose fresh production could be sold to local hotels and restaurants.

Examples of flowering wetland plants are: canna, heliconia, alpinia, hedichium, and iris among others.

orchard and vegetable garden

An area close to the kitchen and dining hall is reserved to provide fresh fruit and vegetable produce to add to the basic diet. We also recommend that selection of trees and vegetables not be limited to native materials. The final selection can be made depending on the area available and the recommendations of a nutritionist.

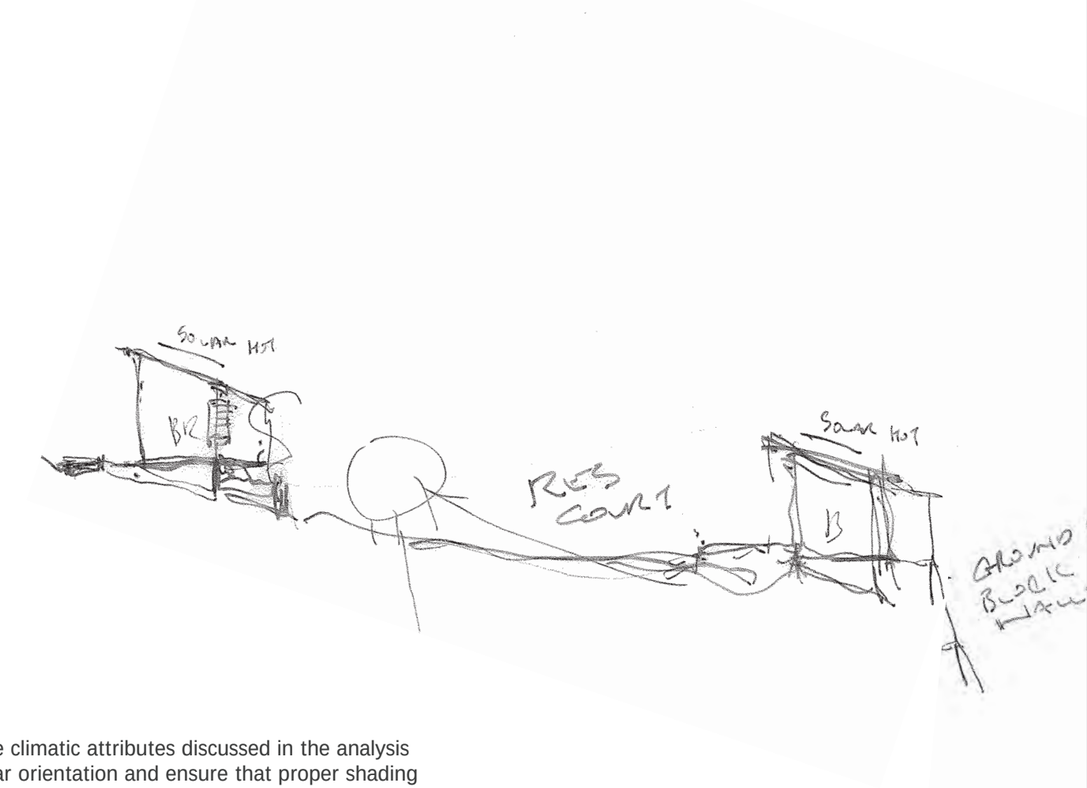
Native Shrub and Ground Cover Edge and Mangrove Restoration Strip

There are ongoing restoration concerns and efforts related to the site. One such example is the mudflat restoration plan.

The native shrub and ground cover edge is a landscape component that not only provides a barrier that defines borders between different functions and uses within the reserve, these edges also become a starting point of another restoration effort whose objective is to remove invasive species and restore native coastal ecosystems that include plants such as: Coccolobis uvifera, Chrysobalanus icaco, Argusia gnaphaloides and Suriana maritima among others.

The mangrove restoration strip is another landscape component we recommend be incorporated into the restoration efforts. Its objective would be to restore and or protect the basic three species of mangrove forest (Laguncularia racemosa, Avicennia germinans, Rhizophora mangle) and diversify the ecosystem by inserting a transitional area that includes species such as: Conocarpus erecta, Bucida buceras and the swamp fern Acrostichum danaeifolium.

These landscape components shall be coordinated with the mudflat restoration plan because they are all directly interrelated to the Salt River Bay estuarine ecosystem.



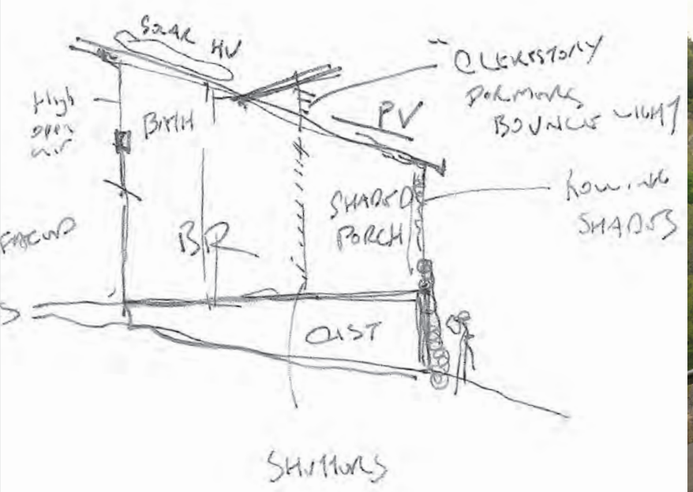
.3 architecture

The buildings will sit on the site and take advantage of the positive climatic attributes discussed in the analysis section of the Master Plan. Buildings will be sited to maximize solar orientation and ensure that proper shading is possible on buildings to minimize the solar heat gain. Orientation will be important to allow even daylighting of spaces and avoid glare. In addition, since the domestic hot water and onsite power generation systems are all solar based, their orientation and location must be carefully considered in a final design solution. All of these criteria point to buildings that are generally long in the east-west axis to be sure the south and north facades are maximized, as these are easiest to control solar gain on and offer the best natural light.

In addition, the project's built components need to be configured to allow for cross ventilation and to take advantage of the easterly winds. One of the project's challenges then is the optimal orientation for solar and wind are contradictory; however we have determined that the solar issue should take precedent in the site design as other options are available to take advantage of prevailing winds. These opportunities include solar chimneys to take advantage of stack effects, proper cross ventilation to draw air across spaces, wind catchers to help direct the wind and open pavilions. These strategies could also be used in combination. For example, using thermal chimneys to help reduce fan usage in the exhaust stream of the labs is an idea that will be further explored during the next phase of design. Another example will be to use the building layouts as wind catchers. This is the intent of leaving the eastern ends of the courtyards open – which also provides great views – to allow air to move into the courtyards where it can aide in cross ventilation of the buildings creating that courtyard.

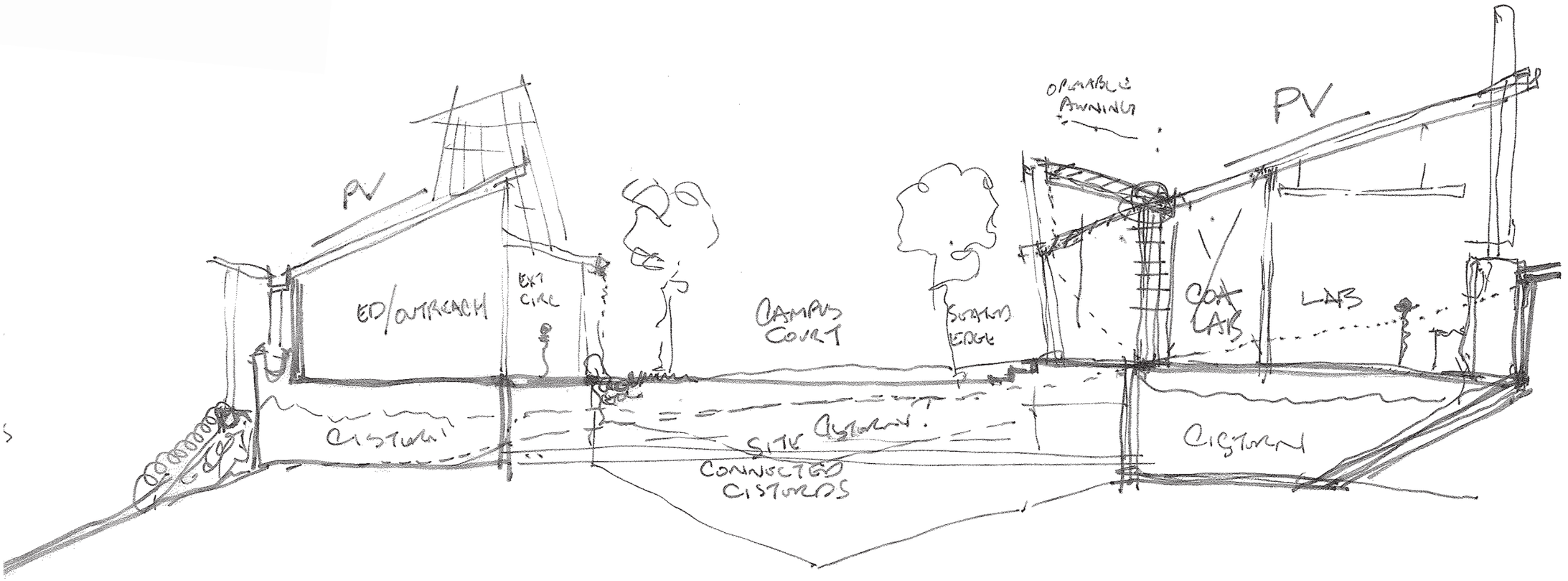
The buildings will be situated in the site to take advantage of the site slopes as well. Building on the moderate slopes of the site allows for views as buildings tier up the hill. In addition, the selected locations of most of the facilities allow for cistern foundations. This is the traditional location for rain water storage in St. Croix as the solution to limited fresh water.

Materials slated for campus buildings will be selected for long-term durability and compatibility with the marine environment. Flooring is scheduled to be sealed concrete (thermal mass), walls with epoxy paint, and no ceiling system (to avoid cavities without air movement). UV-tolerant materials (and service distribution means) will need to be considered. Glued laminated timbers offer great potential in this arena. They are resistant to the marine locale, can be easily fabricated from sustainable forest materials and offer warmth in their use as a visible structural system. Other material of interest include stone, which is quarried locally in St. Croix, and concrete for its durability.



shaded facades/walkways

durable building materials that are compatible with their environment



example of a teaching lab

.4 labs

description

The laboratory component of the Marine Research and Education Center (MREC) on St. Croix will support both marine research and teaching functions required of the Joint Institute of Caribbean Marine Studies (JICMS). Member schools, and perhaps other schools who may wish to participate, will offer courses at the campus which will be enhanced by what the facility offers, and by access to the marine environment.

The 15,000 gross square feet of laboratories will be designed to support a variety of marine research by both the JICMS and others of the campus facilities and marine environment. The two most critical components for long-term success of the project are reliable electrical power and quality seawater used in marine research and education programs.

program

The Research Labs will be easily divisible by visiting research teams, each with common layouts and service distributions. There will be ‘core’ labs which will be shared among the research teams; these will include Analytical Lab, Remote Operated Vehicle (ROV) Lab, an Equipment Room, Global Information Systems (GIS) Lab, Wet Labs, Sample Prep Labs, Materials Storage space and Field Lab space for biology, geology and archeology.

The Teaching Labs will be located both at the main lab facility as well as a component of the Boat/Dive operations area at the lagoon level. Space for marine biology, fisheries, geology, archeology, field operations and future expansion will be programmed and noted on the schematic design drawings.

Indoor spaces will be designed on an 11 ft. width by 33 ft. depth lab module, with structure, mechanical, electrical, plumbing, data distribution systems as well as sea water systems based on the module. The module is designed to be easily divisible for space assignment and for potential reconfiguration and repurposing as needed with program or project changes.

location on the site

The Lab component of the MREC requires functionally associating the Lab Building above the 20' contour line and the Boat Dock/Dive Locker facility at the lagoon level. This allows for the movement of samples from the field to the lab in the most efficient manner. As there are limited locations where this 20' contour approaches the lagoon at the inlet, options for locating these two critical components are limited. The space programmed for a future mariculture component is to be adjacent the Boat/Dive operations facility.

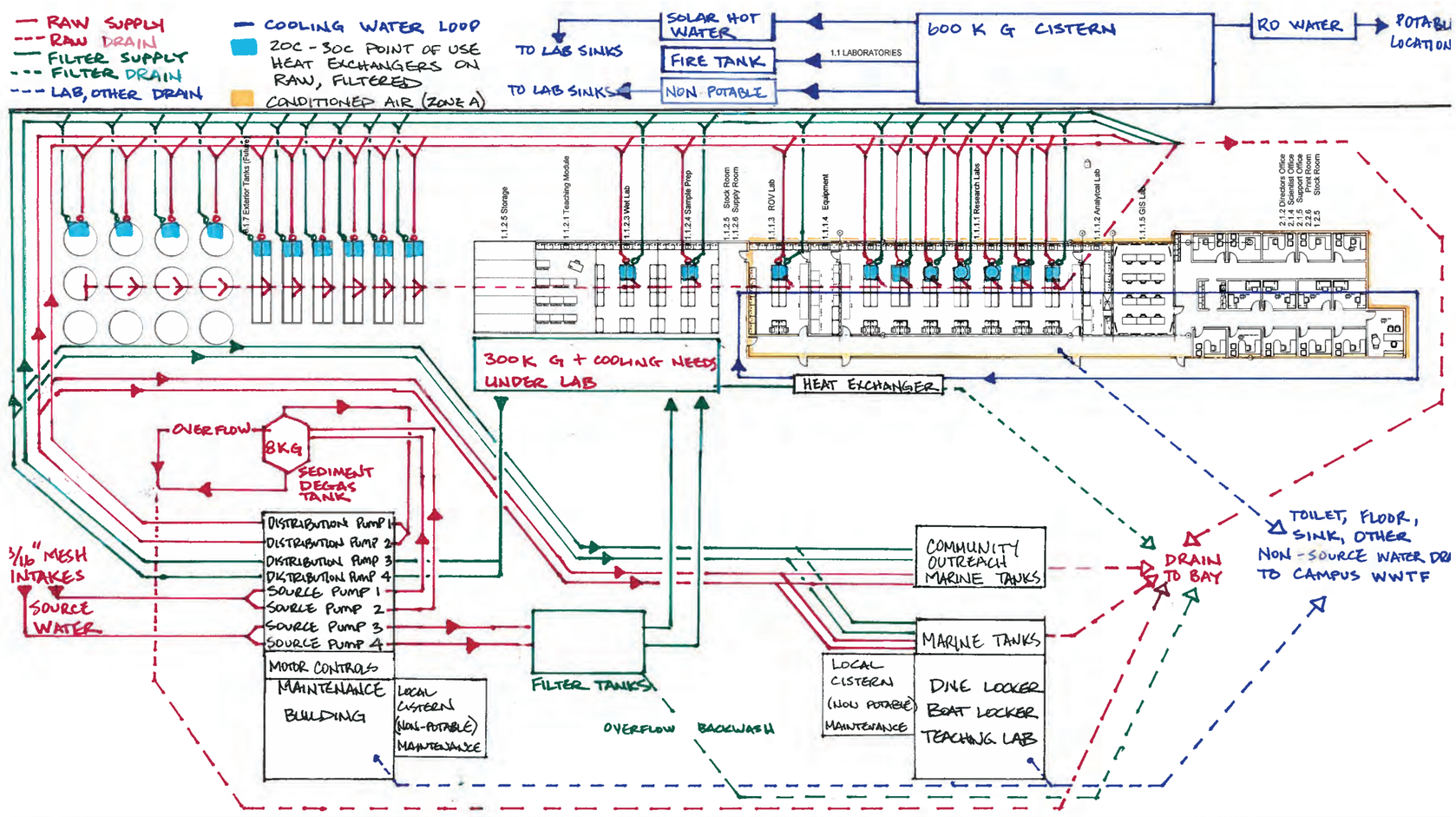
functional adjacencies

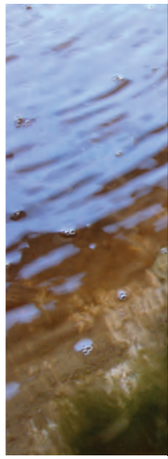
The Lab will be organized into blocks largely driven by functional adjacency requirements and by the need for associating spaces with similar environmental conditioning requirements. The ROV Lab and GIS Lab require Zone A conditioning, as do the Research Labs (assignable space) Analytical Lab (core) and Equipment Room (core). These labs will be a single 'block' within the larger lab volume. Other spaces – Teaching Labs, Wet Lab, Sample Prep Lab, Storage – are Zone C spaces and therefore may be associated in the most reasonable manner.

Offices for administrators, researchers and shared space for agency staff will also be Zone A conditioned, and will be adjacent the lab block. See pages 18 and 19 for Zone definitions.

The Teaching labs in the main lab building will be functionally-associated with the Teaching labs at the Boat Dock/Dive operations facility. These labs will need to be placed reasonably close to the teaching classrooms on the site. The Teaching Labs at the Boat Dock/ Dive operations facility, at the lagoon level, will require minimal facilities for restroom and showers.

lab utility distribution diagram





environmental conditions

The program calls for two environmental conditions for the Lab volumes. The 'core' Research Labs, Analytical Lab, Remote Operated Vehicle (ROV) Lab, an Equipment Room, and Global Information Systems (GIS) Lab will be maintained at 60% RH or less and from ambient temperature to 78 degree F (cooled, but unheated). These parameters have been established to meet the sustainability goals of the project, the targeted human comfort thresholds for those who may be working in the lab, and for establishing an environment conducive to the success of the research. Other spaces which will be a part of the lab can function appropriately as unconditioned space, which may be screened, shaded, or open. This open environment must consider the transfer of particulates (often wind-driven) and salt through the space, and the impact on comfort and research success.

The JICMS has confirmed that the use of chemicals, whether acid/base or solvent, will be limited to small volumes and will be dilute. As such, the labs are not required to meet the ASHRAE standard for lab ventilation requiring single-pass air.

access

Once the lab functional adjacencies are established, it is assumed that labs will be a linear assembly of the 11' by 33' modules, with each lab type (Research Lab, Analytical Lab, Remote Operated Vehicle (ROV) Lab, Equipment Room, Global Information Systems (GIS) Lab, Wet Labs, Sample Prep Labs and Materials Storage) accessible to the adjacent lab.

Labs will be either temperature/humidity controlled, or open to the environment. Access into each conditioned lab space from the outside will be via an internal egress corridor. The ROV Lab will require an oversized door for bringing large equipment and carts; this access point may be shared by other Lab components.

materials of construction

Materials slated for the Labs will be selected for long-term durability and compatibility with the marine environment. Flooring is scheduled to be sealed concrete, walls with epoxy paint, and no ceiling system (to avoid cavities without air movement). Laboratory Casework will be thermoplastic; doors and frames will be fiberglass reinforced polyester. Fastener materials will be selected for their resistance to exposure in a salt environment. UV-tolerant materials (and service distribution means) will need to be considered.

service distribution

Power and data will be distributed to casework at the perimeter of the lab, likely via out-of-wall systems that can be reconfigured as needed without penetrating the walls. Power and data in the 'core' research lab will be delivered to the casework via either umbilicals at the ends of island assemblies (i.e. from above), or via overhead service drop locations. Power will be predominately 120V/20A 1phase service, with limited 208V/20A/1phase service. The lab plug load is targeted (preliminarily) at 3.5 W/sf.

Solar heated hot water and cold water (non-potable) will be delivered to lab sinks and to marine tank locations, as well as to locations required to service the seawater delivery system. Purified water (Lab grade) will also be owner-furnished, and will be assumed to be fed from the potable (house RO) filtered source.

lab lighting

Targets for lighting within the lab would be to use daylighting only during the majority of the day, and 50 footcandles (at the work surface) by zones during night use. The option of point-of-use task lighting will be considered. Shading will need to be considered to avoid glare and direct light strikes at the worksurfaces.

Surface treatments will be considered to enhance the distribution of natural light, and to reach daylighting targets for the labs.

lab equipment

The equipment which will remain on site will likely include a fume hood for mixing and dilution (and perhaps for dedicated lab ventilation). A biological safety cabinet (IIA) and -80C freezer(s) will be available for shared assignment. It is likely that a reasonable distribution of other lab equipment– analytical balances, centrifuge, microscopes – will be on-site for common use, as well as the consummables required for their operation.

lab waste

Water effluent from floor drains and from lab sinks will be directed to the facility wastewater system. Solid lab waste and liquid solvent waste will be collected and removed from the campus by a contracted vendor. Acid or base waste product will be neutralized, pH confirmed, and released to the facility wastewater system via the lab sinks.

Sea water rejected from marine tanks and aquaria will be released to either the inlet, bay, or ocean pending review of options by the research team currently considering the source water delivery system design and the authorities having jurisdiction.

lab storage

There will be limited square footage (unconditioned) available for storage of lab equipment and consumables in the project. The nature of the assignment of the Research Lab – short duration data collection, analysis and manipulation – will likely require research teams to return to their respective home bases for more in-depth review of data gathered on the island. As such, there is the reasonable expectation that these same teams will return for further rounds of work at the MREC, and that these teams might wish to leave equipment or research set-ups on the island. The Storage Facility at the MREC may have to consider this eventuality, and consider the capacity on-site versus storage at a bonded off-site storage facility, or make arrangements for storage (and perhaps sharing) at the University of the Virgin Islands campus.

seawater supply and delivery

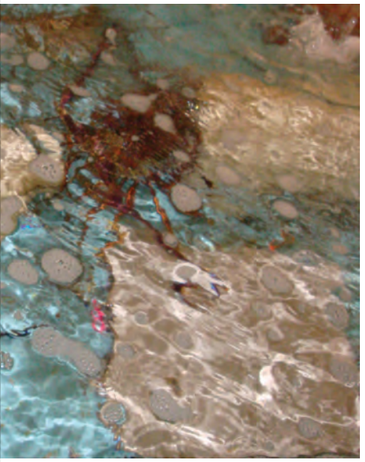
One predominant Project Goal has been the consistent delivery of high quality seawater to the facility, in terms of availability, flow rates, storage capacity, temperature, salinity, turbidity, and the presence of limited amounts of other runoff contaminants. This system must be integrated with the proposed building campus design.

The initial specification for the system as defined by the JICMS Seawater System Advisory Team include the following parameters, with design team assumptions/clarifications/additions noted in italics:

- Two 3/16: mesh supply intake in a TBD location(s)

- Each of the two supply intakes will split into two Source Pumps *at the Maintenance Building (Zone C unconditioned space)*, Primary and Back-up. The Primary pump will be 300 GPM *electric-powered pump, with both pump and controls backed-up by a single diesel generator. The Back-up pump will be a 300 GPM diesel powered, with pump controls backed-up by the generator. On power loss, the Primary (electric-powered) pump will switch to the diesel pump fed by a local diesel tank. Loss of normal operation of this Back-up diesel pump will result in the generator driving the Primary electric-powered pump/controls into normal operation.*

- One of the two redundant Source Pump systems described above will feed source water into an 8,000 Gallon conical Sediment/Degassing tank, *conical at top and bottom for removal of sediment at the bottom and overflow near the top. Sediment and overflow will be routed back to the ocean.*



- Seawater hereafter described as 'Raw Water for Distribution' will be decanted from the top of this conical tank, and delivered via redundant Distribution pumps *(powered in the same manner as described for the Source pumps, redundant in the same way, with pumps and controls located in the Maintenance Building)* to the Research/Teaching Lab Building, to the Dive Operations at the lagoon level, and to the Community Outreach facility, all locations where marine life will be housed.

- The other of the two redundant Source Pump systems described above will feed source water into a filter system composed of aggregate and sand, with backwash and overflow capability with lines routed back to the ocean. This seawater hereafter described as 'Filtered Water for Distribution' will be delivered to a storage tank designed to hold 300,000 Gallons *plus, to be located beneath the unconditioned component of the Research/Teaching Lab.* From this point the Filtered water for distribution will be routed via redundant Distribution pumps *(powered in the same manner as described for the Source pumps, redundant in the same way, with pumps and controls located in the Maintenance Building)* to the Research/Teaching Lab Building, to the Dive Operations at the lagoon level, and to the Community Outreach facility, all locations where marine life will be housed.

- It is envisioned that the seawater exchange in the tanks located in the Research/Teaching Lab Building, in the Dive Operations at the lagoon level, and in the Community Outreach facility where marine life will be housed will be delivered at an exchange rate based on diversity. We are assuming a diversity rate for the flow of this water to be the following: 1/3 of the tanks flow at 25%, 1/3 at 35% and 1/3 at 50%.

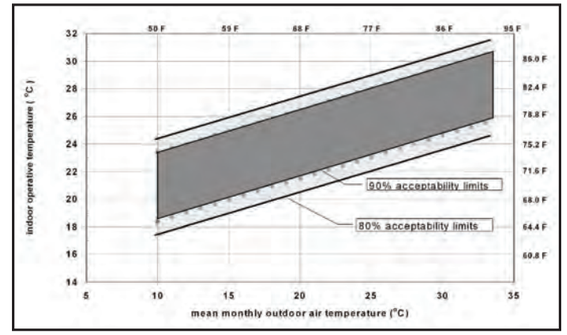
- At those locations where marine life will be housed, both Raw water for distribution and Filtered water for distribution will be available. Heat exchangers will be available on a per outlet basis to adjust the feedwater temperature *in a point-of-use, metered manner* between feedwater temperatures ranging from 20°C-30°C at marine tanks located in the Main Research/Teaching Building and at the future mariculture tanks adjacent the Dive Operations. The diversity calculated for this distribution will be 25% of the chilled seawater reduced to 20°C, with other 25% tiers at 25°C, 27.5°C, and 30°C. It is assumed that tanks requiring this level of cooling will require some type of insulative barrier between tank water and the environment to maintain these setpoints for supply water. *This capability will not be required of tanks at either the Dive Operations at the lagoon level, or the Community Outreach facility, as these are not research functions. Effluent from all tanks will be routed back to the ocean. At all tank locations with marine life, individual tanks will have the ability to further filter either/both the Raw Water for Distribution and/or the Filtered Water for Distribution as needed.*

- At locations where marine life will be housed, a high-volume low pressure air system will provide Oxygenation to the tanks housing marine life. *At locations where marine life will be housed, non-potable water from a facility cistern will be available for washing of marine tanks, Sediment/Degassing tank, Filter beds for Filtered Water for Distribution, and at locations where 'pigs' will be located for clean-out of lines.*

- *It was noted that the 'Filtered Water for Distribution' storage tank 300,000 Gallons plus. An additional capacity to be delivered by source pumps, filtered and stored in this tank will be needed to provide 'Filtered Water for Distribution' required of the cooling needs of the Zone A space of the project. Zone A space will have in-slab cooling loops, and this medium will reject heat from the Zone A space to the Filtered Water for Distribution, which will be routed back to the ocean. The additional capacity and storage required of this Zone A heat exchange plan has not yet been determined, but has been estimated to provide minimal impact on overall water storage. It has also not been determined whether the source pump for supplying filtered water for distribution will be upsized to account for this added capacity, or whether a separate source pump/filter system will be required of this heat exchange system.*

More specific requirements of the MREC Seawater Supply, Filtration, Storage, Control and Distribution System – components, materials of construction, distribution, layout, cleaning, piping, control, filtration – are included in the appendix as the April 2011 Report prepared by the JICMS Seawater System Advisory Team (Bori Olla, Ron Moore, Dennis Allen, Robert Wicklund).

For the purposes of the Master Plan deliverable prepared by the Design Team for the NPS, where the information noted in the April 2011 Report is in conflict with this Report, the Master Plan Report is the updated and agreed upon direction for the project.



ASHRAE 55 Adaptive comfort range; mean monthly outdoor air temperature varies from 78-82 F on St. Croix

.5 mechanical

general hvac overview

The first and foremost priority of the design team will be to provide a HVAC system that meets or exceeds all of the requirements of the building users. Systems are designed to require minimum maintenance and to survive the hurricane conditions that the site will see over the life of the building. Minimum power use is critical since the building objective is to be net zero (ie, to export as much renewable electricity to the grid as is consumed from the grid for an annual net electricity use of zero), with all water and power provided by onsite systems.

There are three main types of areas in this project. The living accomodations will be designed to provide comfort with mostly passive systems – operable windows, exposed mass floor, and ceiling fans. The main lab areas will be provided with dehumidification and cooling to provide an indoor environment significantly cooler and dryer than outdoor conditions. Solar heated hot water will be the primary energy source to drive dehumidification, with a small traditional compressor based heat pump moving heat out via the seawater system providing additional comfort cooling. The final area is the small museum/archive space, which will be supplied with a small traditional mechanical system to ensure stable control. It is important to note that the museum/archive space is the only space with a set air temperature and humidity setpoint – the other two spaces need to provide comfort, which is only partly determined by air temperature.

The outflow from the seawater system will be used to reject heat as necessary. The system will emphasize use of equipment that requires minimal maintenance; this includes using hallways as plenums to distribute air instead of ducting, and a dehumidification system powered by simple solar hot water collectors and a desiccant wheel that can be literally hosed clean when required.

A high quality direct digital control (DDC) system will be used to operate the system. A modern DDC system allows for the greatest flexibility in scheduling and operating systems as well as the ability to remotely monitor system operation and provide a public reporting of campus efficiency with real-time power usage data.

living spaces

A number of traditional architectural approaches will be used to provide comfort in the residences. All living accomodations will have access to operable windows. A ceiling fan will be provided to increase air movement and the floor will be a high thermal mass material that helps even out the minor daytime temperature peaks. The typical residence on St Croix does not use air conditioning to maintain comfort and with careful design, these space should not require any either.

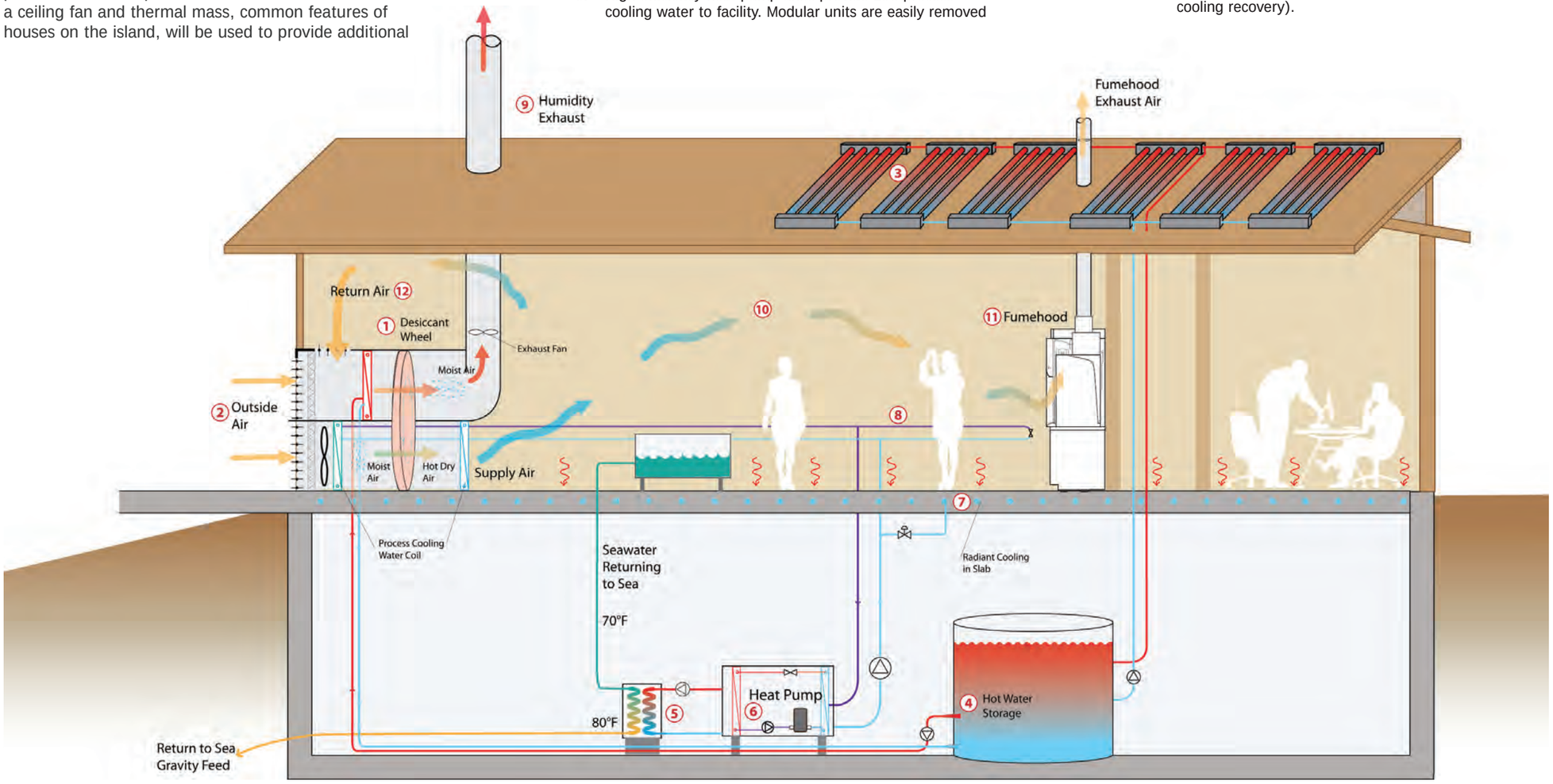
The living accomodations will be classified as naturally conditioned by ASHRAE standards. Evaluating the interior conditions that will make occupants comfortable falls under the Adaptive Comfort portion of Standard 55, the widely used method of predicting occupant comfort. Based upon thousands of surveys, it has been found that in naturally ventilated dwellings occupants adapt to the outdoor climate conditions and report comfort at higher temperatures than in a traditional sealed and mechanically cooled space. For the St Croix typical weather year, temperatures between 82-85F would be predicted to make 90% of occupants comfortable. By designing the spaces to be naturally ventilated and not concentrate solar heat (careful shading to avoid direct solar gains), comfort can be maintained for the majority of the year.

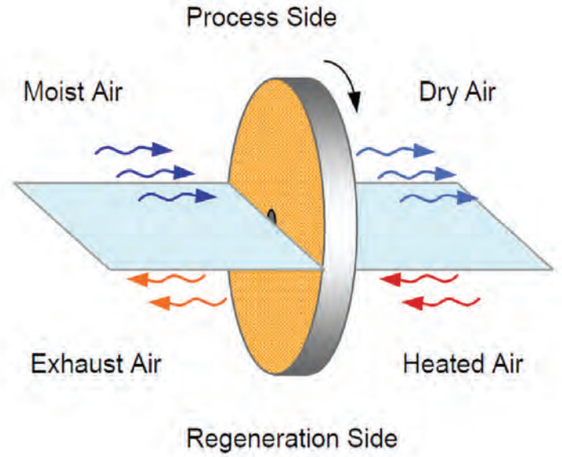
While these spaces will not have active mechanical systems, the design of passive features will emphasize proven features to provide comfort. The addition of a ceiling fan and thermal mass, common features of houses on the island, will be used to provide additional comfort and temper the highest temperature days. Breezes will be captured with an open, cross-ventilation design. And careful shading design will block direct solar from overheating occupants.

laboratory system overview

The conditioning system for the laboratory is summarized in the diagram below.

1. A desiccant wheel removes humidity from incoming air. Cooling is still required, but with the wheel it can be provided by warmer water.
2. Outside air intake will be positioned to capture dominant winds across site, minimizing fan power and allowing some blow-through ventilation in case of system failure.
3. Solar hot water panels provide heat to regenerate the desiccant wheel dehumidification system.
4. An insulated tank stores solar hot water to provide desiccant regeneration during nighttime ventilation.
5. A titanium heat exchanger is used to reject heat from the heat pump into the seawater outflow.
6. High efficiency heat pump units provide 15C process cooling water to facility. Modular units are easily removed and replace at end-of-life and essentially maintenance free (similar to a home refrigerator).
7. A radiant slab absorbs heat from the space; slab is cooled to a surface temperature of 21-23C using the process cooling water.
8. Process cooling water is supplied by a pipe loop with connection points available throughout the space for point-of-use water coolers, fan coils, or other equipment.
9. Humidity exhaust fan power usage can be reduced by incorporating a thermal chimney to create a heat-driven exhaust during peak solar time.
10. Air distribution is primarily through the space, not ducts. An open plan lab facilitates this approach, although careful layout of hallways and small transfer fans for the few closed rooms are expected.
11. The fumehood will operate continuously, providing a minimum level of exhaust from the laboratory space and preventing humidity buildup from the tanks.
12. As required to control humidity and provide ventilation (primarily control to odors), additional air can be exhausted from the space via the outdoor air unit where it improves desiccant dehumidification effectiveness (latent cooling recovery).





Desiccant wheel with outdoor air dried on the top half and regeneration air on the bottom half

process cooling (chilled) water generation system

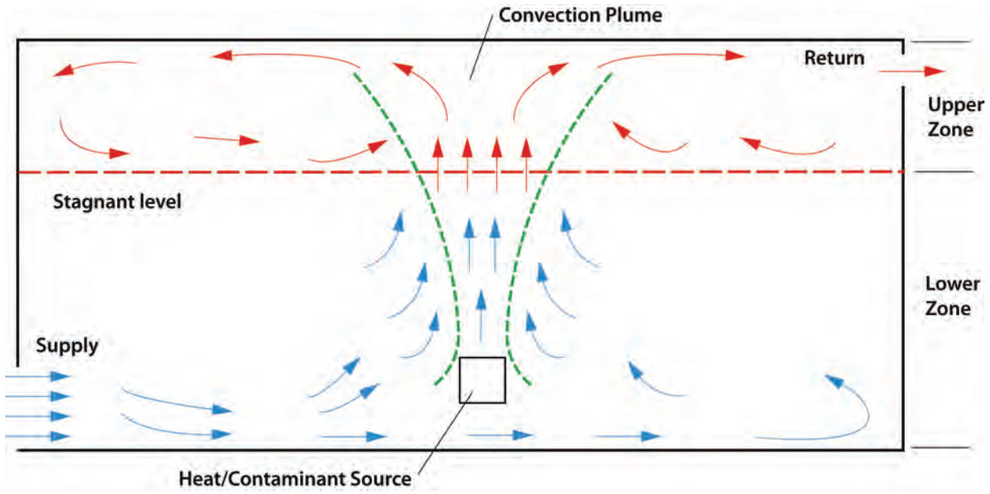
To achieve the control desired in the laboratory spaces, some mechanical compressor based cooling will be required. While the conditioned areas will, by design, be habitable without mechanical cooling, the desired comfort control is simply not possible without it in this climate. To minimize the amount of mechanical equipment required and centralize it indoors and protected from the corrosive environment, a chilled water loop is recommended. A pair of water to water heatpumps will be used to create a process cooling water loop that will then be used to supply any cooling loads in the building. This cool water will also be supplied to the adjacent cooled office spaces. All cooling systems will be optimized to use 15C (60°F) water, a relatively high temperature for cooling water that significantly improves the heatpump units efficiency.

Heat will be rejected to the seawater system's outflow to the sea. Due to the low loads expected, the heat rejection will be insignificant to the volume of the bay, although the worst case heat rise in the rejection water (estimated to be 5F-8F over the intake temperature) should be determined and its acceptability verified. To ensure longevity in the harsh corrosive environment of seawater, a heat exchanger with pressed type titanium will be used in contact with seawater. There must be some method of rejecting heat to the environment, and this will provide a very reliable method of heat rejection that will not have the maintenance, hurricane vulnerability, and corrosion problems of a typical cooling tower or dry cooler (a radiator type fan and coil).

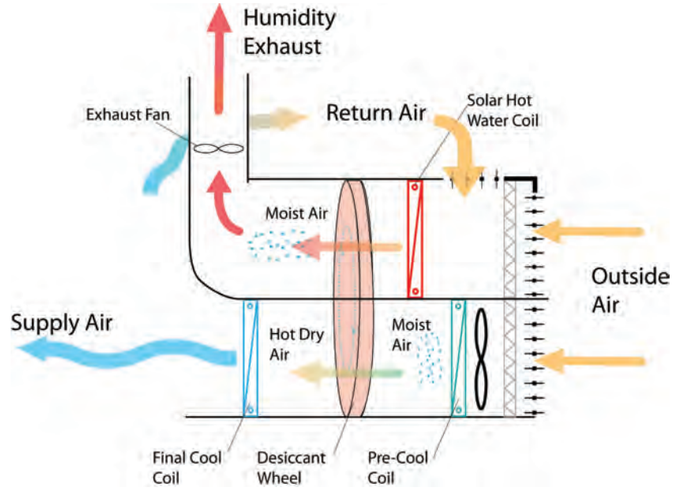
lab requirement overview

The lab spaces need to provide a comfortable space for extended work. In particular, extended lab work in the high ambient humidity conditions is a comfort concern so some degree of air conditioning is required to provide a drier indoor environment. A space design criteria of 78F and 60% humidity is targeted. This is in line with the typical comfort envelope of 78F at 60%, and will meet the client's expectations for a space conditioned, but not to quite the same degree as a full featured, sealed traditional mainland laboratory.

There are three key elements to the laboratory: Ventilation, dehumidification, and sensible cooling.



Displacement ventilation concept



Desiccant wheel dehumidification air handler

lab ventilation

Ventilation will use the constant volume laboratory fume hood as the primary exhaust fan. Constant volume exhaust hoods are very simple devices – just a constant speed fan. The disadvantage to constant volume hoods is that they cannot reduce the amount of air they are exhausting when not in use and exhaust air is energy intensive to replace. However, the labs require a certain level of continuous ventilation to control humidity. By utilizing an open floor plan for the lab that joins all the lab space into a single ventilation zone and minimizing the number of hoods, the constant airflow of the hood is less than the constant airflow required just to maintain humidity control. As long as an open floor plan is used for the majority of the lab space, constant volume hoods are not an energy penalty.

More airflow than used by the hood (or hoods) will draw out may be required for humidity control. To remove this air, a displacement approach will be used. Cool air naturally pools near the floor, in the occupied zone of the space, and is pulled towards thermal plumes, which are the updrafts of air around heat sources such as people or electrical equipment. This natural tendency can improve system efficiency if the system minimizes air motion in the space to allow for stratification and then pulls exhaust air out at the highest, warmest level. The exhaust air not used by the fume hood will be pulled from ceiling level back at the main desiccant air handler, where it will be used to help dehumidify incoming air before being exhausted.

lab dehumidification

Dehumidification is an energy intensive process that is traditionally done by using compressor based cooling to cool air down to around 6C, which is where enough water condenses out. Cooling air to that very low temperature is energy and equipment intensive. There is an alternative approach that uses a desiccant wheel and heat. Desiccant applied to a number of air passages through a wheel (a honeycomb pattern) absorbs water out of incoming air blown through the wheel. Then, the desiccant wheel rotates out of the incoming air stream and into a hot air stream, air hot enough to carry away the water from the desiccant. That hot air is passed through the moisture laden desiccant to dry it so it can be rotated back into the supply air and continue the dehumidification cycle. The hot air required to dry (regenerate) the desiccant will be generated by solar hot water panels supplying a heating coil.

The air leaving the wheel is dry but quite hot. Coils will be used to drop the air temperature, ideally with water cooled by the heatpump heat rejection loop that is cooled via a heat exchanger by spent seawater and then from the process cooling water loop if required. The ideal system concept is seen in the figure above (the energy model discussed later assumes both coils use process cooling water, a conservative worst case energy consumption assumption). A custom, or “built up”, unit is recommended to allow for optimizing for minimal fan power, but there are some packaged units now available to provide this kind of operation.

The benefit of a desiccant system over a traditional dehumidification package is that no compressor based cooling is required for the dehumidification (but it is needed for final tempering of the delivered air) and solar heat can be used to power it. Solar heat will be produced by solar hot water panels at 160F and stored in an insulated tank to allow for night time operation. The wheel itself requires no complex maintenance – it can be cleaned by spraying with water and has little mechanical wear as it rotates at less than 1 RPM.

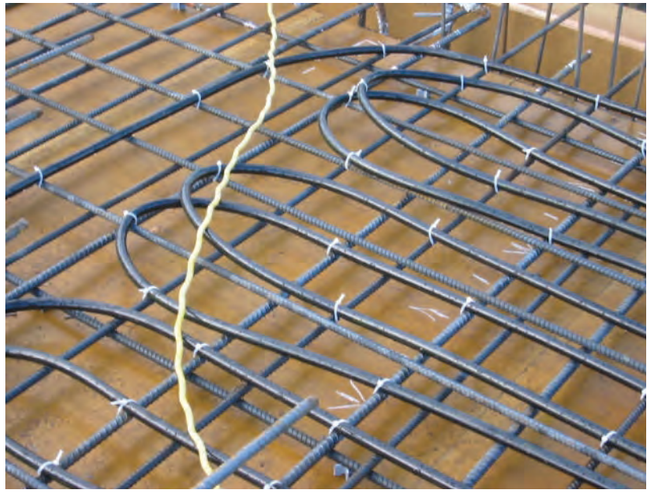
Radiant tubing ready to have 3” thick topping slab poured over it to create a radiant slab floor

lab sensible cooling

With dry ventilation air controlling the space humidity, sensible cooling (temperature control) will be provided primarily by a radiant slab connected to the process cooling (chilled) water loop. A radiant slab is cooled by embedded plastic tubing that has cool water flowing through it. The cool slab absorbs heat from the space and ultimately transfers it to the process cooling water to be removed by the building heat pump. In this case, the process cooling water will be a relatively warm 15C (60F), or even higher if space loads are lower than expected.

Radiant slab systems have very low maintenance requirements, with the only moving part being a pump and control valve. The tubing encased in the slab is a very tough plastic material called PEX (crosslinked polyethylene) which is inert to any chemical reactions and able to bend and stretch without leaking. The main drawback to radiant is limited capacity; the floor surface cannot be cooled too far without risking condensation, limiting the maximum cooling available.

Radiant slabs are simple to control. The slab will be maintained at a set temperature between 20 C and 23 C. As the space temperature rises, the slab will naturally absorb more heat creating a self-regulating system. There are no ducts that can harbor mold. The cooling delivery device is the floor itself – an impermeable, washable surface.



Radiant tubing ready to have structural concrete slab poured around it to create a radiante slab floor

A typical radiant manifold that distributes water into the slab tubing circuits

A mobile chilled water fan coil unit

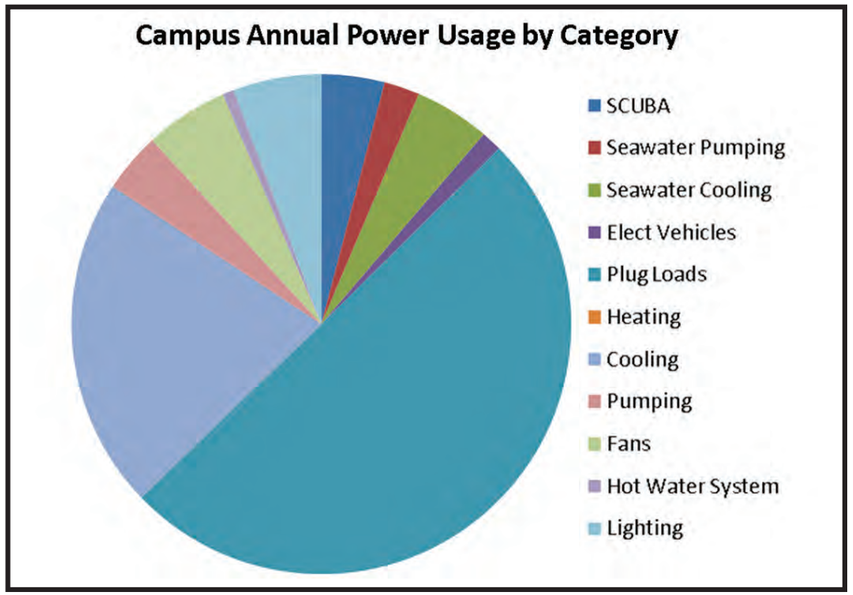
auxiliary cooling fancoils

In laboratories aiming to avoid oversizing their mechanical systems for cost and efficiency reasons, a fall back method of efficiently providing additional cooling if future usages required it is recommended. If future plug loads do exceed the design assumptions, portable fan coils that, by design, easily connect to the process cooling water loop that is accessible throughout the laboratory provide additional cooling as necessary. The portable fan coil would be on wheels, have internal controls, and connect by quick connects (leak free and simple, used often in industrial applications) to process cooling water connection points located throughout the lab. No ductwork is required with these spot cooling devices.

At least one fan coil would be included at building startup. Often, implementing a nominal cooling fee for use of a fan coil, enforced by submetering of plug load energy use/heat load per module, is more effective than any rarely-read facility efficiency policies in promoting the selection of more efficient lab equipment. Note that it is critical that this unit use the process cooling water loop, not an internal compressor – it should rely on the efficient building cooling water production system, with the unit itself providing only a fan, cooling coil, and thermostat controls.

museum storage / archive space

The museum storage/archive space is more challenging due to the tight control requirements and constant dehumidification environment. A small, dedicated dehumidification unit will be provided to control the humidity and temperature in this space. Air will be dehumidified in the traditional manner, by using compressor based cooling to cool the air down to 55F to condense out water. As the design progresses, a desiccant wheel assisted unit should also be considered to improve efficiency. The volume of outdoor air introduced will be minimized to reduce the humidity load. In case of dehumidifier failure, outdoor air will be shut off entirely. The efficiency of this kind of system will be only standard, but it serves a very small space and load so the annual impact on energy use will be minimal. The highest priority is reliability and humidity stability.



Energy model results by end use (kWh / yr)

energy modeling and budget - overview

To achieve a zero energy building requires an early and rigorous accounting of the building's energy requirements. The popular EQuest energy simulation package was used to perform an 8,760 hour analysis using Charlotte Amalie – Harry S Truman typical year weather data to estimate the energy use of the facility. A simplified block structure was used for the building since floor plans are undefined at this time, but program gross footages, expected daylighting harvesting, construction types, internal loads, orientation and other key features match the proposed plan for the campus.

Beyond the standard building loads, in this project there are a number of unusual loads including: SCUBA compressor load, electric vehicle charging, seawater system pumping, seawater system cooling, and laboratory equipment plug loads (both the direct electric consumption and the cooling of the resultant waste heat). All of these loads have been evaluated to a preliminary degree and input into the energy model.

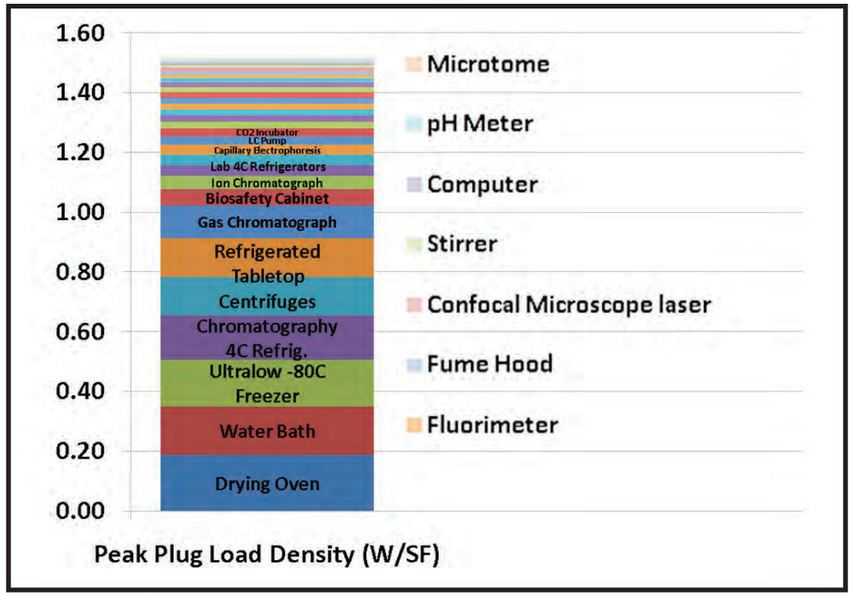
energy modeling - scuba compressor system

To support research operations, approximately 120 SCUBA tanks per day will need to be filled. The compressed air to do this can be generated during the daytime, when the solar array will be producing the most power, and stored to provide SCUBA tank charging in the evening when the majority of divers will return. Shifting compressor operation to the daytime reduces concerns of compressor noise causing annoyance. An electric compressor will be used with an annual energy consumption of 31,000 kWh/yr included in the energy model.

energy modeling - seawater system

Total tank volume (including future)				132,000 Gallons
Percent of tanks cooled				25%
Total Cooled Tank Volume				33,000 Gallons
Quantity of Total Cooled Tank Volume at 20C	25%	8,250	Gallons total	
Quantity of Total Cooled Tank Volume at 23C	25%	8,250	Gallons total	
Quantity of Total Cooled Tank Volume at 25.5C	25%	8,250	Gallons total	
Quantity of Total Cooled Tank Volume at 28C	25%	8,250	Gallons total	
Daily tank turnover				50%
Annual Cooling Energy Cost Estimate				37,000 kWh

Energy Usage	kWh / yr
SCUBA	31000
Seawater Pumping	18000
Seawater Cooling	37000
Electric Vehicles	10000
Plug Loads	385000
Heating	0
Cooling	165000
Pumping	30000
Fans	41000
Hot Water System	6000
Lighting	44000
Total	767000



Peak plug load initial survey result

A key component of the facility is reliable access to seawater. A continuous source of seawater from the ocean must be available at all times to support research tanks and aquaria. This system will be designed with redundant pumps and two separate intakes. All pumps will be equipped with variable speed drives to maximize system flexibility and efficiency.

There is an opportunity to recover energy by incorporating an electricity generating turbine in the seawater return pipe to the ocean. A turbine would generate power from the energy of the water falling down the hill from the laboratory back to sea level. Appropriate microturbine generators are available, but fouling and first cost are significant design challenges. In this environment, it is unclear if a microturbine would provide renewal energy at a lower cost than additional photovoltaic cells, but it should be analyzed further.

The electricity consumption for seawater pumping is estimated based upon an average daily seawater consumption of 100,000 gallons and a total system pressure drop (including filters) of 50 PSI. The annual seawater pumping energy use is estimated to be 17,000 kWh/yr.

The other energy aspect of the seawater system is the energy required to provide cool seawater. This energy is estimated based upon a cooling system efficiency of 1 kW/ton cooling (an EER of 12), an average water intake temperature of 29C and the estimates of the daily average amounts and temperatures of cooled tanks in the table on the left.

energy modeling - laboratory plug loads

It is assumed that every effort will be made to minimize internal plug loads. Selection of efficient equipment (particularly refrigerators, freezers, and compressors) has a significant financial savings with the high cost of power at this site (be it from the local utility or the photovoltaic array).
To predict the plug load density of equipment in the lab, a list of typical equipment was created. The power consumption and heat load for the equipment was then determined from manufacturer's data, field measurement of similar equipment or estimates from the electrical circuiting data. The results of this preliminary survey are shown above (square footage is gross square footage of lab).

The peak calculated average plug load of 1.5 W/sf across the laboratory corresponds well with actual measured loads in operating laboratories. This load is far lower than the initial desired plug load capacity – again a common situation. Further plug load research, including more detailed equipment lists and spot power measurements on actual operating equipment, should be undertaken in later design stages. At this phase of the project, a significantly higher plug load than the 1.5 W/sf of the initial load survey was used for design due to uncertainty about the final equipment and future capacity required.

To account for uncertainly and future loads, the calculated plug load density of 1.5 W/sf was doubled and an additional 0.5 W/sf was the added for the load of the low pressure compressed air system. The energy model uses the resulting 3.5 W/sf as the peak plug load; in the model, the laboratory space operates at peak load for 9 hours a day and drops down to 30% of the peak load at night. Note again that this plug load density was applied to the programmed gross square footage; another conservatism built into the calculations.

energy modeling results

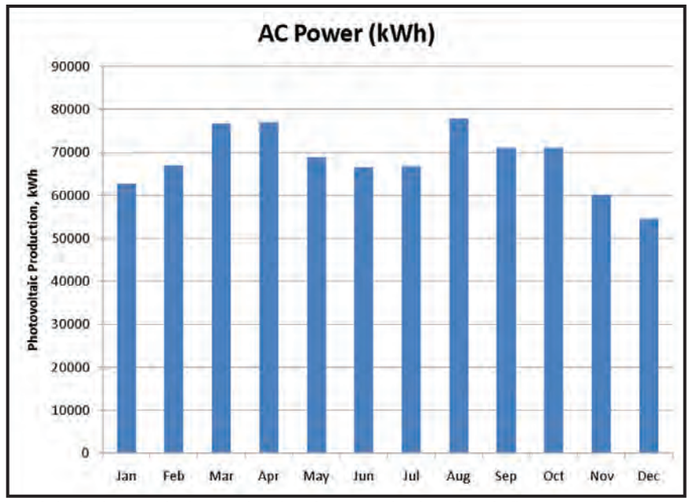
The results of an energy model at this stage are useful for estimating the magnitude of energy consumption and the largest energy consumers on the project. They are expected to change as the design is refined and floor plans become set. Based upon reasonable and conservative estimates, the model energy usage results seen the table below form an energy budget to evaluate whether a net zero target is achievable.

The model results also offer a power insight into the aspects of the project that offer the most potential for energy savings as the design progresses. A simple pie chart of the Campus Annual Power Usage by Category offers quick insight into where the greatest energy reductions can likely be found.

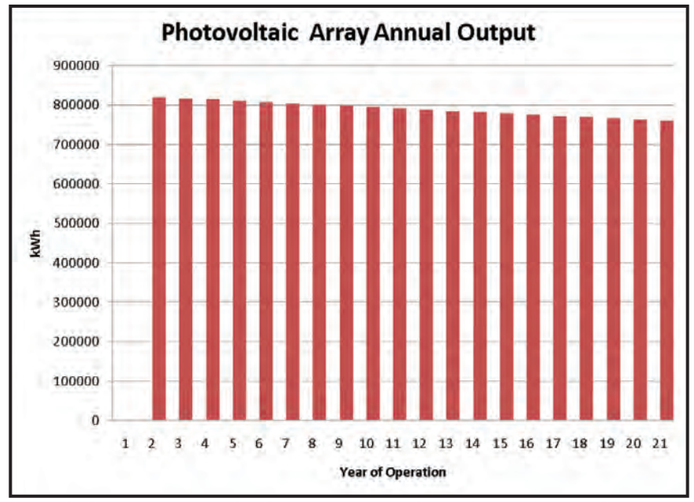
The largest area of power consumption based upon current estimates are the plug loads, followed by the cooling – which is driven largely by the need to remove plug load heat from the laboratory. It is critical that the design process both properly estimate plug loads and actively provide occupants the ability to manage them. During the design process, a detailed plug load study should be done. A design case equipment list should be defined and accurate heat load data collected for all the equipment, ideally by direct power measurement of the specific lab equipment. A reasonable future growth factor is prudent, but it should be clearly defined and applied.

The final design can incorporate a number of features to reduce plug load power consumption. For example, providing outlets that are controlled by occupancy sensors is a method of giving occupants an easy way to ensure non-critical equipment is shut off at night. Sub-metering power consumption on a per-module basis and charging the occupants based upon their actual power usage is a very effective way to encourage efficient equipment usage; to avoid insulting prize researchers, the same effect can be harnessed by not billing for power but rather providing refunds to the most efficient labs.

The energy model results combined with an analysis of the renewable energy resources available at the site provide the analytical support for the feasibility of the net-zero goal.



Modeled photovoltaic production by month showing influence of weather



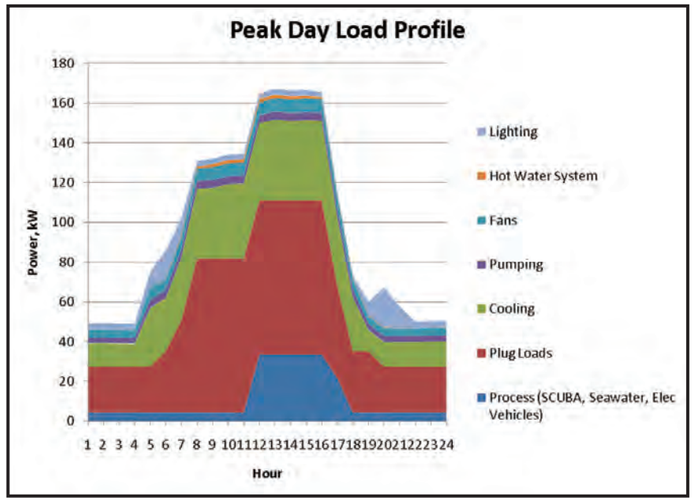
Annual photovoltaic production for years 1 through 20 of operation

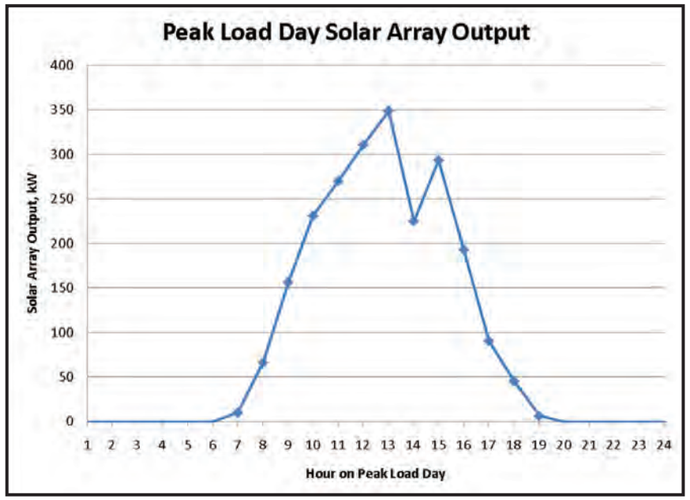
solar system sizing and payback

At this site, the primary renewable energy source is solar. To evaluate the potential for solar, an hourly simulation tool called the System Advisor Model provided by the National Renewable Energy Laboratories (NREL) was used. Hourly weather data for a statistically typical weather year at the relatively nearby Charlotte Amalie – Harry S Truman airport provided the hourly solar radiation data required to model annual PV power production. The software also accounts for typical losses in inverters and annual performance degradation over time.

It is assumed that the photovoltaic modules will have a fixed mount pointed south at an angle approximately equal to the latitude of the site, about 18°. A high efficiency rigid panel module was chosen as the basis of design (the Sunpower SPR-315E-WHT) with performance as tested by Sandia National Laboratories. The target annual power production was set to the annual campus power consumption predicted by the energy model of 767,000 kWh/yr. Photovoltaic panel output degrades over time, (0.4% per year), so the array output in year 20 was used. Based on these assumptions, a 2,600 m2 (28,000 ft2) array of 1,600 modules with 34 inverter units is required to fully offset all site electricity usage and achieve net-zero operation.

Simple Payback	5.3 years
Simple Payback is defined as the Year Zero implementation cost divided by the Year One cost savings. It is a rough measure of how quickly your investment is recovered. It does not account for the effects of inflation, depreciation, competing investments, maintenance costs, nor does it ask if “do nothing” is an option.	
Relative Net Present Value (RNPV)	$6,380,599
Net Present Value is a time series of cash flows, both incoming and outgoing, and is defined as the sum of the present values of the individual cash flows. Both the baseline (purchase power from grid only) and the proposed scenarios compared here have their own Net Present Value. The difference between these two NPVs is termed the Relative Net Present Value. We present only the RNPV here, based on the differential costs.	
Internal Rate of Return (IRR)	24%
IRR equals the percentage rate by which you have to discount the net benefits over our 20-year time period until the point that they equal the initial costs. IRR is related closely to net present value. The discount rate you would need to apply to your benefits to obtain a net present value of zero is the rate of return calculated by IRR.	
Return On Investment (ROI)	632%
Return On Investment is the ratio of money gained or lost (whether realized or unrealized) on an investment relative to the amount of money invested. In this analysis, we account for the effects of inflation. We use 20 years in this analysis and a discount rate of 4%.	





In the first year of operation, when the photovoltaic cells are at their newly manufactured efficiency, the campus will actually generate 50,000 kWh more than it consumes. That power will be provided back to the local power grid, making the campus not merely netzero, but net-negative. And the campus will remain a net power producer, for the first two decades of operation.

The high total cost of local electricity of $0.49 per kWh (Atlanta, GA is about $0.07 per KWh) makes the financial argument for onsite photovoltaic generation quite compelling. A simple payback of 5.3 years and a net present value of over $6 million is the result of an initial financial analysis as summarized in the table to the left. The simple payback improves if the array is sized by its year one capacity.

A critical issue to consider when evaluating payback is the correct sizing of the photovoltaic array. Surplus energy generated by the array will provide green power back to the grid, but the money earned from generating more power than the campus uses on an annual basis is negligible. Extra generation capacity must be essentially given away, a benevolent gift of green power to the island; oversizing the array gains no financial benefits for the additional upfront cost. This makes the plug load estimate, the largest component of the annual energy consumption driving the array sizing, critical to achieving a cost effective netzero installation. For example, if the photovoltaic array is sized for a 6 W/sf plug load but the building only consumes 1.5 W/sf, as the initial plug load study and similar lab benchmarking suggests is possible, the simple payback is pushed back to 7.4 years.

The best payback will be achieved by installing exactly as much photovoltaics as required to produce the power used by the campus over the course of a year, no more. Accurate load estimates and modeling is required to achieve this, or a phased buildout of the photovoltaic array where a portion of the capacity is added after the campus is in operation and power usage is known.

A final design objective is to match the site electrical load profile over the day to the varying solar electricity production profile. In a typical building, this is difficult to do – the load (lights, cooling, fans, plug loads, etc) are instantaneous and cannot be shifted to other times. But at this site, a number of the process loads can be shifted. The seawater storage tank can typically be filled during sunny hours. Air can be compressed and stored for use in charging SCUBA tanks during the day (when noise is also less of a concern). And electric vehicle chargers can be set on timers to maximize daytime charging. These measures require design accommodations, but are feasible and can result in a peak day profile that approximates the solar production profile. This will minimize the sales required to the grid and makes the campus more robust to power outages, extending the hours that the solar array and small supporting battery room can support normal operation when the grid power is unavailable.

To allow the photovoltaic system to function as a reliable source of power for redundancy purposes, a moderately sized battery bank will also be provide. The battery bank will be sized to provide 8 hours of critical facility loads. Charged during the daytime, the battery bank will support critical systems during the hours when solar power is not available and the grid is down. In normal use, the grid will be used at night with the kWhs used ‘paid back’ during the sunny daytime period. Battery bank usage will be minimized to maximize the life of the batteries and avoid the energy loss inherent in charging batteries.

nontraditional opportunities

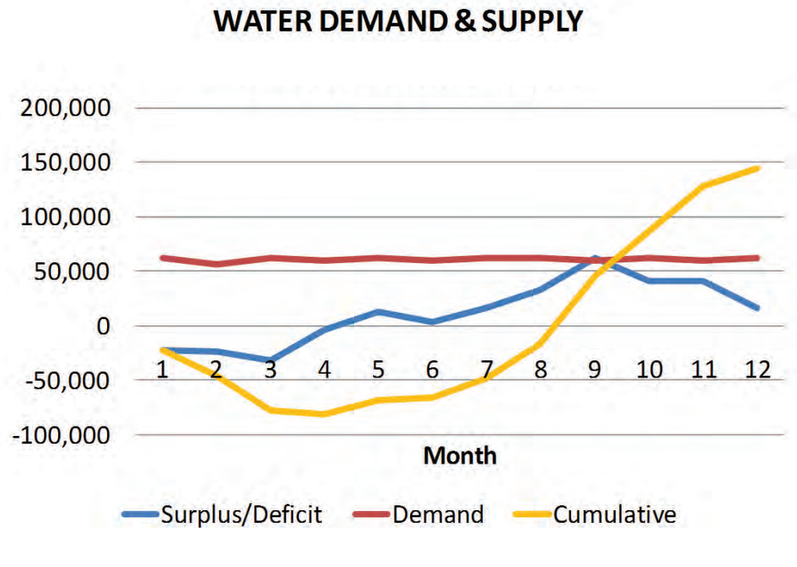
The use of solar photovoltaics to produce electricity is a mature technology and well suited to this site. Solar hot water is even more established and provides a lower cost and higher efficiency capture of solar energy. There are additional renewable energy opportunities that may not have as attractive a payback period but offer opportunities to diversify the site energy production (improving reliability) and/or serve as educational features.

One opportunity is to use a wind turbine to mechanically drive either a seawater pump or an air compressor. A direct drive system will be over 25% more efficient than photovoltaics producing electricity to drive electric motors. The SCUBA air supply system in particular is attractive for this approach since it will include a large storage tank that would easily accommodate the variable wind power production, compressing air when the wind blew.

Another renewable opportunity is to incorporate thermal stacks into the building structures to reduce the fan power required for ventilation air movement. The stacks could be designed to heat up by sun that falls on them, or assisted with a hot water coil located inside the stack and supplied by solar hot water. Such a stack is unlikely to entirely replace a fan in the critical fume hood application, but it could in less critical applications such as ventilation of visitor areas or classrooms.

There is also opportunity for wind capture. There is a consistent wind across the site that could be captured to reduce fan power. The building structures can direct wind into building intakes to reduce fan power. It is also possible to incorporate airfoil shaped caps over stacks to create a wind-powered suction to help ventilate the buildings, however it is a difficult design challenge to ensure they could survive hurricane conditions.

A final opportunity to save first cost and maintenance is to configure the site to allow for a gravity fed fire sprinkler system. This would require a fire water tank be located 30’ or more higher than the ceiling in the highest sprinklered space. It would eliminate the need for fire water pumps. This is mostly a maintenance issue, since fire water pumps are only used in case of fire, so their annual energy use is hopefully negligible (just monthly test starts). The impact of elevation (a pumping cost) and siphoning (a pumping saver) on energy use at this site will be carefully considered throughout the system design as it impact the energy usage of many systems (seawater pumping, rainwater supply, waste treatment).



UV disinfection units - bulb(s) is in center, accessed from end; lower cost PVC units also available

.6 water systems

overview

The focus of the plumbing system design shall be the supply of all domestic water needs from rainwater captured and stored onsite. All “waste” streams, including toilets, kitchen, and laboratory sinks, shall be treated onsite and the water recovered for appropriate secondary uses.

Drinking water will be provided from rainwater captured and stored onsite in cisterns primarily below grade under the buildings.

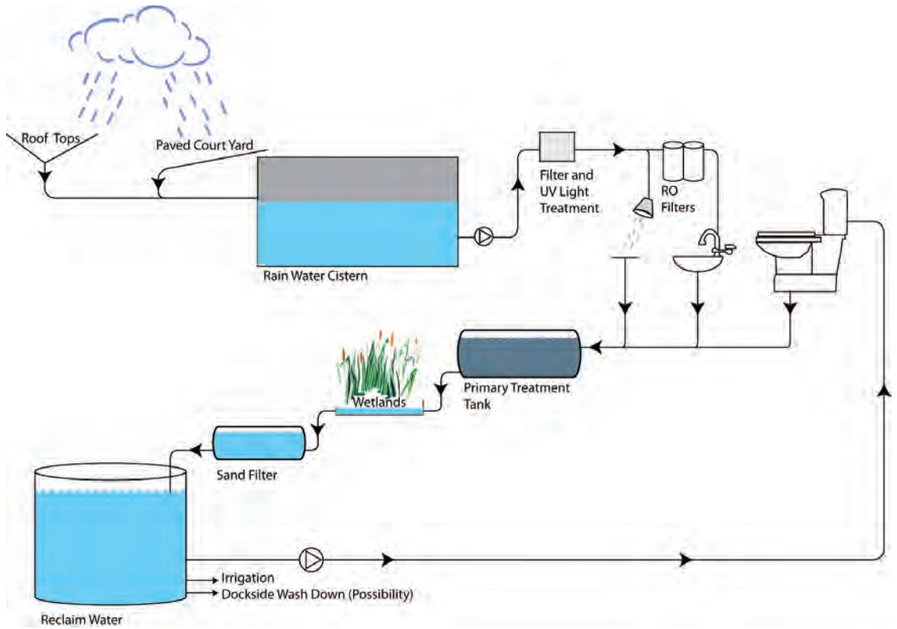
Low-flow fixtures will be used for all showers and lavatory sinks to reduce the domestic water load by a minimum of 40%. Standard flow toilets and urinals will be used, with ample flushing water available from reclaimed water produced by the onsite waste treatment system.

A small constructed wetlands will be part of the waste water treatment system. Local plants can be used in this lined gravel bed area; the primary purpose of the plants is to provide a root structure for the processing to take place in, so the specific plant type and biology is not critical.

The diagram above summarizes the basic water cycle on the site. Rainwater is the primary source of water, with all used water collected and treated to provide for flushing toilets and any irrigation needs on the site. Rainwater harvesting will provide all the water needs for this site.

rainwater harvesting

As is common on the island, the only source of potable water shall be collection of rainwater. The US Virgin Islands require that all buildings include a cistern, with the size varying depending on the type of building. Based on the local code, Title 29 Chapter 5, a cistern of at least 370,000 gallons is required for this facility. This campus is likely



Site water cycle summary

not bound by this code and a careful statistical analysis (gamma distribution based simulation) is required to determine the optimal size, but since site occupant capacity is limited by the water collection larger is advisable. To allow for process water usage and ensure capacity for dry seasons and potentially additional occupants, we recommend a size of 500,000 gallons at this stage of design. Ultimately, the system must be sized for the 1 in 10 drought year; only a full analysis can accurately size the cistern.

A reasonable starting assumption for occupant water consumption is 49 gallons a day. Typically, 21% of that consumption is used for flushing toilets, which in this case will be done with treated reuse water dropping the daily potable water requirement to 39 gallons per day. In the sample year shown in the graph below, there is plenty of water available with a catchment area of only 32,280 square feet provided the cistern is properly sized. This is a minimum amount of roof catchment area required; all roof area will serve as water catchment to improve resilience to dry conditions, provide a safety factor, and allow for future growth in residents or laboratory water consumption.

The construction of the cistern itself is primarily an architectural challenge influenced by the site layout and excavation conditions. Options range from buried fiberglass tanks to cast in place concrete tank to a flexible bladder tank with only a sunshade. From an energy standpoint, it is best if the tanks are located near but not above the elevation of the collection surfaces, to take advantage of gravity feeding to minimize pumping energy. To best align with local practice, concrete cisterns cast into the foundations are the current design recommendation. If this approach is found to be infeasible, fiberglass tanks are a reasonable alternative. A flexible bladder tank offers costs savings, but carries maintenance and higher failure risks.

The rooftops make the most natural collection surfaces, with collection from solar cells, standing seam metal roofs, or concrete all options. Due to storm damage concerns, eliminating exterior gutters and downspouts by design is attractive. One option is to have a controlled open cascade off the roof to courtyards below designed to serve as rainwater collection basins.

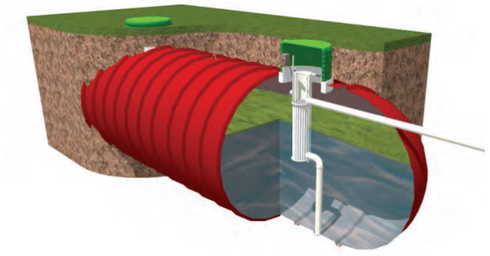
rainwater treatment

Because the cistern must hold water continuously, it will require treatment for grit, fine particles, algae, bacteria and some microinvertebrates that will enter or grow in the system. All of this is mostly harmless, but we are now used to pure drinking water so a treatment system will be provided.

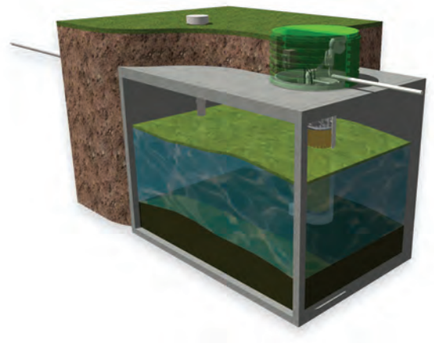
Treatment for drinking water will be filtration followed by a point of use RO filter. The RO filter carries an energy cost due to the pumping power it requires, but reliably provides pure water using a common and widely supported technology.

Water for showering will receive a lower level of treatment, more comparable to the treatment level required for swimming pools. Treatment will consist of a filtration step followed by a UV light for disinfection. This offers a good level of treatment at a lower cost than the RO filtration used for drinking water. However, maintenance of UV can be higher than with RO.

Filter options



waste water treatment diagram



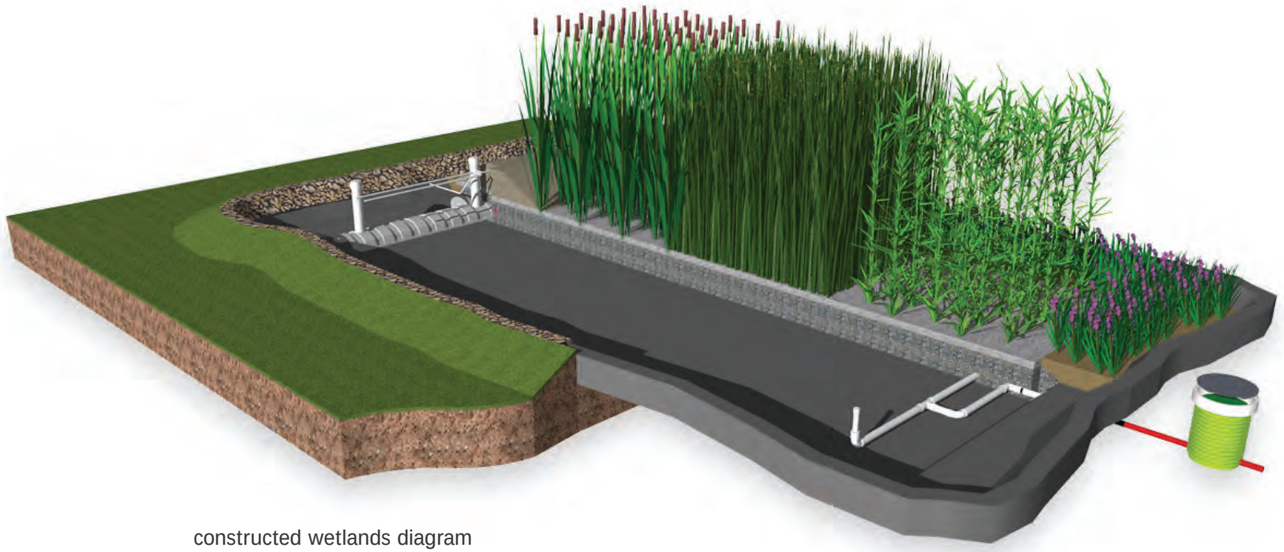
primary treatment tank diagram

wastewater treatment

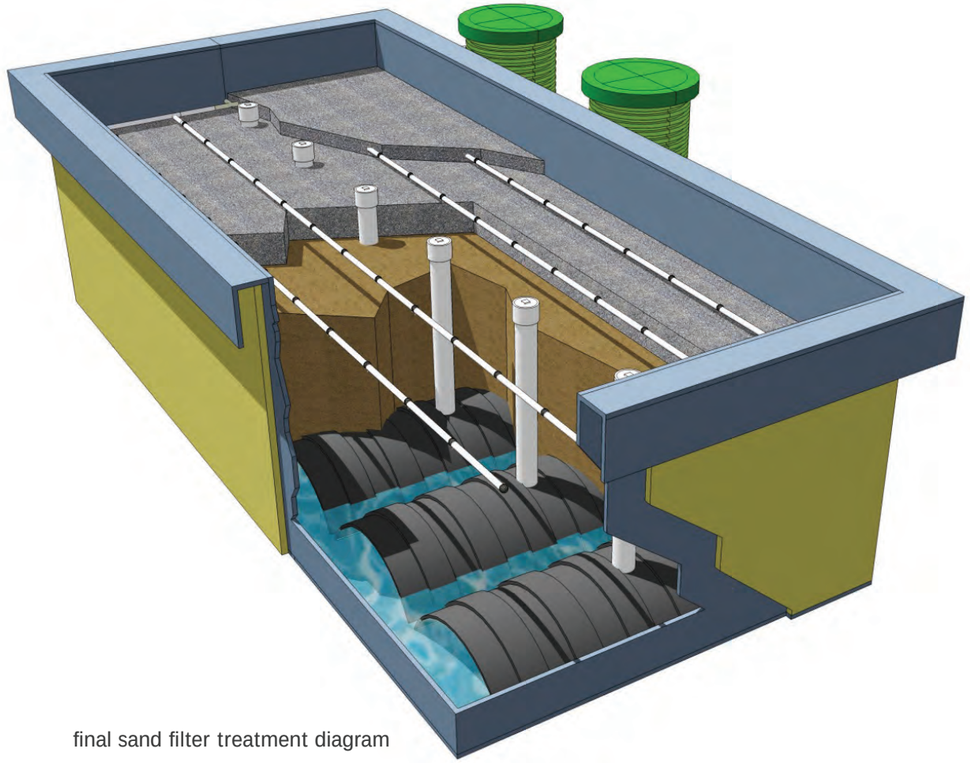
Onsite treatment of the wastewater is a critical leg of making the campus self sustaining. While there are many proprietary mechanical systems available that can do this task, a simple passive approach that needs nothing more complex than a standard well pump is recommended. The system provides enough treated water to supply all toilet flushing, reducing the demand on the rainwater system.

primary treatment tanks

The passive approach utilizes a three step process to clean the water. The first step is the primary treatment tank. Waste water will be collected from all the site sources and pumped to the primary treatment tank where resident bacteria and organisms perform the first step in breaking down the waste. An ordinary tank of about 4000 gallons capacity is expected for this component to handle the waste from all campus sources. Maintenance requirements of this tank are the same as a standard septic tank.



constructed wetlands diagram



final sand filter treatment diagram

constructed wetlands

After the initial digestion in the primary tank, the waste water is pumped into a constructed wetlands. This wetlands is simply a carefully sized concrete lined depression filled with gravel that receives a wetland plant covering. It can be located almost anywhere on the site (although closer to the primary tank will reduce the already-small pumping energy consumption) and will have a footprint of around 1000 square feet. The specific type of plants used is not critical because it is their root structure that is important to provide the surface area and media to support a second stage of biological waste breakdown. It is most important to use native plants or other plants that will thrive in the local climate and environment, including tolerating hurricanes and salt mists.

final sand filter treatment

The final stage is a sand filter, a simple workhorse filtration technology that is commonly used in municipal drinking water supplies. The sand filter has a foot print of about a quarter the constructed wetlands. A generic well pump is the most complex device in the system, allowing for very simple maintenance and local support. The water turbidity is tested via sensor at the final tank and simply recirculated through the system again automatically if it does not meet the desired standard.

Total residence time in the system is several days. A catastrophic accidental discharge into the system could be caught at the primary tank, pumped out, and the system restarted if necessary. However, the system is very robust and able to accommodate most foreseeable discharge events, with very high volume discharges (many gallons) of harsh cleaning chemicals such as bleach more likely to disrupt operation than any expected lab discharges or spills.

The final treated water will be disinfected by a UV light system and used for toilet flushing and subsurface irrigation. A 5 hp recycled water pump will be used to pressurize a recycled water tank that will supply the water to the desired building fixtures. Overflow, if any, from the rainwater cistern will be piped to the on-site waste water treatment system.

All site water for toilet flushing will come from the treatment system, which will supply a surplus of water for this purpose so low water flow toilet technologies are not required. Excess treated water can be used for subsurface irrigation of plants or even crops, although it is recommended that as a fail-safe approach in case of a system failure edible plants should be chosen that do not contact the water directly (no tubers).

example of constructed wetlands in campus setting

water systems – waste and supply flows summary

There will be three water harvesting streams from the building. They shall be defined as follows:

- Sanitary Waste & Vent – To be routed to the onsite treatment system and treated for use in toilet flushing, irrigation and possibly for rinse down at dockside.
- Lab Waste – The small volume of very hazardous chemicals used will be collected in containers for offsite treatment. Laboratory sink outflow will be benign acids and bases and routed to the onsite treatment system.
- Storm Water – Rainwater captured from roofs is to be routed to a storage cistern and becomes the site domestic water supply. With appropriate treatment (UV, point of use RO, ozone are options), it will be reused in the building for potable use. Overflow to the on-site waste water treatment system and ultimately site features such as bioswales.

There will be four water supply streams inside the building. The water supply streams shall be defined as follows:

- Domestic Water (Cold &Hot) – Rainwater cistern will supply lavatories, showers, drinking fountains (cold only), kitchen sinks, emergency shower/eyewash stations with filteration, UV treatment and local RO for sinks.
- Industrial (Cold & Hot) Water – Rainwater cistern will supply the laboratory sinks and all of the laboratory equipment with industrial water as required. The industrial water system is identical to the domestic water system, but with a double check backflow preventer to ensure no risk of backflow somehow contaminating the cistern.

- Sea Water – Supplied as required by separate seawater system.
- Treated Reclaim Water – Water reclaimed by the treatment of sanitary and lab waste. To be used for toilet flushing and irrigation needs as required.

storm water (s)

Storm water from the building roof shall be discharged by gravity into the underground rainwater cistern. All rainwater is to be collected in the cistern until it is filled to the point of the provided overflow release.

laboratory waste and vent (lw and lwv)

The laboratory waste system shall include provisions for future installation of an in-ground neutralization tank with utility vault and remote monitoring system. If lab usage changes in the future, this will allow the lab waste to be easily separated from the other sources of waste water.
Piping material shall be mechanical-joint polypropylene for above-ground piping and schedule 80 PVC for underground piping.

domestic cold water (dw)

Domestic cold water shall be connected restroom lavatories, showers, non-lab sinks, break room areas, kitchen sinks, and water fountains. Domestic water shall also be provided for the emergency eyewash and safety showers. A separate industrial water system shall be designed for the industrial fixtures. Domestic water pipe material shall be type L copper above grade, type K copper underground. All buried domestic water pipe will be protected with 20 mil polyethylene tape and/or pipe sleeve.

domestic hot water (dhw)

Domestic hot water shall be supplied to the restroom lavatories, showers, non-lab sinks, break room areas, and kitchen sinks. The domestic hot water system shall be designed as an on-demand circulating system that shall provide hot water quickly and efficiently. The cold water supply line shall be used as the return leg of the recirculation system. This type of system shall also reduce the amount of water wasted down the drain while waiting for hot water to arrive.

Domestic hot water will be generated via solar and stored in an insulated tank to carry nighttime and early morning loads. The residence showers and lavatories will be provided with local solar hot water collectors with integrated tanks on each roof.
Hot water to building plumbing fixtures will be 120 °F, but temperature and mixing valves will be provided that allow water storage temperature adjustment up to 150 °F. The higher storage temperature maximizes the amount of heat that can be stored for use during cooler nights and cloudy periods.

industrial cold water (icw)

Industrial cold water shall be connected to the domestic water system through an approved reduced pressure type backflow pre. The industrial water systems shall be connected to all laboratory fixtures and equipment (except eyewash and safety showers).

Industrial water shall be designed to serve laboratory equipment. Industrial water pipe material shall be type L copper above grade, type K copper underground. All buried industrial water pipe will be protected with 20 mil polyethylene tape and/or pipe sleeve.

industrial hot water (ihw)

Industrial hot water shall be supplied to the laboratory spaces including lab and other lab equipment as required. The industrial hot water system shall be designed as an on-demand circulating system that shall provide industrial hot water quickly and efficiently.

Industrial hot water will be generated in the same manner as the building hot water via solar and supplied at the same temperatures.

reclaimed water

Waste water that has been treated utilizing the on on-site waste water treatment system will be used to supply water to toilets, urinals and subsurface irrigation as desired. Through the reuse of the sanitary waste water streams, the use of potable water for sewage conveyance will be eliminated completely.

All fixtures with treated water supply will be labeled “Non-Potable Water”.

Treated water pipe material shall be type L copper above grade, type K copper or PVC from a roll to minimize joints underground. All buried treated water pipe will be protected with 20 mil polyethylene tape and/or pipe sleeve. All treated water pipe and fittings shall be continuously wrapped with purple colored Mylar tape. This system is commonly referred to as a ‘purple pipe’ system.

fixtures

Low-flow plumbing fixtures shall be chosen for this installation that shall conserve water and meet the requirements of the client. These low-flow plumbing fixtures shall reduce the domestic water consumption by a minimum of 40%, reducing the rainwater cistern size requirement.

Solar-powered, sensor-operated faucets shall be installed at the restroom lavatories that provide water at 0.5 gpm. The Sloan Solis solar-powered faucet automatically operates in natural and artificial light. The restroom lavatories shall be supplied with hot and cold water.

wet pipe sprinkler system

battery bank

.7 fire protection

fire suppression system

All sprinklered buildings will be provided with wet pipe sprinkler systems. The source of water for the fire suppression systems will be the rainwater cistern. A vertical turbine pump will draw water directly from the rainwater cistern and distribute water to each building through underground pipe.

All fire suppression systems will be hydraulically calculated. Each building will be provided with a sprinkler control valve, waterflow switch, and inspector's test/drain connection.

fire alarm system

An addressable fire alarm system will be provided in the Lab Building. A combination of addressable monitor modules, initiating device circuits, and conventional (non-addressable) detection devices will be utilized to provide detection in the outlying buildings. Total coverage smoke detection will be provided in all buildings. Occupant notification will be provided through the use of fire alarm horns and strobe lights.

.8 hazardous materials

The supply, storage, use and removal of hazardous materials are important issues that must be addressed as the design of the MREC moves forward. The identified hazardous materials include:

- Chemicals used in the research: the researchers will be required to provide MSDS material for all chemicals used on the campus. Included in information from the researchers will be how the material will reach the facility, how it will be stored at the site, and a plan for removing the material from the facility. The JCIMS will be responsible to follow-up on the required procedures for chemicals used in the research.

- Petroleum products: Several types of petroleum products will be utilized on the campus and protocols and procedures will be developed by the JCIMS to describe the appropriate methods for the storage, use, and the removal of waste materials. It is anticipated that there will be storage requirements for diesel fuel and gasoline and those requirements will be determined during the design phase. Needs for these petroleum based

products include:

o Diesel fuel: outboard motors, emergency generator, service vehicles.

o Gasoline: outboard motors, service vehicles

o Lubricants: engines, equipment.

• Batteries and battery acid: an array of storage batteries will be required to support the “net-zero energy” concept for this complex and the storage and removal of this material is important to maintain the environment of the site. The decision on a centralized or decentralized storage system will be determined during the design phase of the project and that decision will drive the solution to the storage of the batteries. Procedures and protocols for the removal of used batteries and the acid will be developed by the JCIMS prior to the start-up of operations at the campus.

• Flammable gasses: a small amount of flammable gases will be required at the research labs for various analytical testing functions. These gasses will be stored in an appropriate manner and empty cylinders will be removed from the facility by a private vendor. A listing of the gasses required for the research will be provided by the JCIMS during the design phase of the project. The fuel type for cooking has yet to be determined, but the most efficient fuel for food preparation is a flammable gas, and a storage cylinder for propane maybe required. Private vendors will be responsible to supply appropriate vessels and remove empty cylinders from the campus.

All procedures and protocols for the procurement, storage, use and removal of any and all hazardous materials developed by the JCIMS must meet the requirements of the NPS and approved by the NPS prior to implementation. The operations manager must prepare and maintain an active hazardous materials plan, and an up to date inventory of all hazardous material used at the site.

.9 electrical

energy storage

Designing for passive survivability means supplying sufficient energy storage capacity such that essential functions are not impacted during power outages or natural disasters. The current storage options are batteries and compressed air, but additional storage media will be researched and likely a combination will be used.

The project will have the capacity to store electricity for times when the PV array is not active at night. While net metering allows use of grid sourced power at night, the unreliable nature of the grid mandates a storage capacity to address the potential gap left in service, while not necessarily having to rely on the back-up generator. Thus, an 8-hour battery bank is proposed to smooth over these grid outages and allow for overnight power should the grid be down for an extended period. A diesel generator will be provided for additional back up, the capacity of which will be determined during subsequent design phases.

building power distribution

Building power will be supplied from a combination of net metering with the local utility company, onsite renewable energy sources and roof mounted photovoltaic cells with 8 hours of battery storage capacity. The onsite solar and wind renewable energy can be gathered as either 208 Volt 3-phase or 480 Volt 3-phase electric power. Power will be supplied to the buildings at 208V, 3-phase unless the distance between the power source and building load is such that voltage drop becomes an issue at which point the building can be supplied with 480V, 3-phase power.

Both wind turbines and photovoltaics create DC that will have to be converted into AC for most equipment loads. The inverter that switches from DC to AC has an efficiency of 85%, so some energy will be lost in the conversion to AC. The use of DC power for lighting and other appropriate equipment will be investigated as a potential means of conserving the energy lost in the conversion from DC to AC power. Likely, a combination of both DC and AC power will be used on site.

Power in each building will be classified using the tiered system noted below and distributed throughout the building. Each panelboard will monitor its energy usage and report the information to a central network. Receptacles on each different power tier shall be independently color-coded to allow the users to distinguish between the different systems.

Tier 1 - Critical loads requiring 24/7 power and emergency generator back-up power. Includes essential loads such as life safety, saltwater pumps, lab freezers, museum storage, etc.

Tier 2 - Normal loads requiring 24/7 power. Includes loads which require continuous or extended periods of power but no emergency back-up.

Tier 3 - Occupant or time controlled loads. Includes loads that can be shut off after a set period of time or when the occupants leave the space.

A diesel engine-generator will be provided as an emergency backup in cases where the onsite battery bank is not sufficient to handle the loads or outages are longer than the capacity of the battery bank.

lighting

Daylighting will be used to the maximum extent possible as the primary light source with LED or fluorescent luminaires supplementing the daylight during overcast days and at night. Multiple daylighting strategies will be incorporated into the architectural design and include: light shelves, use of windows on both sides of the spaces, glare avoidance, and clerestories. The lighting will be designed such that the spaces are not overlit at night and with an avoidance of light pollution to promote views of the night sky and minimize the disturbance of sea turtles.

Illumination levels will be based on IESNA lighting standards for the appropriate task being performed in each space. Task lighting will be used to supply additional light for a minimum of 90% of the building occupants. The use of LED and fluorescent luminaires will be determined by a cost-benefit analysis in order to meet the lighting power density requirements set forth by the sustainable design goals of the project.

The lighting control system will be flexible to meet the lighting needs of the different spaces while reducing the overall energy use within the building. Dimmable or multi-level luminaires will be used in conjunction with daylight sensors to supplement the natural daylight within the space during overcast days and to reduce light levels at night. Occupancy sensors will be utilized to reduce the energy wasted by lights left on after the occupants have left the space.

Egress lighting and exit signs will be provided with integral battery back-up.

Site lighting will be minimal; only where required for footpaths and security. Site lighting will be designed to minimize light pollution and impact on local wildlife.

example of potential exhibit type

.10 exhibits

visitor experience tracks

The following types of visitor tracks have been identified by NPS for applicability at MREC:

Track 1: Self-guided outdoor experience consisting of trails and accompanying wayside interpretive stops that include information about what the MREC is accomplishing at the Salt River NPS site for St. Croix and the Virgin Islands.

Conditions:
- Open to visitors during daylight hours when the park is open.
- Does require a tour guide or docent
- Does not require access into the lab buildings or Education Center (with interactive exhibits)

Track 2: A guided tour including the Education Center (with interactive exhibits), MREC labs, and Park Trail.

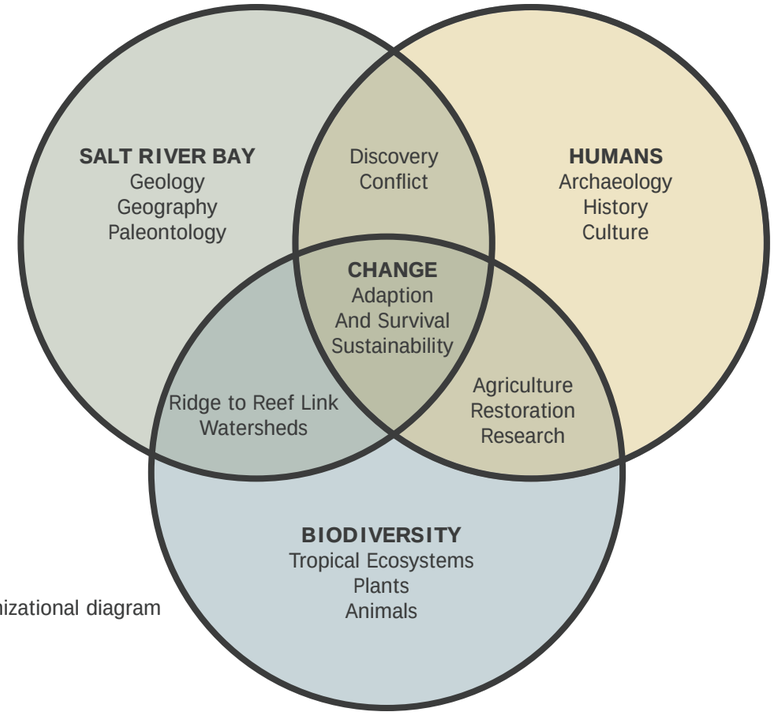
Conditions:
- Expanded trail leading down to various outdoor research works in progress.
- Escorted trail option to include the archaeological field school. This would be a scheduled tour (3) times per week with a tour guide, NPS interpretive ranger, or science education student.

audience

The following four audience types have been identified by JICMS and NPS:
- College Students- undergraduate, graduates in residency at the MREC Campus for full semester.
- Faculty/Staff - graduate, post-doctoral, professors, including scientists, administration, and maintenance.
- Visiting Researchers / Federal Agency Researchers - an integral part of the MREC operations and park mission goals for marine research/resource management activities in the parks.
- Local School Groups ages 10-18, Grades 5th to 12th.

In addition consideration should be made for casual visitors:
- Local Community - those who are curious about the activities and opportunities at MREC
- Seasonal Residents/Tourists - visitors who have sustained stays; visitors staying with family and friends
- Organized Tour Groups–limited cruise ship groups

touch tank



organizational diagram

core interpretive messages

The overarching theme is “Science in the Parks”–integrating research and resource management in the National Parks. The site-wide key messages are Sustainability, Change, Adaptation and Survival. In this instance Change is the relevant key message: the change of the landscape over thousands of years, and the changes brought about by natural phenomenon and human occupation. Adaptation is a secondary message: showing how plants and animals have adapted to the particular environmental conditions from the island’s ridge to the reef.

The organizational diagram above shows the primary messages and their vital connections–between land and sea as well as where they intersect driven by *change* at the center.

topics

The following is a preliminary list of topics:

change

• Geological change: Salt River formed millions of years ago
• Environmental change: land and marine ecosystems are diminishing over time
• Human change: people have occupied this island from Pre-historic times through today

adaptation and survival

• Plants and animals have evolved adaptive characteristics to find water and nutrients
• People have used the natural resources of this island for thousands of years

sustainability

- This is one of the most biodiverse areas in the Caribbean but its biodiversity threatened by human interactions including global climate change
- The Park’s landscape and biodiversity is being restored
- The new research center is environmentally responsible and resource-efficient in its design

visitor outcomes

about the education center complex

- Understand the reason for the Research Center is located here and who is sponsoring it
- Discover the type of research being performed (past and present); what the marine researchers, scientists and archaeologists do in their jobs and at this site
- Legacy of research at Salt River

about the island

- Realize that from the mountain ridge to the reef there are diverse terrestrial and marine communities
- Realize human actions can have a positive or a negative impact on the environment
- Understand that this is a dynamic and changing landscape

education center interior exhibits (preliminary)

reception

A reception desk will face visitors as they arrive providing a welcome, orientation information, program and exhibit information. Trail maps and leaflets can be given to visitors from this location. These will be themed to allow exploration of different elements of the site, complementing content from the Education Center exhibits.

lobby

A design feature marine or wetlands touch tank will punctuate the space making it as an inviting, public area. Consideration should be made to include a rotating exhibition of artwork by artists. Images that show the biodiversity of the area should be incorporated into the interior space as aesthetic design elements.


interactive touch-screen exhibit

individual exhibits

what is this place?

An exhibit provides an orientation to this research facility and the restoration of the Marine Studies Program. Visitors will discover the long history of research at Salt River; understand why it is here, who is responsible for this facility; and why it is important to their lives.

who works here-what do they do?

An exhibit should enable young visitors to discover career opportunities that may be available to them in marine and ecological studies. Video diaries from staff enable visitors to hear about various restoration efforts or research projects, why they love what they do, and why it matters. (Oceanographer, marine biologist, field biologist, NPS Ranger, geologist, botanist, climatologist, archaeologist)

why is this area ecologically unique and significant?

Visitors will leave with an understanding as to why the geology of this area contributes to the ecological niches created from the ridge to the reef. Consider using a video format to tell this story in a theater environment.

what are the current threats?

Visitor will realize the current threats to the marine environment and plants and animals here. These exhibits could include threats from: climate change, ocean acidification, invasive species (Lion Fish), and feature threatened species such as sea turtles. Visitors will discover how this area can be protected, restored and preserved for the future. This will provide information on how through the MREC, the NPS and JICMS are addressing these threats with science and research management actions.

talk-back wall

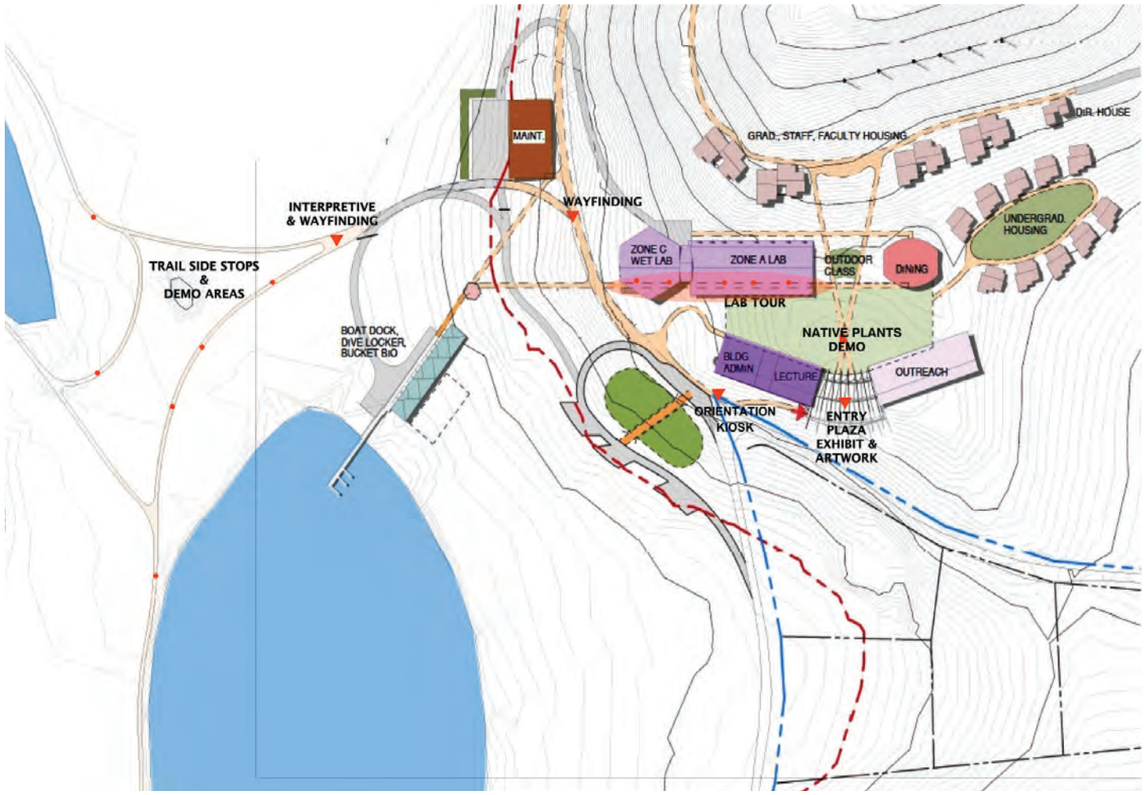
Provide an area where visitors can express their point of view about the Education Center activities here and environmental challenges.

FAQs

Provide an area where you answer visitors most frequently asked questions. Consider providing a QR code enabling visitors to find out more using their smart phones.

display exhibit

interactive water-themed exhibit



education center exterior exhibits (preliminary)

entry plaza

A living mangrove model, located in the central plaza, illustrates the value of a mangrove, how it works as a natural system and restorations efforts and methods. This would be comparable to the one at Coral World. This living ecosystem exhibit could be in combination with a touch tank.

facility walking tour

To enable visitors to understand the purpose and the activities at the Research Center visitors can take a controlled walking tour. Labs are identified and graphics describe basic activities. A video flat panel enables visitors to “meet a researcher” or see a demonstration of scientific progress from “behind the scenes”. This supplements those times when individuals are not in the lab and eliminates the need for researchers to be compelled to interact with visitors.

Lab facility interpretation will be located at:

- The wall of the main building along the visitor path
- The interior of the lab along the visitor path
- Along any outdoor test or demonstration areas

about the building walking tour

A self-guided walking tour explains the sustainable design features in the buildings and throughout the site.

It might include:

- How the areas are climate controlled
- How water is conserved on site to ensure a minimum necessary amount is used
- How waste is managed
- What makes a material green or considered sustainable

trails

Self-guided walking trails enable visitors to walk from the Education Center on the hillside to the water’s edge. Interpretive wayside exhibits provide visitors with messages addressing the primary themes with an emphasis on the site’s marine features, archaeological sites, and study programs. Visitors can see from the trails the bay, reef, canyon and ancient river channel.

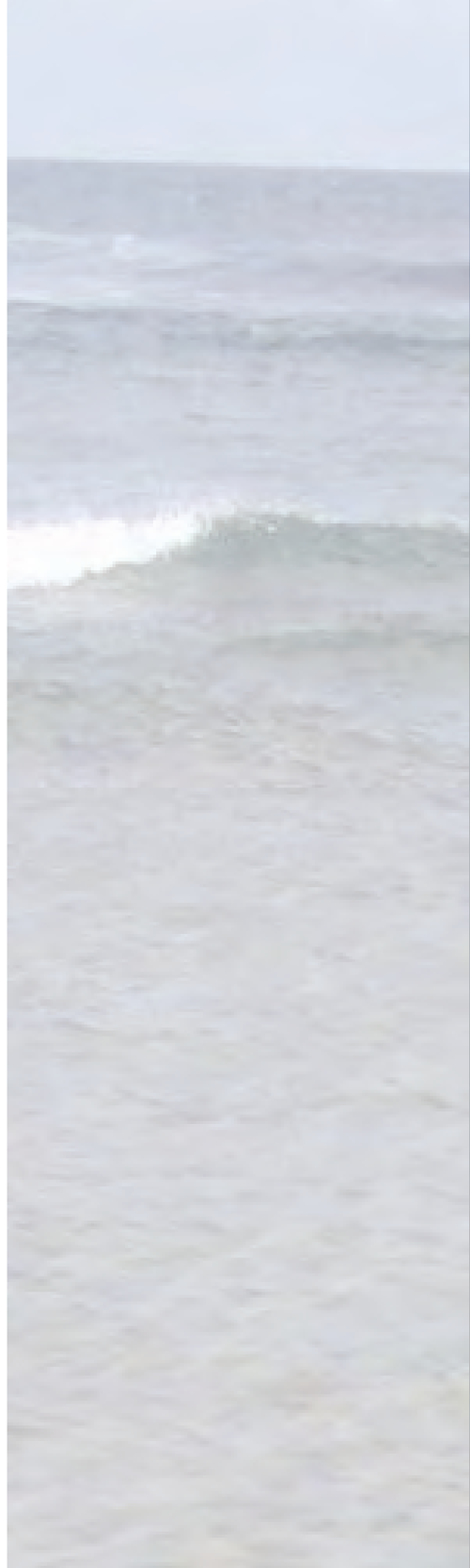
These graphics should:

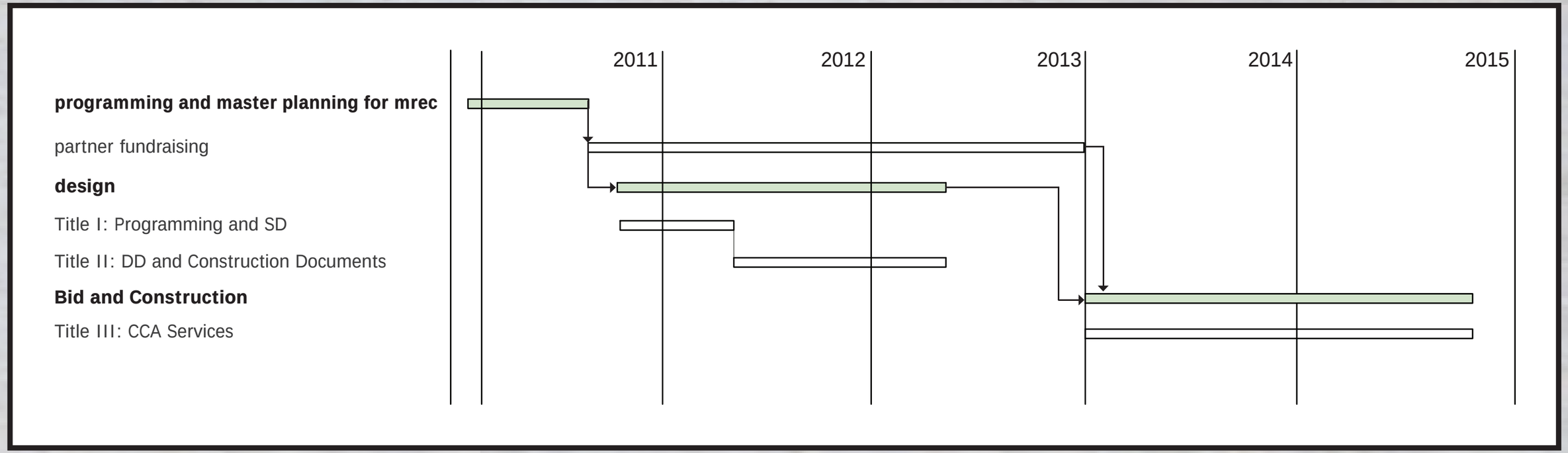
- Encourage visitors to explore and make discoveries
- Impress upon visitors the importance of respecting the site
- Demonstrate the uniqueness of this site and of the work that is being done
- Impress upon visitors the importance of site safety

4.6 project schedule

The MREC schedule will be dependent on the fundraising schedule of the JICMS partner group. The schedule currently shows the fundraising effort commencing after the Master Plan and the associated fundraising images are completed. Thus, fundraising would start in earnest in August of 2011. It is anticipated that this will take no longer than 3 years, yielding an anticipated start of construction in 2014. It is anticipated that construction will take just under two years based on the complexity of the project and its remote location.

The design phases could begin as soon as funding is made available. It is anticipated that the project would take about 18 months to design, but this could be accelerated if necessary. Since momentum for the project is important to maintain to aid in fundraising and building public support for the project, it is desirable to start some early design activities during late 2011. This would leave a cushion post design before the anticipated completion of the fundraising and start of construction that will allow the design phases to float if necessary.




2011
2012
2013
2014
2015
programming and master planning for mrec
partner fundraising
design
Title I: Programming and SD
Title II: DD and Construction Documents
Bid and Construction
Title III: CCA Services

.cost

05

5.1 cost estimate

Class C estimates were created for each of the three alternatives that were evaluated during the CBA. As a result of that process, a hybrid preferred alternative was selected and a Class C estimate was created for it. The summary page of the estimate follows; please note that this is a construction estimate only and not a total project budget. It is therefore exclusive of design, scientific equipment, Owner contingencies and other costs that accompany the construction of complex projects. For further detail, please refer to the appendix for the full estimate.

The estimate is only conceptual given the level of design of the project and as such carries a design contingency as well as a bidding/procurement contingency. The costs have been adjusted based on a location factor from RS Means for San Juan Puerto Rico as RS Means has no documented factor for St Croix. Based on discussions with local experts and past experience with construction in St. Croix, a remoteness factor has been added to the costs.

Based on the anticipated fundraising duration, the costs have been escalated to 2014 dollars. Many of the onsite systems discussed elsewhere in this Master Plan have been included in the cost, such as on site power generation. However, some costs are unknown at this juncture; these include portions of the seawater system and full site restoration. With respect to the sea water system, the components that are on the site (piping and trenching) and portions that are directly linked to the buildings such as the storage cisterns are included. Since the location of the intake is unknown at this time (it is under study by a separate group) an allowance for this portion of the project has been included. This cost could vary widely depending on the depth, distance and route to the selected intake points. For site restoration, it is the intent of the Park that this work be performed outside of the costs of the MREC.

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National Park Service

Net Construction Budget (Class C)

Salt River Bay Marine Research & Education Center (Scheme 2A)

Prepared: May 9, 2011

Revised: June 6, 2011

Item			$/GSF	% Construction	Total
Construction			$721.60	100.0%	**$44,123,869**
Laboratory (Zone A)	*9,300*	*GSF*	*$815.80*	17.2%	*$7,586,913*
Laboratory (Zone C)	*5,700*	*GSF*	*$609.17*	7.9%	*$3,472,270*
Building Administration	*3,385*	*GSF*	*$653.42*	5.0%	*$2,211,825*
Lecture & Teaching	*4,234*	*GSF*	*$578.94*	5.6%	*$2,451,235*
Community Outreach and Collections	*4,400*	*GSF*	*$483.13*	4.8%	*$2,125,765*
Lobby/Comminuity Shared Space/Pavillion (Zone C)	*4,400*	*GSF*	*$349.63*	3.5%	*$1,538,384*
Housing (Director) Zone A	*1,308*	*GSF*	*$685.59*	2.0%	*$896,755*
Housing (Graduate) Zone C	*9,000*	*GSF*	*$718.62*	14.7%	*$6,467,583*
Housing (Undergraduate) Zone C	*8,550*	*GSF*	*$716.47*	13.9%	*$6,125,794*
Dining Pavillion (Zone C)	*2,800*	*GSF*	*$326.99*	2.1%	*$915,573*
Dining Support (Zone A)	*750*	*GSF*	*$523.84*	0.9%	*$392,884*
Boat Dock Facilities (Zone C)	*3,000*	*GSF*	*$367.05*	2.5%	*$1,101,157*
Maintenance Building (Zone C)	*4,320*	*GSF*	*$304.20*	3.0%	*$1,314,148*
Site Improvements	*38,452*	*SY*	*$195.66*	17.1%	*$7,523,583*
Exhibits			$3.60	0.5%	**$220,000**
Seawater Intake Piping Allownace			$8.99	1.2%	**$550,000**
Total Project Budget	***61,147***	*GSF*	***$734.20***	***101.75%***	***$44,893,869***

6.1 planning team and acknowledgements

The Design Team would like to acknowledge local organizations in St Croix for their support and their on-going desire to improve the environment in which we all live. In addition, we would like to acknowledge the organizations identified on the following page for their contribution to this Master Plan and for their tireless efforts to make this the best project that it can be.

In addition, we would like to thank the following people specifically for their dedication to furthering the advancement of marine science and of our National Parks; without whom this project would not be possible:

Karen H. Koltes, Ph.D.
Joel Tutein, Superintendant
Zandy Hillis-Starr, Chief or Resources
Stephen Meinhold, PH.D., Assoicate Dean of Research
Michael Bayer, AICP
Amy L. Sebring, Architect
Andrea Lind, Landscape Architect
Dennis McCarthy, Architect

DEPARTMENT OF THE INTERIOR

Office of Insular Affairs:

Office of Insular Affairs; MS 2429
U.S. Department of the Interior
1849 C St., NW
Washington, DC 20240

The Park:

National Park Service Christiansted
NHS/Buck Island Reef NM/
Salt River Bay NHP-EP
2100 Church Street, #100
Christiansted, VI 00820-4611

JOINT INSTITUTE FOR CARIBBEAN MARINE STUDIES

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Office of Research Services and
Sponsored Programs
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Wilmington, NC 28403

JICMS Liaison:

Environmental Resources
Management
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Annapolis, MD 21401

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Electrical and Fire Protection Engineer:

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Atlanta, GA 30303

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National Park Service
Denver Service Center
12795 W. Alameda Pkwy
Denver, CO 80228-2838

Southeast Regional Office:

National Park Service
SERO Facility Support Division
100 Alabama Street, SW
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Atlanta, GA 30303

JICMS Partner Institutions:

University of the Virgin Islands
University of North Carolina, Wilmington
Rutgers University
University of South Carolina

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3600 Cerrillos Rd
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Santa Fe, NM 87507

Civil Engineering:

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Orlando, FL 32810

Structural Engineering:

Palmer Engineering Company
3581 Habersham at Northlake
Tucker, GA 30084

Exhibit Design:

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40 North Main Street
Medford, NJ 08055

appendix

marine research and education center/master plan and program

national park service/joint institute for caribbean marine science

july 29, 2011
Lord•Aeck•Sargent

table of contents

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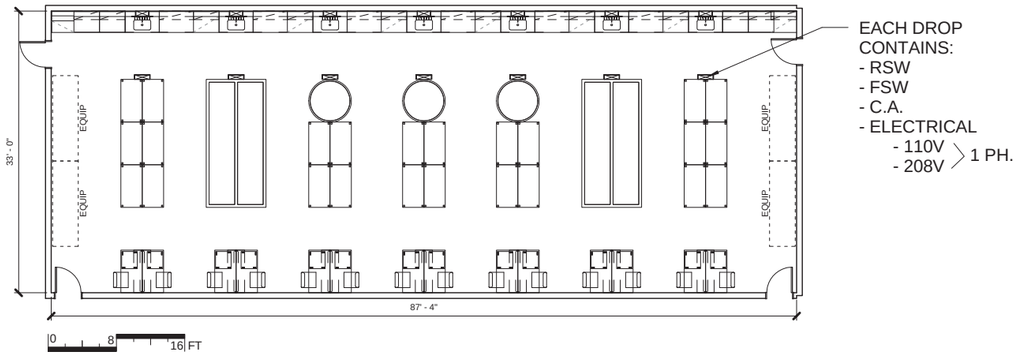
appendix

07 **appendices**

Space Diagrams



EACH DROP CONTAINS:
- RSW
- FSW
- C.A.
- ELECTRICAL
  - 110V
  - 208V

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General Room Data

Room Name	Research Labs		
Room Number	1.1.1		
Department	Lab/Lab Support		
Space Type	Zone A		
Area	2,882 SF	**No. of Occupants**	
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:

Temperature:	Ambient - 78° F
Humidity:	< 60%
Vibration	-
Electromagnetic:	-
Acoustics:	NC 40-50

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Double Uneven
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-6" x 8'-0"
Wall Base	6" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	FRP
Min. Ceiling Ht.	9'-6"	**Frame Material**	FRP
Wall Protect. (mat'l)	ALUM	**Specialty Door (type)**	n/a
Corner Guards (mat'l)	ALUM	**Vision Panel (y/n)**	Yes
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	Movable/Fixed
Casework Mat'l	FRP
Worktop Mat'l	Epoxy
Casework Ht.	Standing
Sink Mat'l	Epoxy
Sink Quantity	7
Cup Sinks (y/n)	No
Flam/Ventilated Base Cab's at FH (y/n)	No

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1		0	
Benchtop Fume Hood Type 2		0	
Walk-In Fume Hoods		0	
Radioisotope Hoods		0	
Specialty Hoods (list type)		0	
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1		0	
BSC Type 2		0	
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods		0	
Canopy Hoods		0	

Snorkel Exhausts (y/n)	No		
Pressurization (+pos/-neg)	+	**Single Pass Air (y/n)**	TBD
Air Changes per Hour (normal operation)	TBD		
Air Filtration (supply and/or exhaust)	Supply Only		

Piped Services Data

service	**y/n**	**comments**
Cold Water	Yes	
Hot Water	Yes	
Purified Water	No	
RO/DI Water	Yes	P.O.U. (OFOI)
Raw Sea Water	Yes	
Filtered Sea Water	Yes	
Compressed Air	Yes	
House Vacuum	No	P.O.U. as needed
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	Yes
Floor Sink (y/n)	No
Fire Protection Hazard Class	
Fire Extinguisher Type	C

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	II		
Safety Shower (y/n)	Yes	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	Yes		
Flam. Stor. Cab's (y/n)	No	**ventilated (y/n)**	No

Electrical Data

110V Power	Yes		
208V Power	Yes	**Phase**	1
480V Power	No		
Emergency Power	Yes		
Specialty Power (specify)	No		
UPS	Yes	**OFOI (y/n)**	Yes

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	Yes
Safe Light (y/n)	No
In-Use Light (y/n)	No
Zoned Lighting (y/n)	Yes

Additional Comments:

Data

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ARCHITECTURE

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appendix

room data sheets

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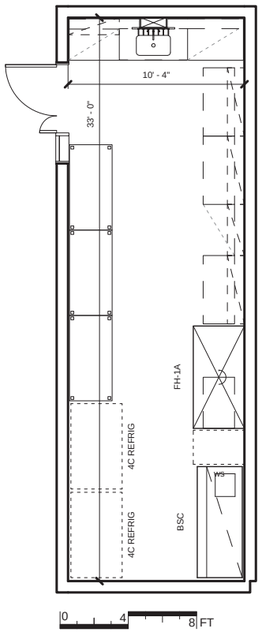
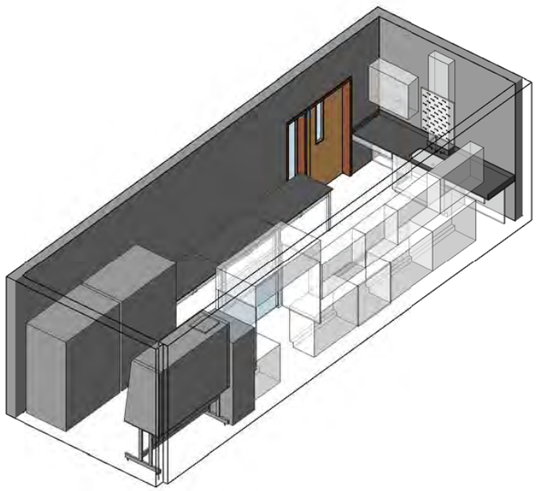
Space Diagrams





General Room Data

Room Name	Analytical Lab		
Room Number	1.1.2		
Department	Lab/Lab Support		
Space Type	Zone A		
Area	341 SF	**No. of Occupants**	
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:

Temperature:	Ambient - 78° F
Humidity:	< 60%
Vibration	-
Electromagnetic:	-
Acoustics:	NC 40-50

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-6"x 8'-0"
Wall Base		**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	FRP
Min. Ceiling Ht.	9'-6"	**Frame Material**	FRP
Wall Protect. (mat'l)	ALUM	**Specialty Door (type)**	n/a
Corner Guards (mat'l)	ALUM	**Vision Panel (y/n)**	Yes
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	Movable/Fixed
Casework Mat'l	FRP
Worktop Mat'l	Epoxy
Casework Ht.	Standing
Sink Mat'l	Epoxy
Sink Quantity	1
Cup Sinks (y/n)	No
Flam/Ventilated Base Cab's at FH (y/n)	Yes

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1		1	6'-0"
Benchtop Fume Hood Type 2		0	
Walk-In Fume Hoods		0	
Radioisotope Hoods		0	
Specialty Hoods (list type)		0	
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1		1	6'-0"
BSC Type 2		0	
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods		0	
Canopy Hoods		0	

Snorkel Exhausts (y/n)	No		
Pressurization (+pos/-neg)	+	**Single Pass Air (y/n)**	TBD
Air Changes per Hour (normal operation)	TBD		
Air Filtration (supply and/or exhaust)	Supply Only		

Piped Services Data

service	**y/n**	**comments**
Cold Water	Yes	
Hot Water	Yes	
Purified Water	No	
RO/DI Water	Yes	P.O.U. (OFOI)
Raw Sea Water	Yes	
Filtered Sea Water	Yes	
Compressed Air	Yes	
House Vacuum	No	P.O.U. as needed
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	Yes
Floor Sink (y/n)	No
Fire Protection Hazard Class	
Fire Extinguisher Type	C

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	II		
Safety Shower (y/n)	No	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	Yes		
Flam. Stor. Cab's (y/n)	Yes	**ventilated (y/n)**	No

Electrical Data

110V Power	Yes		
208V Power	Yes	**Phase**	1
480V Power	No		
Emergency Power	Yes		
Specialty Power (specify)	No		
UPS	Yes	**OFOI (y/n)**	Yes

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	No
Safe Light (y/n)	No
In-Use Light (y/n)	No
Zoned Lighting (y/n)	Yes

Additional Comments:

Data

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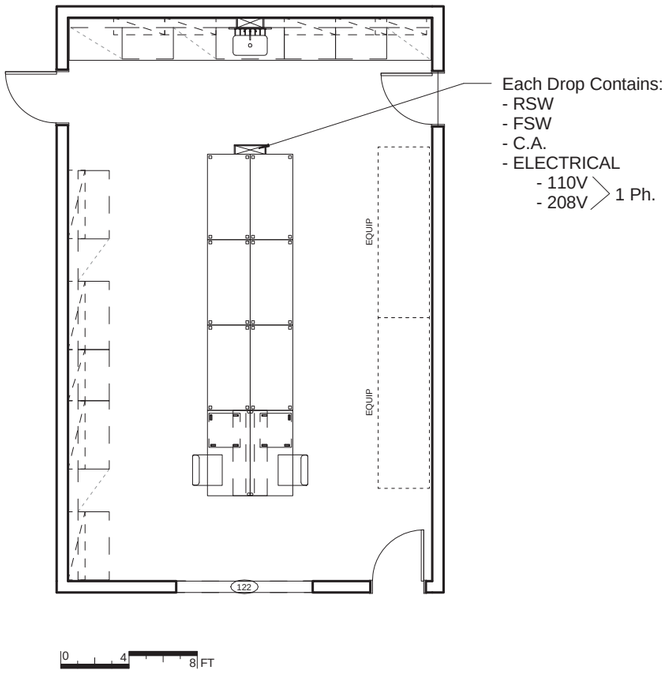
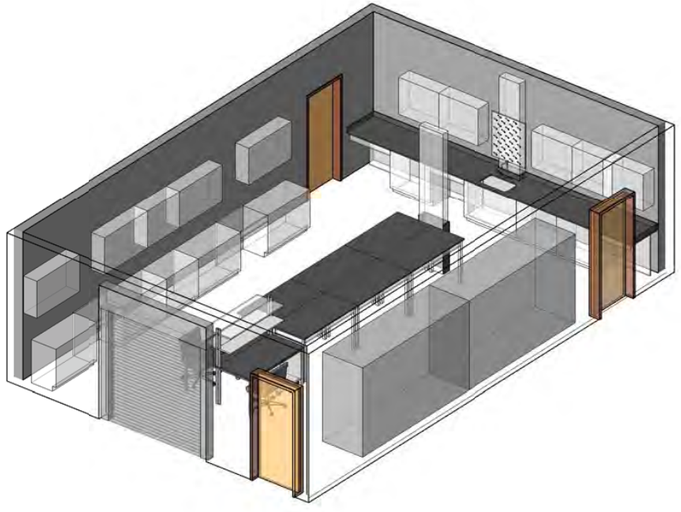
Space Diagrams





General Room Data			
Room Name	Electronics/ROV Lab	**Special Requirements:**	
Room Number	1.1.3	**Temperature:**	Ambient - 78° F
Department	Lab/Lab Support	**Humidity:**	< 60%
Space Type	Zone A	**Vibration**	-
Area 704 SF	**No. of Occupants**	**Electromagnetic:**	-
Hours of Utilization per Day - People		**Acoustics:**	NC 40-50
Hours of Operation per Day - Equipment			

Architectural and Door Data			
Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-6" x 8'-0"
Wall Base	6" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	FRP
Min. Ceiling Ht.	9'-6"	**Frame Material**	FRP
Wall Protect. (mat'l)	ALUM	**Specialty Door (type)**	n/a
Corner Guards (mat'l)	ALUM	**Vision Panel (y/n)**	Yes
		Natural Daylight (y/n)	Yes

Casework Data	
Casework Type	Movable/Fixed
Casework Mat'l	FRP
Worktop Mat'l	Epoxy
Casework Ht.	Standing
Sink Mat'l	Epoxy
Sink Quantity	1
Cup Sinks (y/n)	No
Flam/Ventilated Base Cab's at FH (y/n)	No

Fume Hood, Bio Safety Cab's and HVAC Data			
Hoods:		**count**	**size**
Benchtop Fume Hood Type 1		0	
Benchtop Fume Hood Type 2		0	
Walk-In Fume Hoods		0	
Radioisotope Hoods		0	
Specialty Hoods (list type)		0	
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1		0	
BSC Type 2		0	
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods		0	
Canopy Hoods		0	

Snorkel Exhausts (y/n)	Yes		
Pressurization (+pos/-neg)	+	**Single Pass Air (y/n)**	TBD
Air Changes per Hour (normal operation)	TBD		
Air Filtration (supply and/or exhaust)	Supply Only		

Piped Services Data		
service	**y/n**	**comments**
Cold Water	Yes	
Hot Water	Yes	
Purified Water	No	
RO/DI Water	Yes	P.O.U. (OFOI)
Raw Sea Water	Yes	
Filtered Sea Water	Yes	
Compressed Air	Yes	
House Vacuum	No	P.O.U. as needed
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data	
Floor Drains (y/n)	Yes
Floor Sink (y/n)	No
Fire Protection Hazard Class	
Fire Extinguisher Type	

Lab Safety and Personnel Protection Data			
Biosafety Level (I, II, III, IV)	II		
Safety Shower (y/n)	Yes	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	Yes		
Flam. Stor. Cab's (y/n)	Yes	**ventilated (y/n)**	No

Electrical Data			
110V Power	Yes		
208V Power	Yes	**Phase**	1
480V Power	No		
Emergency Power	Yes		
Specialty Power (specify)	No		
UPS	Yes	**OFOI (y/n)**	Yes

Lighting Data	
Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	No
Safe Light (y/n)	No
In-Use Light (y/n)	No
Zoned Lighting (y/n)	Yes

Additional Comments:
Data; Exterior access via roll-up door

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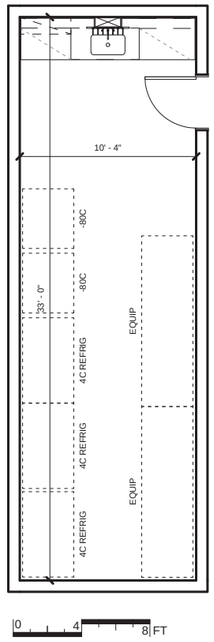
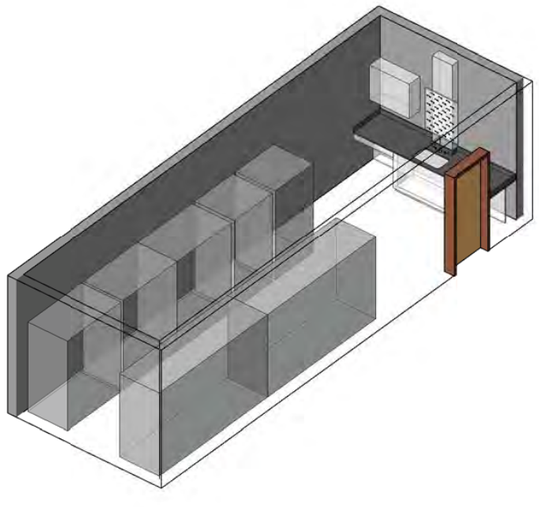
Space Diagrams





General Room Data

Room Name	Equipment Room		
Room Number	1.1.4		
Department	Lab/Lab Support		
Space Type	Zone A		
Area	341 SF	**No. of Occupants**	
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:

Temperature:	Ambient - 78° F
Humidity:	< 60%
Vibration	-
Electromagnetic:	-
Acoustics:	NC 40-50

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-6" x 8'-0"
Wall Base	6" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	FRP
Min. Ceiling Ht.	9'-6"	**Frame Material**	FRP
Wall Protect. (mat'l)	ALUM	**Specialty Door (type)**	n/a
Corner Guards (mat'l)	ALUM	**Vision Panel (y/n)**	Yes
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	Movable/Fixed
Casework Mat'l	FRP
Worktop Mat'l	Epoxy
Casework Ht.	Standing
Sink Mat'l	Epoxy
Sink Quantity	1
Cup Sinks (y/n)	Yes
Flam/Ventilated Base Cab's at FH (y/n)	No

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1		0	
Benchtop Fume Hood Type 2		0	
Walk-In Fume Hoods		0	
Radioisotope Hoods		0	
Specialty Hoods (list type)		0	
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1		0	
BSC Type 2		0	
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods		0	
Canopy Hoods		0	

Snorkel Exhausts (y/n)	Yes		
Pressurization (+pos/-neg)	+	**Single Pass Air (y/n)**	TBD
Air Changes per Hour (normal operation)	TBD		
Air Filtration (supply and/or exhaust)	Supply Only		

Piped Services Data

service	**y/n**	**comments**
Cold Water	Yes	
Hot Water	Yes	
Purified Water	No	
RO/DI Water	No	
Raw Sea Water	Yes	
Filtered Sea Water	Yes	
Compressed Air	Yes	
House Vacuum	No	P.O.U. as needed
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	Yes
Floor Sink (y/n)	No
Fire Protection Hazard Class	
Fire Extinguisher Type	C

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	II		
Safety Shower (y/n)	Yes	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	Yes		
Flam. Stor. Cab's (y/n)	No	**ventilated (y/n)**	No

Electrical Data

110V Power	Yes		
208V Power	Yes	**Phase**	1
480V Power	No		
Emergency Power	Yes		
Specialty Power (specify)	No		
UPS	Yes	**OFOI (y/n)**	Yes

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	No
Safe Light (y/n)	No
In-Use Light (y/n)	No
Zoned Lighting (y/n)	Yes

Additional Comments:

Data; High heat load room

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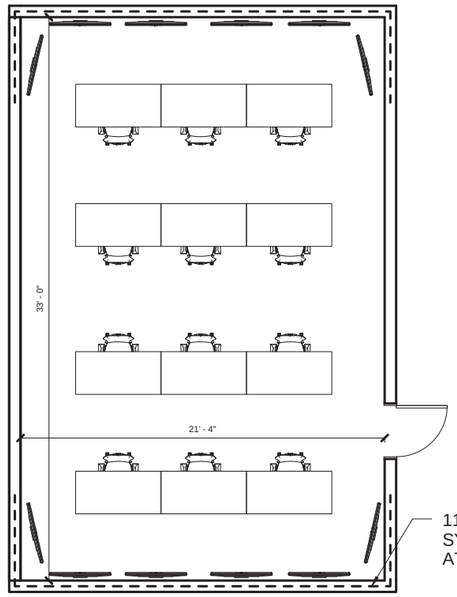
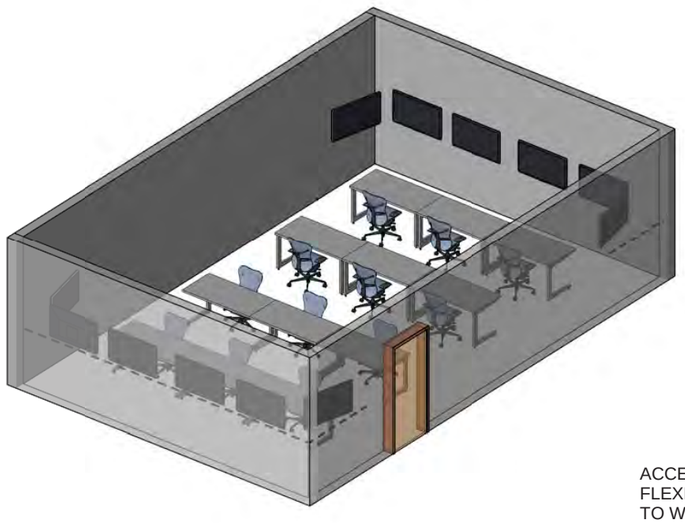
Space Diagrams



110V & DATA IN DISTRIBUTED SYSTEM AROUND PERIMETER AT 50"-60" AFF.



ACCESS TO LAB UTILITIES FOR FLEXIBILITY (FUTURE CONVERSION TO WET LAB)

General Room Data

Room Name	GIS Lab		
Room Number	1.1.5		
Department	Lab/Lab Support		
Space Type	Zone A		
Area	704 SF	**No. of Occupants**	0
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:

Temperature:	Ambient - 78° F
Humidity:	< 60%
Vibration	-
Electromagnetic:	-
Acoustics:	NC 40-50

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-6" x 8'-0"
Wall Base	6" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	FRP
Min. Ceiling Ht.	9'-6"	**Frame Material**	FRP
Wall Protect. (mat'l)	ALUM	**Specialty Door (type)**	n/a
Corner Guards (mat'l)	ALUM	**Vision Panel (y/n)**	Yes Screen
		Natural Daylight (y/n)	

Casework Data

Casework Type	Movable/Fixed
Casework Mat'l	FRP
Worktop Mat'l	Epoxy
Casework Ht.	Standing
Sink Mat'l	Epoxy
Sink Quantity	
Cup Sinks (y/n)	
Flam/Ventilated Base Cab's at FH (y/n)	No

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1		0	
Benchtop Fume Hood Type 2		0	
Walk-In Fume Hoods		0	
Radioisotope Hoods		0	
Specialty Hoods (list type)		0	
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1		0	
BSC Type 2		0	
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods		0	
Canopy Hoods		0	

Snorkel Exhausts (y/n)	No		
Pressurization (+pos/-neg)	+	**Single Pass Air (y/n)**	No
Air Changes per Hour (normal operation)	TBD		
Air Filtration (supply and/or exhaust)	None		

Piped Services Data

service	**y/n**	**comments**
Cold Water	No	
Hot Water	No	
Purified Water	No	
RO/DI Water	No	
Raw Sea Water	No	
Filtered Sea Water	No	
Compressed Air	No	
House Vacuum	No	
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	No		
Floor Sink (y/n)	No		
Fire Protection Hazard Class			
Fire Extinguisher Type	C		

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	II		
Safety Shower (y/n)	No	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	No		
Flam. Stor. Cab's (y/n)	No	**ventilated (y/n)**	No

Electrical Data

110V Power	Yes		
208V Power	No	**Phase**	
480V Power	No		
Emergency Power	Yes		
Specialty Power (specify)	No		
UPS	Yes	**OFOI (y/n)**	Yes

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	Yes
Safe Light (y/n)	No
In-Use Light (y/n)	No
Zoned Lighting (y/n)	Yes

Additional Comments:

Heavy Data; Dimmable; Provide overhead junction box for flexibility to install projector

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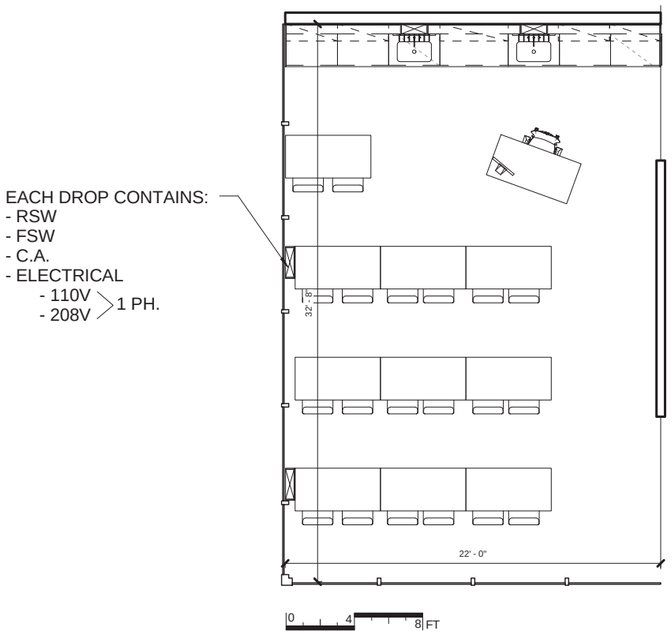
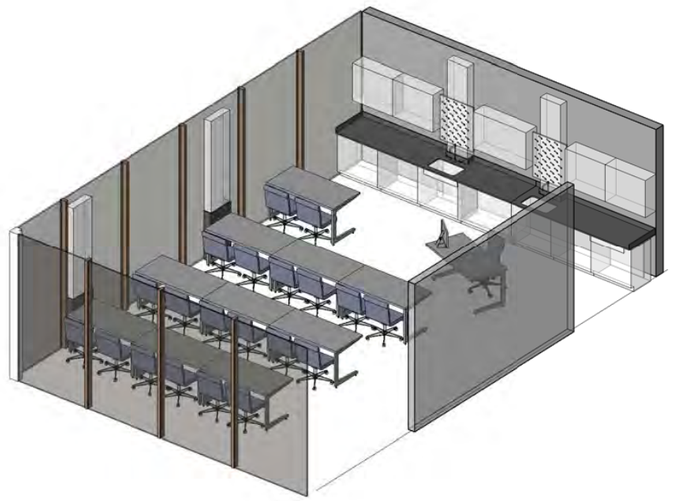
Space Diagrams





FLEXIBILITY TO BRING IN TANKS FOR FUTURE WET LAB

General Room Data

Room Name	Teaching Lab		
Room Number	1.1.6		
Department	Lab/Lab Support		
Space Type	Zone C		
Area	715 SF	**No. of Occupants**	16 - 20
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:

Temperature:	Ambient
Humidity:	
Vibration	
Electromagnetic:	
Acoustics:	

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	Screen. CMU	**Single or Double:**	Single
Wall Finish	Screen, Epoxy Coating	**Primary Leaf Size:**	3'-6" x 8'-0"
Wall Base	6" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	FRP
Min. Ceiling Ht.	9'-6"	**Frame Material**	FRP
Wall Protect. (mat'l)	ALUM	**Specialty Door (type)**	n/a
Corner Guards (mat'l)	ALUM	**Vision Panel (y/n)**	Yes
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	Movable
Casework Mat'l	FRP
Worktop Mat'l	Epoxy
Casework Ht.	Standing
Sink Mat'l	Epoxy
Sink Quantity	2
Cup Sinks (y/n)	No
Flam/Ventilated Base Cab's at FH (y/n)	No

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1		0	
Benchtop Fume Hood Type 2		0	
Walk-In Fume Hoods		0	
Radioisotope Hoods		0	
Specialty Hoods (list type)		0	
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1		0	
BSC Type 2		0	
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods		0	
Canopy Hoods		0	

Snorkel Exhausts (y/n)	
Pressurization (+pos/-neg)	**Single Pass Air (y/n)** No
Air Changes per Hour (normal operation)	N/A
Air Filtration (supply and/or exhaust)	N/A

Piped Services Data

service	**y/n**	**comments**
Cold Water	Yes	
Hot Water	Yes	
Purified Water	No	
RO/DI Water	No	
Raw Sea Water	Yes	
Filtered Sea Water	Yes	
Compressed Air	Yes	
House Vacuum	No	
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	Yes
Floor Sink (y/n)	No
Fire Protection Hazard Class	
Fire Extinguisher Type	

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	N/A		
Safety Shower (y/n)	No	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	Yes		
Flam. Stor. Cab's (y/n)	No	**ventilated (y/n)**	No

Electrical Data

110V Power	Yes		
208V Power	Yes	**Phase**	1
480V Power	No		
Emergency Power	Yes		
Specialty Power (specify)	No		
UPS	Yes	**OFOI (y/n)**	Yes

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	No
Safe Light (y/n)	No
In-Use Light (y/n)	No
Zoned Lighting (y/n)	Yes

Additional Comments:

Data; Shaded Exterior Space; Minimal Fixed Equipment; Dimmable

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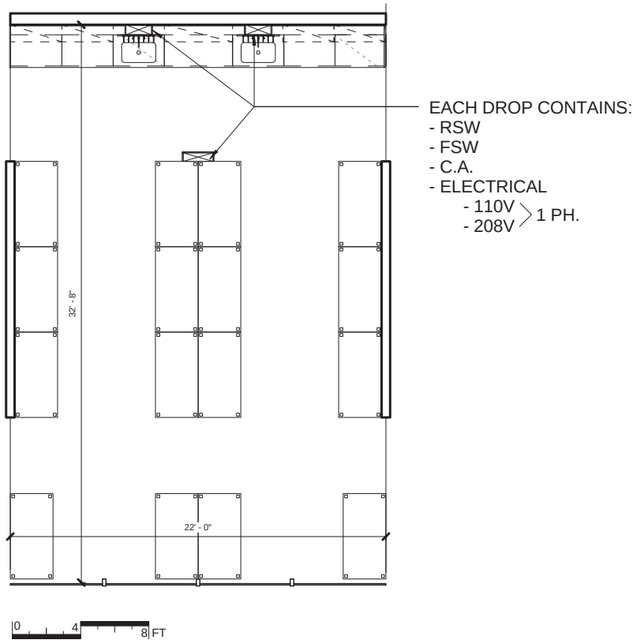
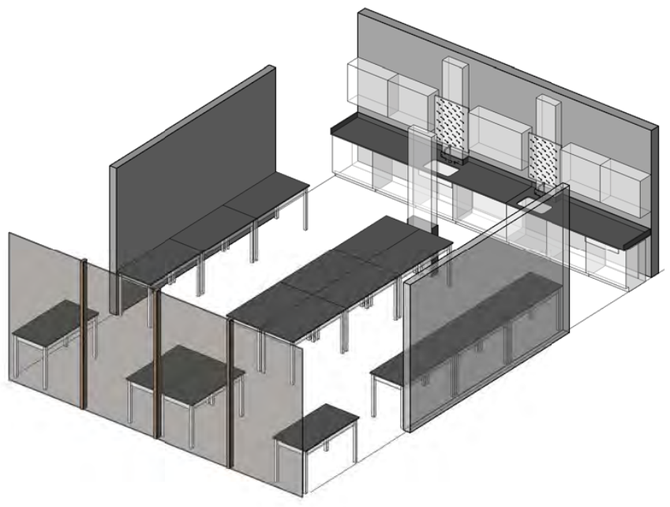
Space Diagrams





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General Room Data

Room Name	Wet Lab	**Special Requirements:**	
Room Number	1.1.7	**Temperature:**	Ambient
Department	Lab/Lab Support	**Humidity:**	Ambient
Space Type	Zone C	**Vibration**	-
Area 711 SF	**No. of Occupants**	**Electromagnetic:**	-
Hours of Utilization per Day - People		**Acoustics:**	-
Hours of Operation per Day - Equipment			

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	Screen. CMU	**Single or Double:**	Single
Wall Finish	Screen, Epoxy Coating	**Primary Leaf Size:**	3'-6" x 8'-0"
Wall Base	6" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	FRP
Min. Ceiling Ht.	9'-6"	**Frame Material**	FRP
Wall Protect. (mat'l)	ALUM	**Specialty Door (type)**	n/a
Corner Guards (mat'l)	Stainless Steel	**Vision Panel (y/n)**	Yes
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	Fixed and Movable
Casework Mat'l	FRP
Worktop Mat'l	Epoxy
Casework Ht.	Standing
Sink Mat'l	Epoxy
Sink Quantity	2
Cup Sinks (y/n)	
Flam/Ventilated Base Cab's at FH (y/n)	No

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1		0	
Benchtop Fume Hood Type 2		0	
Walk-In Fume Hoods		0	
Radioisotope Hoods		0	
Specialty Hoods (list type)		0	
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1		0	
BSC Type 2		0	
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods		0	
Canopy Hoods		0	
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)		**Single Pass Air (y/n)**	No
Air Changes per Hour (normal operation)		N/A	
Air Filtration (supply and/or exhaust)		N/A	

Piped Services Data

service	**y/n**	**comments**
Cold Water	Yes	
Hot Water	Yes	
Purified Water	No	P.O.U. as needed
RO/DI Water	No	
Raw Sea Water	Yes	
Filtered Sea Water	Yes	
Compressed Air	Yes	
House Vacuum	No	
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	Yes
Floor Sink (y/n)	No
Fire Protection Hazard Class	
Fire Extinguisher Type	C

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	N/A		
Safety Shower (y/n)	Yes	**w/ Eyewash (y/n)**	Yes
Drench Hose at Sinks (y/n)	No		
Flam. Stor. Cab's (y/n)		**ventilated (y/n)**	

Electrical Data

110V Power	Yes		
208V Power	Yes	**Phase**	3
480V Power	No		
Emergency Power	Yes		
Specialty Power (specify)	No		
UPS	Yes	**OFOI (y/n)**	Yes

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	No
Safe Light (y/n)	No
In-Use Light (y/n)	No
Zoned Lighting (y/n)	Yes

Additional Comments:

Data

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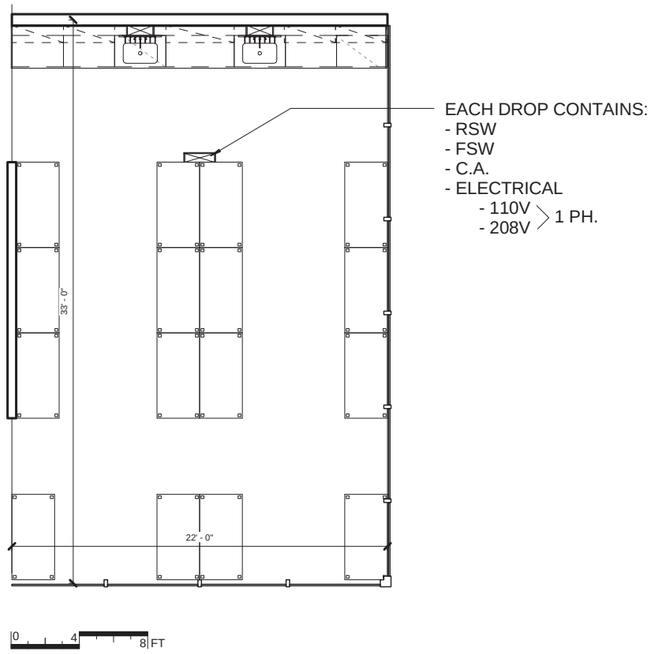
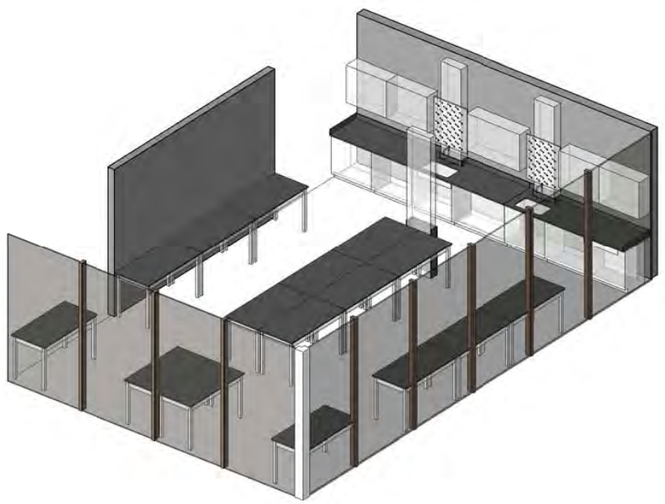
Space Diagrams





General Room Data

Room Name	Sample Prep	***Special Requirements:***	
Room Number	1.1.8	***Temperature:***	Ambient
Department	Lab/Lab Support	***Humidity:***	Ambient
Space Type	Zone C	***Vibration***	-
Area 715 SF	***No. of Occupants***	***Electromagnetic:***	-
Hours of Utilization per Day - People		***Acoustics:***	-
Hours of Operation per Day - Equipment			

Architectural and Door Data

Flooring	Sealed Concrete	***Door and Frame Data:***	
Partitions	Screen. CMU	***Single or Double:***	Single
Wall Finish	Screen, Epoxy Coating	***Primary Leaf Size:***	3'-6" x 8'-0"
Wall Base	6" Rubber	***Secondary Leaf Size:***	
Ceiling Mat'l	Exposed Structure	***Door Material***	FRP
Min. Ceiling Ht.	9'-6"	***Frame Material***	FRP
Wall Protect. (mat'l)	ALUM	***Specialty Door (type)***	n/a
Corner Guards (mat'l)	ALUM	***Vision Panel (y/n)***	Yes
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	Movable
Casework Mat'l	FRP
Worktop Mat'l	Epoxy
Casework Ht.	Standing
Sink Mat'l	Epoxy
Sink Quantity	2
Cup Sinks (y/n)	No
Flam/Ventilated Base Cab's at FH (y/n)	No

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		***count***	***size***
Benchtop Fume Hood Type 1		0	
Benchtop Fume Hood Type 2		0	
Walk-In Fume Hoods		0	
Radioisotope Hoods		0	
Specialty Hoods (list type)		0	
Biological Safety Cabinets:	***class/type***	***count***	***size***
BSC Type 1		0	
BSC Type 2		0	
Other Exhaust Devices:		***count***	***size***
Laminar Flow Hoods		0	
Canopy Hoods		0	

Snorkel Exhausts (y/n) No

Pressurization (+pos/-neg) ***Single Pass Air (y/n)*** No

Air Changes per Hour (normal operation) TBD

Air Filtration (supply and/or exhaust) None

Piped Services Data

service	***y/n***	***comments***
Cold Water	Yes	
Hot Water	Yes	
Purified Water	No	P.O.U. as needed
RO/DI Water	No	
Raw Sea Water	Yes	
Filtered Sea Water	Yes	
Compressed Air	Yes	
House Vacuum	No	
Natural Gas	No	
Steam	No	
Chilled Water (process)		
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	Yes
Floor Sink (y/n)	No
Fire Protection Hazard Class	
Fire Extinguisher Type	C

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV) N/A

Safety Shower (y/n) Yes ***w/ Eyewash (y/n)***

Drench Hose at Sinks (y/n) Yes

Flam. Stor. Cab's (y/n) No ***ventilated (y/n)*** No

Electrical Data

110V Power	Yes		
208V Power	Yes	***Phase***	1
480V Power	No		
Emergency Power	Yes		
Specialty Power (specify)	No		
UPS	Yes	***OFOI (y/n)***	Yes

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	No
Safe Light (y/n)	Yes
In-Use Light (y/n)	No
Zoned Lighting (y/n)	Yes

Additional Comments:

Data; 1 Teaching Lab is Conditioned

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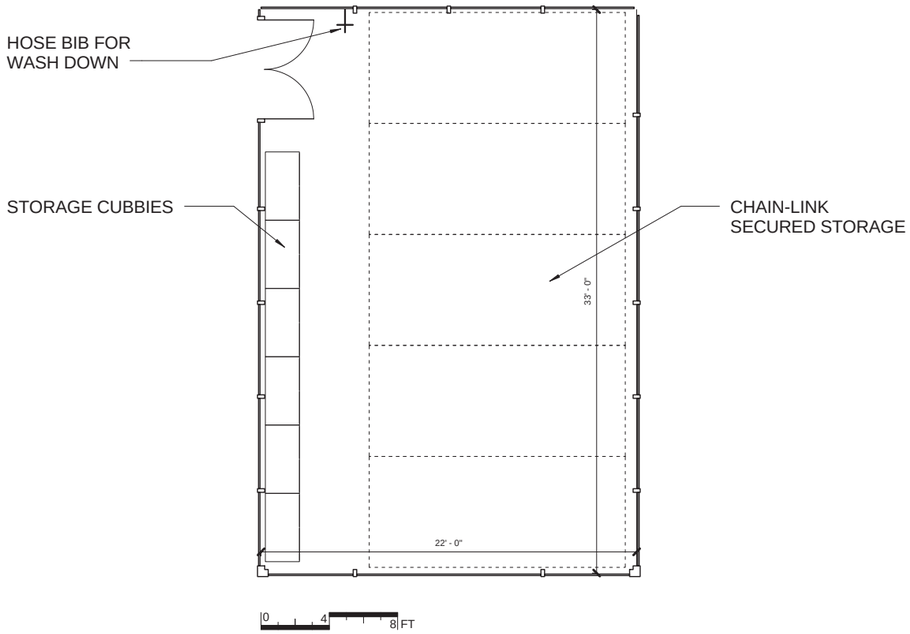
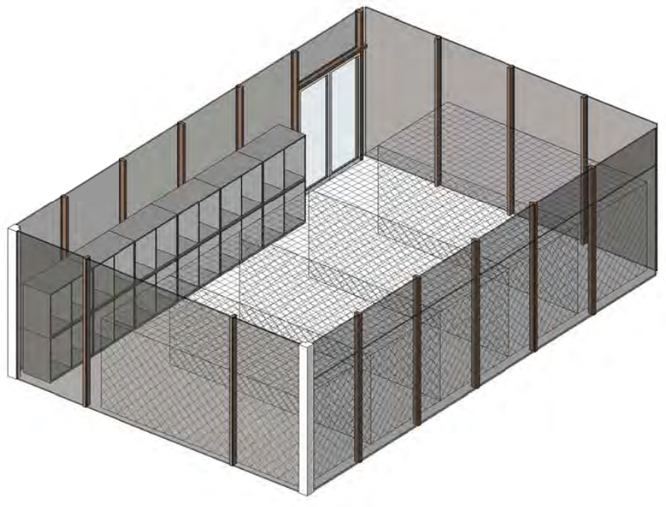
Space Diagrams





General Room Data

Room Name	Storage		
Room Number	1.1.9		
Department	Lab/Lab Support		
Space Type	Zone C		
Area	726 SF	**No. of Occupants**	
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:

Temperature:	Ambient
Humidity:	Ambient
Vibration	-
Electromagnetic:	-
Acoustics:	-

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	Screen, Chain-Link	**Single or Double:**	Pair
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	6'-0" x 8'-0"
Wall Base	N/A	**Secondary Leaf Size:**	
Ceiling Mat'l	N/A	**Door Material**	Coated Chain-Link
Min. Ceiling Ht.	N/A	**Frame Material**	
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	
		Natural Daylight (y/n)	

Casework Data

Casework Type	None
Casework Mat'l	
Worktop Mat'l	
Casework Ht.	
Sink Mat'l	
Sink Quantity	
Cup Sinks (y/n)	No
Flam/Ventilated Base Cab's at FH (y/n)	

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1		0	
Benchtop Fume Hood Type 2		0	
Walk-In Fume Hoods		0	
Radioisotope Hoods		0	
Specialty Hoods (list type)		0	
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1		0	
BSC Type 2		0	
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods		0	
Canopy Hoods		0	
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)		**Single Pass Air (y/n)**	No
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water	Yes	Hose Bib
Hot Water	No	
Purified Water	No	
RO/DI Water	No	
Raw Sea Water	No	
Filtered Sea Water	No	
Compressed Air	No	
House Vacuum	No	
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	No
Floor Sink (y/n)	No
Fire Protection Hazard Class	
Fire Extinguisher Type	

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	N/A		
Safety Shower (y/n)	No	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	No		
Flam. Stor. Cab's (y/n)		**ventilated (y/n)**	

Electrical Data

110V Power	Yes		
208V Power	No	**Phase**	
480V Power	No		
Emergency Power	No		
Specialty Power (specify)	No		
UPS	No	**OFOI (y/n)**	No

Lighting Data

Lighting Level (benchtop)	30 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	No
Safe Light (y/n)	No
In-Use Light (y/n)	No
Zoned Lighting (y/n)	Yes

Additional Comments:

Data

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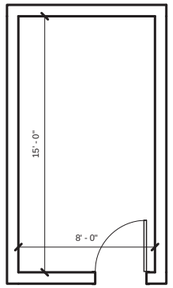
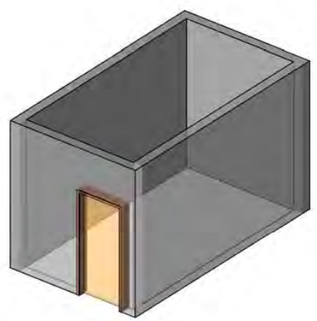
Space Diagrams





General Room Data

Room Name	Stock Room, Supply Room		
Room Number	1.2.5, 1.2.6		
Department	Lab/Lab Support		
Space Type	Zone C		
Area	120 SF	**No. of Occupants**	
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:

Temperature:	Ambient
Humidity:	Ambient
Vibration	
Electromagnetic:	
Acoustics:	

Architectural and Door Data

Flooring		**Door and Frame Data:**	
Partitions		**Single or Double:**	
Wall Finish		**Primary Leaf Size:**	
Wall Base		**Secondary Leaf Size:**	
Ceiling Mat'l		**Door Material**	Wood
Min. Ceiling Ht.		**Frame Material**	
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	
Casework Mat'l	
Worktop Mat'l	
Casework Ht.	
Sink Mat'l	
Sink Quantity	
Cup Sinks (y/n)	
Flam/Ventilated Base Cab's at FH (y/n)	

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)		**Single Pass Air (y/n)**	
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water		
Hot Water		
Purified Water		
RO/DI Water		
Raw Sea Water		
Filtered Sea Water		
Compressed Air		
House Vacuum		
Natural Gas		
Steam		
Chilled Water (process)		
Nitrogen (N2)		
Nitrogen (liquid, LN)		
Carbon Dioxide (CO2)		
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)
Floor Sink (y/n)
Fire Protection Hazard Class
Fire Extinguisher Type

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	
Safety Shower (y/n)	**w/ Eyewash (y/n)**
Drench Hose at Sinks (y/n)	
Flam. Stor. Cab's (y/n)	**ventilated (y/n)**

Electrical Data

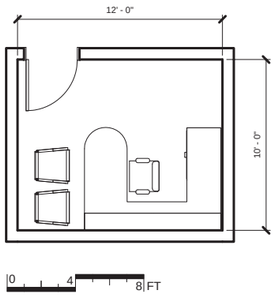
110V Power	Yes
208V Power	**Phase**
480V Power	
Emergency Power	
Specialty Power (specify)	
UPS	**OFOI (y/n)**

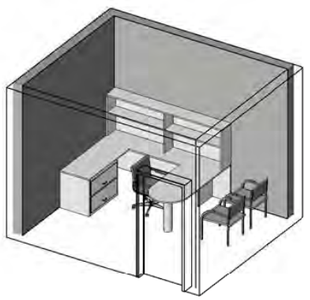
Lighting Data

Lighting Level (benchtop)
Ambient Lighting Type
Task Lighting (y/n)
Safe Light (y/n)
In-Use Light (y/n)
Zoned Lighting (y/n)

Additional Comments:

Space Diagrams





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General Room Data

Room Name	Administration Office (NPS), Visiting Scientist Office (JICMS)		
Room Number	2.1.1, 2.1.4		
Department	Administrative Offices		
Space Type	Zone A		
Area	120 SF	**No. of Occupants**	
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:

Temperature:	Ambient
Humidity:	
Vibration	
Electromagnetic:	
Acoustics:	

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-0" x 8'-0"
Wall Base	4" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	Galv. HM
Min. Ceiling Ht.	9'-6"	**Frame Material**	Galv. HM
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	Yes
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type
Casework Mat'l
Worktop Mat'l
Casework Ht.
Sink Mat'l
Sink Quantity
Cup Sinks (y/n)
Flam/Ventilated Base Cab's at FH (y/n)

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)	**Single Pass Air (y/n)**		
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water		
Hot Water		
Purified Water		
RO/DI Water		
Raw Sea Water		
Filtered Sea Water		
Compressed Air		
House Vacuum		
Natural Gas		
Steam		
Chilled Water (process)		
Nitrogen (N2)		
Nitrogen (liquid, LN)		
Carbon Dioxide (CO2)		
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)
Floor Sink (y/n)
Fire Protection Hazard Class
Fire Extinguisher Type

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	
Safety Shower (y/n)	**w/ Eyewash (y/n)**
Drench Hose at Sinks (y/n)	
Flam. Stor. Cab's (y/n)	**ventilated (y/n)**

Electrical Data

110V Power	Yes
208V Power	**Phase**
480V Power	
Emergency Power	
Specialty Power (specify)	
UPS	**OFOI (y/n)**

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	Yes
Safe Light (y/n)	
In-Use Light (y/n)	
Zoned Lighting (y/n)	

Additional Comments:

Data; Ceiling Fan

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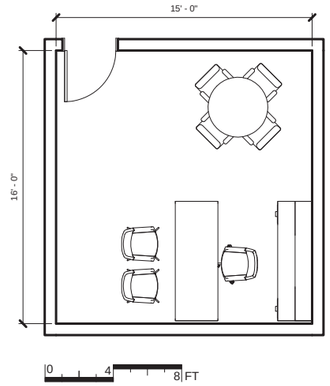
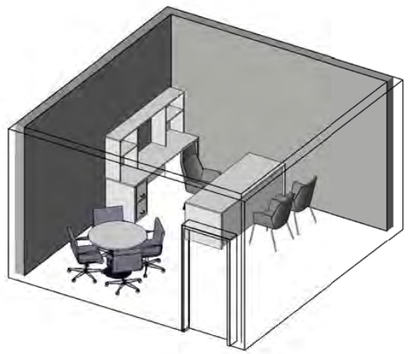
Space Diagrams





General Room Data

Room Name	Director's Office		**Special Requirements:**
Room Number	2.1.2		**Temperature:**
Department	Administrative Offices		**Humidity:**
Space Type	Zone A		**Vibration**
Area	240 SF	**No. of Occupants**	**Electromagnetic:**
Hours of Utilization per Day - People			**Acoustics:**
Hours of Operation per Day - Equipment			

Architectural and Door Data

Flooring	Thermal Mass	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-0" x 8'-0"
Wall Base	4" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	Galv. HM
Min. Ceiling Ht.	9'-6"	**Frame Material**	Galv. HM
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	Yes
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	N/A
Casework Mat'l	
Worktop Mat'l	
Casework Ht.	
Sink Mat'l	
Sink Quantity	
Cup Sinks (y/n)	
Flam/Ventilated Base Cab's at FH (y/n)	

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)		**Single Pass Air (y/n)**	
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water		
Hot Water		
Purified Water		
RO/DI Water		
Raw Sea Water		
Filtered Sea Water		
Compressed Air		
House Vacuum		
Natural Gas		
Steam		
Chilled Water (process)		
Nitrogen (N2)		
Nitrogen (liquid, LN)		
Carbon Dioxide (CO2)		
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	
Floor Sink (y/n)	
Fire Protection Hazard Class	
Fire Extinguisher Type	

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	
Safety Shower (y/n)	**w/ Eyewash (y/n)**
Drench Hose at Sinks (y/n)	
Flam. Stor. Cab's (y/n)	**ventilated (y/n)**

Electrical Data

110V Power	Yes
208V Power	**Phase**
480V Power	
Emergency Power	
Specialty Power (specify)	
UPS	**OFOI (y/n)**

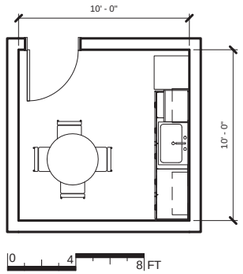
Lighting Data

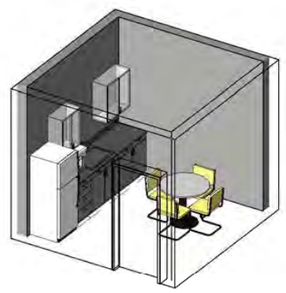
Lighting Level (benchtop)	
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	Yes
Safe Light (y/n)	
In-Use Light (y/n)	
Zoned Lighting (y/n)	

Additional Comments:

Data, Ceiling Fan

Space Diagrams





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General Room Data

Room Name	Breakroom/Lounge		**Special Requirements:**
Room Number	2.1.3		**Temperature:**
Department	Administrative Offices		**Humidity:**
Space Type	Zone C		**Vibration**
Area	100 SF	**No. of Occupants**	**Electromagnetic:**
Hours of Utilization per Day - People			**Acoustics:**
Hours of Operation per Day - Equipment			

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-0" x 8'-0"
Wall Base	4" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	Galv. HM
Min. Ceiling Ht.	9'-6"	**Frame Material**	Galv. HM
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	Standing Ht.
Casework Mat'l	FRP
Worktop Mat'l	Epoxy
Casework Ht.	36"
Sink Mat'l	Epoxy
Sink Quantity	1
Cup Sinks (y/n)	No
Flam/Ventilated Base Cab's at FH (y/n)	No

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)		**Single Pass Air (y/n)**	
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water	Yes	
Hot Water	Yes	
Purified Water	No	
RO/DI Water	No	
Raw Sea Water	No	
Filtered Sea Water	No	
Compressed Air	No	
House Vacuum	No	
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)
Floor Sink (y/n)
Fire Protection Hazard Class
Fire Extinguisher Type

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	
Safety Shower (y/n)	**w/ Eyewash (y/n)**
Drench Hose at Sinks (y/n)	
Flam. Stor. Cab's (y/n)	**ventilated (y/n)**

Electrical Data

110V Power	Yes
208V Power	**Phase**
480V Power	
Emergency Power	
Specialty Power (specify)	
UPS	**OFOI (y/n)**

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	Yes
Safe Light (y/n)	
In-Use Light (y/n)	
Zoned Lighting (y/n)	

Additional Comments:

Data

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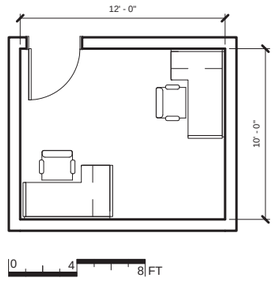
Space Diagrams



General Room Data

Room Name	Support Offices		**Special Requirements:**
Room Number	2.1.5		**Temperature:**
Department	Administrative Offices		**Humidity:**
Space Type	Zone A		**Vibration**
Area	120 SF	**No. of Occupants**	**Electromagnetic:**
Hours of Utilization per Day - People			**Acoustics:**
Hours of Operation per Day - Equipment			

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-0" x 8'-0"
Wall Base	4" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	Galv. HM
Min. Ceiling Ht.	9'-6"	**Frame Material**	Galv. HM
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type
Casework Mat'l
Worktop Mat'l
Casework Ht.
Sink Mat'l
Sink Quantity
Cup Sinks (y/n)
Flam/Ventilated Base Cab's at FH (y/n)

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)		**Single Pass Air (y/n)**	
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water		
Hot Water		
Purified Water		
RO/DI Water		
Raw Sea Water		
Filtered Sea Water		
Compressed Air		
House Vacuum		
Natural Gas		
Steam		
Chilled Water (process)		
Nitrogen (N2)		
Nitrogen (liquid, LN)		
Carbon Dioxide (CO2)		
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)
Floor Sink (y/n)
Fire Protection Hazard Class
Fire Extinguisher Type

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	
Safety Shower (y/n)	**w/ Eyewash (y/n)**
Drench Hose at Sinks (y/n)	
Flam. Stor. Cab's (y/n)	**ventilated (y/n)**

Electrical Data

110V Power	Yes
208V Power	**Phase**
480V Power	
Emergency Power	
Specialty Power (specify)	
UPS	**OFOI (y/n)**

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	Yes
Safe Light (y/n)	
In-Use Light (y/n)	
Zoned Lighting (y/n)	

Additional Comments:

Data; Ceiling Fan

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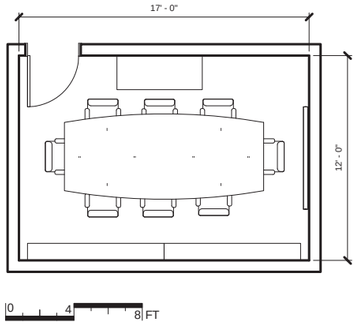
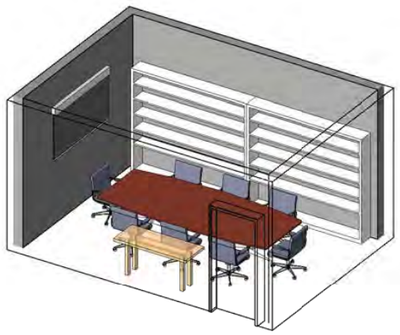
Space Diagrams





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General Room Data

Room Name	Meeting Room		
Room Number	2.2.1		
Department	Administrative Conference		
Space Type	Zone A		
Area	204 SF	**No. of Occupants**	8
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:
- **Temperature:**
- **Humidity:**
- **Vibration**
- **Electromagnetic:**
- **Acoustics:**

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-0" x 8'-0"
Wall Base	4" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	Galv. HM
Min. Ceiling Ht.	9'-6"	**Frame Material**	Galv. HM
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type
Casework Mat'l
Worktop Mat'l
Casework Ht.
Sink Mat'l
Sink Quantity
Cup Sinks (y/n)
Flam/Ventilated Base Cab's at FH (y/n)

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)	**Single Pass Air (y/n)**		
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water		
Hot Water		
Purified Water		
RO/DI Water		
Raw Sea Water		
Filtered Sea Water		
Compressed Air		
House Vacuum		
Natural Gas		
Steam		
Chilled Water (process)		
Nitrogen (N2)		
Nitrogen (liquid, LN)		
Carbon Dioxide (CO2)		
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)
Floor Sink (y/n)
Fire Protection Hazard Class
Fire Extinguisher Type

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	
Safety Shower (y/n)	**w/ Eyewash (y/n)**
Drench Hose at Sinks (y/n)	
Flam. Stor. Cab's (y/n)	**ventilated (y/n)**

Electrical Data

110V Power	Yes
208V Power	**Phase**
480V Power	
Emergency Power	
Specialty Power (specify)	
UPS	**OFOI (y/n)**

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	
Safe Light (y/n)	
In-Use Light (y/n)	
Zoned Lighting (y/n)	

Additional Comments:

Ceiling Fan; Data, Overhead Projector Capable

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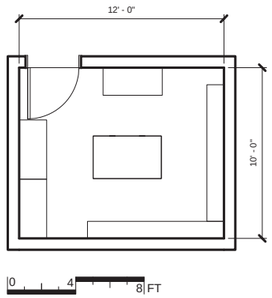
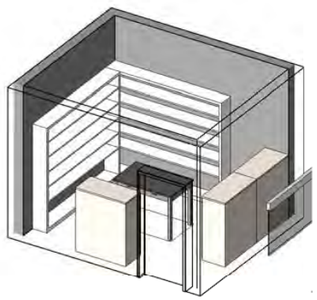
Space Diagrams





General Room Data

Room Name	Storage		**Special Requirements:**
Room Number	2.2.3		**Temperature:**
Department	Administrative Conference		**Humidity:**
Space Type	Zone C		**Vibration**
Area	120 SF	**No. of Occupants**	**Electromagnetic:**
Hours of Utilization per Day - People			**Acoustics:**
Hours of Operation per Day - Equipment			

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-0" x 8'-0"
Wall Base	4" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	Galv. HM
Min. Ceiling Ht.	9'-6"	**Frame Material**	Galv. HM
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type
Casework Mat'l
Worktop Mat'l
Casework Ht.
Sink Mat'l
Sink Quantity
Cup Sinks (y/n)
Flam/Ventilated Base Cab's at FH (y/n)

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)		**Single Pass Air (y/n)**	
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water		
Hot Water		
Purified Water		
RO/DI Water		
Raw Sea Water		
Filtered Sea Water		
Compressed Air		
House Vacuum		
Natural Gas		
Steam		
Chilled Water (process)		
Nitrogen (N2)		
Nitrogen (liquid, LN)		
Carbon Dioxide (CO2)		
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)
Floor Sink (y/n)
Fire Protection Hazard Class
Fire Extinguisher Type

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	
Safety Shower (y/n)	**w/ Eyewash (y/n)**
Drench Hose at Sinks (y/n)	
Flam. Stor. Cab's (y/n)	**ventilated (y/n)**

Electrical Data

110V Power	Yes
208V Power	**Phase**
480V Power	
Emergency Power	
Specialty Power (specify)	
UPS	**OFOI (y/n)**

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	Yes
Safe Light (y/n)	
In-Use Light (y/n)	
Zoned Lighting (y/n)	

Additional Comments:

Data for Future

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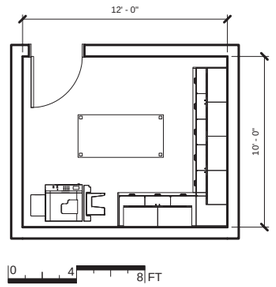
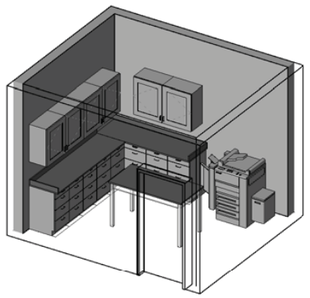
Space Diagrams





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General Room Data

Room Name	Print/Copy/Mail Room		
Room Number	2.2.4, 2.2.6		
Department	Administrative Conference		
Space Type	Zone A		
Area	120 SF	**No. of Occupants**	
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:
- **Temperature:**
- **Humidity:**
- **Vibration**
- **Electromagnetic:**
- **Acoustics:**

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-0" x 8'-0"
Wall Base	4" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	Galv. HM
Min. Ceiling Ht.	9'-6"	**Frame Material**	Galv. HM
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	
		Natural Daylight (y/n)	

Casework Data

Casework Type
Casework Mat'l
Worktop Mat'l
Casework Ht.
Sink Mat'l
Sink Quantity
Cup Sinks (y/n)
Flam/Ventilated Base Cab's at FH (y/n)

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)	**Single Pass Air (y/n)**		
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water	No	
Hot Water	No	
Purified Water	No	
RO/DI Water	No	
Raw Sea Water	No	
Filtered Sea Water	No	
Compressed Air	No	
House Vacuum	No	
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	No
Floor Sink (y/n)	No
Fire Protection Hazard Class	N/A
Fire Extinguisher Type	C

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	N/A		
Safety Shower (y/n)	No	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	No		
Flam. Stor. Cab's (y/n)	No	**ventilated (y/n)**	No

Electrical Data

110V Power	Yes		
208V Power	No	**Phase**	
480V Power	No		
Emergency Power			
Specialty Power (specify)	Dedicated		
UPS		**OFOI (y/n)**	

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	Yes
Safe Light (y/n)	
In-Use Light (y/n)	
Zoned Lighting (y/n)	

Additional Comments:

Data, Confirm copier requirements

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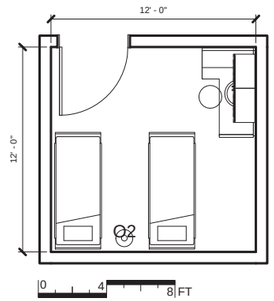
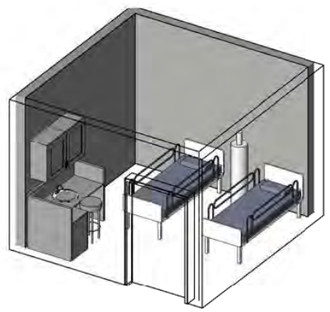
Space Diagrams





General Room Data

Room Name	Nursing Station	**Special Requirements:**	
Room Number	2.2.5	**Temperature:**	
Department	Administrative Conference	**Humidity:**	
Space Type	Zone A	**Vibration**	
Area	144 SF	**Electromagnetic:**	
No. of Occupants		**Acoustics:**	
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	3'-0" x 8'-0"
Wall Base	4" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	Galv. HM
Min. Ceiling Ht.	9'-6"	**Frame Material**	Galv. HM
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	
Casework Mat'l	
Worktop Mat'l	Epoxy
Casework Ht.	
Sink Mat'l	Vitreous China
Sink Quantity	1
Cup Sinks (y/n)	No
Flam/Ventilated Base Cab's at FH (y/n)	

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)		**Single Pass Air (y/n)**	
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water	Yes	
Hot Water	Yes	
Purified Water	No	
RO/DI Water	No	
Raw Sea Water	No	
Filtered Sea Water	No	
Compressed Air	No	
House Vacuum	No	
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	No
Floor Sink (y/n)	No
Fire Protection Hazard Class	N/A
Fire Extinguisher Type	C

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	N/A		
Safety Shower (y/n)	No	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	No		
Flam. Stor. Cab's (y/n)	No	**ventilated (y/n)**	No

Electrical Data

110V Power	Yes
208V Power	**Phase**
480V Power	
Emergency Power	Yes
Specialty Power (specify)	
UPS	**OFOI (y/n)**

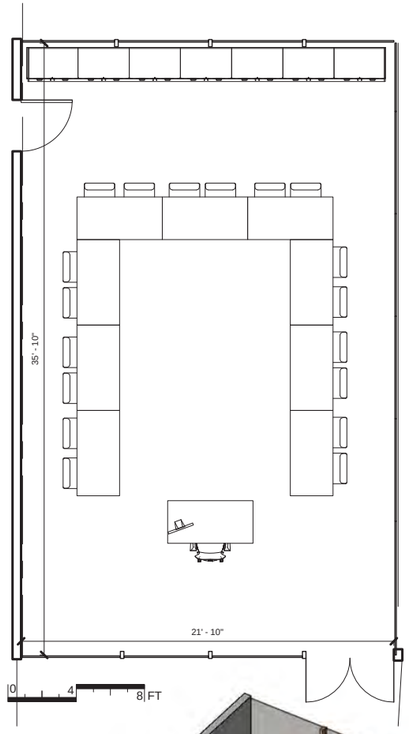
Lighting Data

Lighting Level (benchtop)	30-75 fc
Ambient Lighting Type	Indirect/Daylight
Task Lighting (y/n)	Yes
Safe Light (y/n)	
In-Use Light (y/n)	
Zoned Lighting (y/n)	

Additional Comments:

Data, Ceiling Fan, P.O.U. O2 Gas, Lockable storage cabinets, Hand Sink

Space Diagrams



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General Room Data

Room Name	Classroom, Meeting Room		
Room Number	3.1.1, 3.1.2		
Department	Lecture and Teaching		
Space Type	Zone A		
Area	782 SF	**No. of Occupants**	
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:

Temperature:	Ambient - 78° F
Humidity:	< 60%
Vibration	
Electromagnetic:	
Acoustics:	NC 40-50

Architectural and Door Data

Flooring	Sealed Concrete	**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Pair
Wall Finish	Epoxy Coating	**Primary Leaf Size:**	6'-0" x 8'-0"
Wall Base	4" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	Galv. HM
Min. Ceiling Ht.	9'-6"	**Frame Material**	Galv. HM
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	
		Natural Daylight (y/n)	Yes

Casework Data

Casework Type	Movable/Fixed
Casework Mat'l	FRP
Worktop Mat'l	Epoxy
Casework Ht.	Standing
Sink Mat'l	N/A
Sink Quantity	0
Cup Sinks (y/n)	No
Flam/Ventilated Base Cab's at FH (y/n)	

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)		**Single Pass Air (y/n)**	
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water	No	
Hot Water	No	
Purified Water	No	
RO/DI Water	No	
Raw Sea Water	No	
Filtered Sea Water	No	
Compressed Air	No	
House Vacuum	No	
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	No
Floor Sink (y/n)	No
Fire Protection Hazard Class	
Fire Extinguisher Type	

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	N/A		
Safety Shower (y/n)	No	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	No		
Flam. Stor. Cab's (y/n)	No	**ventilated (y/n)**	No

Electrical Data

110V Power	Yes
208V Power	**Phase**
480V Power	
Emergency Power	
Specialty Power (specify)	
UPS	**OFOI (y/n)**

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	
Task Lighting (y/n)	Yes
Safe Light (y/n)	
In-Use Light (y/n)	
Zoned Lighting (y/n)	

Additional Comments:

Data

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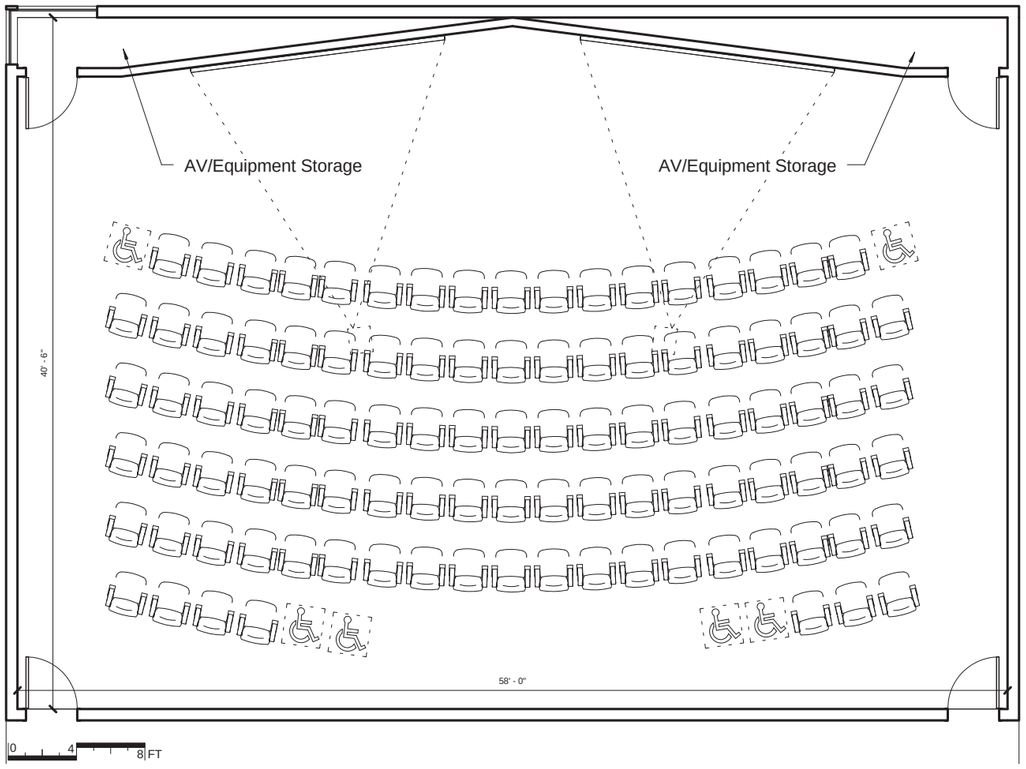
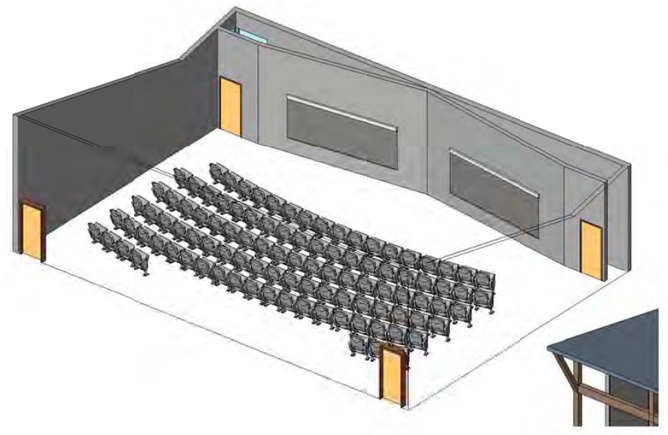
Space Diagrams





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General Room Data

Room Name	Theater w/ AV Room/Storage Room		
Room Number	2.1.10		
Department	Lecture and Teaching		
Space Type	Zone A		
Area	2,216 SF	**No. of Occupants**	100
Hours of Utilization per Day - People			
Hours of Operation per Day - Equipment			

Special Requirements:

Temperature:	
Humidity:	
Vibration	
Electromagnetic:	
Acoustics:	NC 40-50

Architectural and Door Data

Flooring		**Door and Frame Data:**	
Partitions	CMU	**Single or Double:**	Single
Wall Finish		**Primary Leaf Size:**	3'-0" x 8'-0"
Wall Base	4" Rubber	**Secondary Leaf Size:**	
Ceiling Mat'l	Exposed Structure	**Door Material**	Galv. HM
Min. Ceiling Ht.	9'-6"	**Frame Material**	Galv. HM
Wall Protect. (mat'l)		**Specialty Door (type)**	
Corner Guards (mat'l)		**Vision Panel (y/n)**	
		Natural Daylight (y/n)	

Casework Data

Casework Type	
Casework Mat'l	
Worktop Mat'l	
Casework Ht.	
Sink Mat'l	
Sink Quantity	
Cup Sinks (y/n)	
Flam/Ventilated Base Cab's at FH (y/n)	

Fume Hood, Bio Safety Cab's and HVAC Data

Hoods:		**count**	**size**
Benchtop Fume Hood Type 1			
Benchtop Fume Hood Type 2			
Walk-In Fume Hoods			
Radioisotope Hoods			
Specialty Hoods (list type)			
Biological Safety Cabinets:	**class/type**	**count**	**size**
BSC Type 1			
BSC Type 2			
Other Exhaust Devices:		**count**	**size**
Laminar Flow Hoods			
Canopy Hoods			
Snorkel Exhausts (y/n)			
Pressurization (+pos/-neg)		**Single Pass Air (y/n)**	
Air Changes per Hour (normal operation)			
Air Filtration (supply and/or exhaust)			

Piped Services Data

service	**y/n**	**comments**
Cold Water	No	
Hot Water	No	
Purified Water	No	
RO/DI Water	No	
Raw Sea Water	No	
Filtered Sea Water	No	
Compressed Air	No	
House Vacuum	No	
Natural Gas	No	
Steam	No	
Chilled Water (process)	No	
Nitrogen (N2)	No	
Nitrogen (liquid, LN)	No	
Carbon Dioxide (CO_2)	No	
Specialty Gas		

Plumbing and Fire Protection Data

Floor Drains (y/n)	No
Floor Sink (y/n)	No
Fire Protection Hazard Class	
Fire Extinguisher Type	

Lab Safety and Personnel Protection Data

Biosafety Level (I, II, III, IV)	N/A		
Safety Shower (y/n)	No	**w/ Eyewash (y/n)**	No
Drench Hose at Sinks (y/n)	No		
Flam. Stor. Cab's (y/n)	No	**ventilated (y/n)**	No

Electrical Data

110V Power	Yes
208V Power	**Phase**
480V Power	
Emergency Power	Yes
Specialty Power (specify)	
UPS	**OFOI (y/n)**

Lighting Data

Lighting Level (benchtop)	70 fc
Ambient Lighting Type	
Task Lighting (y/n)	
Safe Light (y/n)	No
In-Use Light (y/n)	No
Zoned Lighting (y/n)	No

Additional Comments:

Data, (2) Overhead Projector Junction Boxes

LEED 2009 for New Construction and Major Renovation Project Scorecard

general project notes: 60,000 GSF total building area, on 73 acre site, developing 10; Marine laboratory & education with student housing

Project Name: NPS SARI Marine Research & Education Center
Project Address: Salt River Bay, St. Croix, US Virgin Islands 00820

regional priority credits: SSc2, SSc5.1, SSc6.1, SSc8, WEc2, MRc2 (75%)
updated: 2011.2.10

Responsible	Yes	?	No			SUSTAINABLE SITES	26 Points	notes
C	Y			C	Prereq 1	**Construction Activity Pollution Prevention**	Required	
C			1	D	Credit 1	**Site Selection**	1	Maintenance building below 100 year flood plain
C			5	D	Credit 2	**Development Density and Community Connectivity**	5	
C			1	D	Credit 3	**Brownfield Redevelopment**	1	
C			6	D	Credit 4.1	**Alternative Transportation -** Public Transportation Access	6	Site is more than 1/4 mile from nearest bus routes.
C	1			D	Credit 4.2	**Alternative Transportation -** Bicycle Storage and Changing Rooms	1	Will need covered storage for residents (8 bikes); Need capacity for 11 visitor bikes (@207 visitors).
C	3			D	Credit 4.3	**Alternative Transportation -** Low-Emitting and Fuel-Efficient Vehicles	3	Provide preferred parking for 2 for low-emitting and fuel-efficient vehicles
C	2			D	Credit 4.4	**Alternative Transportation -** Parking Capacity	2	Provide preferred parking for 3 carpool parking spots and parking capacity not to exceed minimum local zoning requirements
C	1			C	Credit 5.1	**Site Development -** Protect or Restore Habitat	1	Restore or protect a minimum of 50% of the site area with native or adapted vegetation
C	1			D	Credit 5.2	**Site Development -** Maximize Open Space	1	
C	1			D	Credit 6.1	**Stormwater Design -** Quantity Control	1	Stormwater management plan
C	1			D	Credit 6.2	**Stormwater Design -** Quality Control	1	reduce impervious cover, promote infiltration and capture and treat stormwater runoff from 90% of the average annual rainfall (about 1.2 million gallons)
C	1			C	Credit 7.1	**Heat Island Effect -** Nonroof	1	
A	1			D	Credit 7.2	**Heat Island Effect -** Roof	1	
E	1			D	Credit 8	**Light Pollution Reduction**	1	extremely important for sea turtle conservation
	Yes	?	No			WATER EFFICIENCY	10 Points	notes
A	Y			D	Prereq 1	**Water Use Reduction**	Required	
C	4			D	Credit 1	**Water Efficient Landscaping**	2 to 4	Net Zero water gets us all these credits; as we are using no municipal water for the whole project.
						Reduce by 50%	2	
						No Potable Water Use or Irrigation	4	
P	2			D	Credit 2	**Innovative Wastewater Technologies**	2	
A	4			D	Credit 3	**Water Use Reduction**	2 to 4	Will have to figure out the degree that we want to lower water use reduction since a greater volume is better for the on site treatment
						Reduce by 30%	2	
						Reduce by 35%	3	
						Reduce by 40%	4	
	Yes	?	No			ENERGY & ATMOSPHERE	35 Points	notes
CxA	Y			C	Prereq 1	**Fundamental Commissioning of Building Energy Systems**	Required	
EM	Y			D	Prereq 2	**Minimum Energy Performance**	Required	
M	Y			D	Prereq 3	**Fundamental Refrigerant Management**	Required	
EM	19			D	Credit 1	**Optimize Energy Performance**	1 to 19	
						Improve by 12% for New Buildings or 8% for Existing Building Renovations	1	
						Improve by 14% for New Buildings or 10% for Existing Building Renovations	2	
						Improve by 16% for New Buildings or 12% for Existing Building Renovations	3	
						Improve by 18% for New Buildings or 14% for Existing Building Renovations	4	
						Improve by 20% for New Buildings or 16% for Existing Building Renovations	5	
						Improve by 22% for New Buildings or 18% for Existing Building Renovations	6	
						Improve by 24% for New Buildings or 20% for Existing Building Renovations	7	
						Improve by 26% for New Buildings or 22% for Existing Building Renovations	8	
						Improve by 28% for New Buildings or 24% for Existing Building Renovations	9	
						Improve by 30% for New Buildings or 26% for Existing Building Renovations	10	
						Improve by 32% for New Buildings or 28% for Existing Building Renovations	11	
						Improve by 34% for New Buildings or 30% for Existing Building Renovations	12	
						Improve by 36% for New Buildings or 32% for Existing Building Renovations	13	
						Improve by 38% for New Buildings or 34% for Existing Building Renovations	14	
						Improve by 40% for New Buildings or 36% for Existing Building Renovations	15	
						Improve by 42% for New Buildings or 38% for Existing Building Renovations	16	
						Improve by 44% for New Buildings or 40% for Existing Building Renovations	17	
						Improve by 46% for New Buildings or 42% for Existing Building Renovations	18	
						Improve by 48%+ for New Buildings or 44%+ for Existing Building Renovations	19	
E	7			D	Credit 2	**On-Site Renewable Energy**	1 to 7	
						1% Renewable Energy	1	
						3% Renewable Energy	2	
						5% Renewable Energy	3	
						7% Renewable Energy	4	
						9% Renewable Energy	5	
						11% Renewable Energy	6	
						13% Renewable Energy	7	DONE - 100% ONSITE!
CxA	2			C	Credit 3	**Enhanced Commissioning**	2	
M	2			D	Credit 4	**Enhanced Refrigerant Management**	2	
M	3			C	Credit 5	**Measurement and Verification**	3	Since 100% of power is generated on site and most systems are ceiling fans, do we need to do this?
O	2			C	Credit 6	**Green Power**	2	Do we get this credit if we meet 100% load on site? Net zero power should give us this credit.
	Yes		No			MATERIALS & RESOURCES	14 Points	notes
	4	6	4					
	Y			D	Prereq 1	**Storage and Collection of Recyclables**	Required	
A			3	C	Credit 1.1	**Building Reuse** - Maintain Existing Walls, Floors and Roof	1 to 3	
						Reuse 55%	1	
						Reuse 75%	2	
						Reuse 95%	3	
A			1	C	Credit 1.2	**Building Reuse -** Maintain Interior Nonstructural Elements	1	
GC	2			C	Credit 2	**Construction Waste Management**	1 to 2	
						50% Recycled or Salvaged	1	
						75% Recycled or Salvaged	2	
GC	2			C	Credit 3	**Materials Reuse**	1 to 2	
						Reuse 5%	1	
						Reuse 10%	2	
GC	2			C	Credit 4	**Recycled Content**	1 to 2	
						10% of Content	1	
						20% of Content	2	
GC	2			C	Credit 5	**Regional Materials**	1 to 2	Due to remote location, this credit is highly unlikely.
						10% of Materials	1	
						20% of Materials	2	
GC	1			C	Credit 6	**Rapidly Renewable Materials**	1	
GC	1			C	Credit 7	**Certified Wood**	1	Will depend on the total amount of wood in the project and the cost impact of FSC products. Need to weigh carbon foot print of long travel against closer supplies.
	Yes	?	No			INDOOR ENVIRONMENTAL QUALITY	15 Points	notes
M	Y			D	Prereq 1	**Minimum Indoor Air Quality Performance**	Required	
O	Y			D	Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required	
M				D	Credit 1	**Outdoor Air Delivery Monitoring**	1	
M	1			D	Credit 2	**Increased Ventilation**	1	Design natural ventilation systems to meet Carbon Trust "Good Practice Guide 237"; use an analytical model to demonstrate minimum ventilation rates required by ASHRAE 62.1-2007 for 90% occupied spaces; increase breathing zone OA ventilation rates by 30% above ASHRAE 62.1-2007
GC				C	Credit 3.1	**Construction Indoor Air Quality Management Plan -** During Construction	1	
GC				C	Credit 3.2	**Construction Indoor Air Quality Management Plan -** Before Occupancy	1	
GC				C	Credit 4.1	**Low-Emitting Materials -** Adhesives and Sealants	1	
GC				C	Credit 4.2	**Low-Emitting Materials -** Paints and Coatings	1	
GC				C	Credit 4.3	**Low-Emitting Materials -** Flooring Systems	1	
GC				C	Credit 4.4	**Low-Emitting Materials -** Composite Wood and Agrifiber Products	1	
M				D	Credit 5	**Indoor Chemical and Pollutant Source Control**	1	
E				D	Credit 6.1	**Controllability of Systems -** Lighting	1	individual task lighting for 90% of occupants
M				D	Credit 6.2	**Controllability of Systems -** Thermal Comfort	1	operable windows that meet ASHRAE 62.1-2007
M				D	Credit 7.1	**Thermal Comfort -** Design	1	ASHRAE 55-2004
O				D	Credit 7.2	**Thermal Comfort -** Verification	1	
A				D	Credit 8.1	**Daylight and Views -** Daylight	1	All spaces should be daylit (maybe minus theater)
A				D	Credit 8.2	**Daylight and Views -** Views	1	thin building to promote natural ventilation so 90% of occupied areas should be achievable
	Yes	?	No			INNOVATION IN DESIGN	6 Points	notes
L				D	Credit 1.1	**Innovation in Design - Green Building Education**	1	
L				D	Credit 1.2	**Innovation in Design -** tbd	1	
L				D	Credit 1.3	**Exemplary Performance - WEc2**	1	100% reduction in potable water for sewage conveyance
L				D	Credit 1.4	**Exemplary Performance - EAc2**	1	Renewable energy accounts for 15% or more of annual building energy cost
L				D	Credit 1.5	**Innovation in Design -** tbd	1	
L				C	Credit 2	**LEED® Accredited Professional**	1	
	Yes	?	No			REGIONAL PRIORITY	4 Points	notes
L				D	Credit 1.1	**Regional Priority - SSc5.1 Protect or Restore Habitat**	1 to 4	
L				D	Credit 1.2	**Regional Priority - SSc6.1 Quantity Control**	1	
L				D	Credit 1.3	**Regional Priority - SSc8 Light Pollution Reduction**	1	
L				D	Credit 1.4	**Regional Priority - WEc2 Innovative Wastewater Technology**	1	
	Yes	?	No			PROJECT TOTALS (Certification Estimates)	110 Points	
	87	6	17					

Certified: 40-49 points Silver: 50-59 points Gold: 60-79 points Platinum: 80+ points

O = Owner; A = Architect; C = Civil; M = Mechanical; E = Electrical; P = Plumbing; EM= Energy Modeler
GC/CM = General Contractor/Construction Manager; CxA = Commissioning Agent; L = LEED AP; I = Interiors

appendix
LEED score card

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INTERNATIONAL LIVING BUILDING INSTITUTE

Project Name: NPS SARI Marine Research & Education Center
Project Address: Salt River Bay, St. Croix, US Virgin Islands 00820

Y/?/N	Site Petal	?
Y	Limits to Growth	Projects may only be built on greyfields or brownfields that are not: wetlands, primary dunes, old-growth forest, virgin prairie, prime farmland, or within the 100-year flood plain
?	Urban Agriculture	Must integrate opportunities for agriculture appropriate to scale and density of the project usings its F.A.R. as the basis
Y	Habitat Exchange	For each hectare of development, an equal amount of land must be set-aside in perpetuity
Y	Car Free Living	Contribute towards the creation of walkable, pedestrian-oriented communities that support a car free lifestyle

Y/?/N	Water Petal	Targeting
Y	Net Zero Water	100% of occupants water use must come from captured precipitation or closed loop water systems that are appropriately purified without the use of chemicals
Y	Ecological Water Flow	100% stormwater & building water discharge must be managed onsite

Y/?/N	Energy Petal	Targeting
Y	Net Zero Energy	100% of projects energy needs supplied by on-site renewables on a net annual basis

Y/?/N	Health Petal	Targeting
Y	Civilized Environment	100% occupiable space must have operable windows that provide access to fresh air and daylight. Theatres and lab spaces with fume hoods are exempt
Y	Healthy Air	Entryways must have an external dirt track-in system; all kitchens, bathrooms, copy rooms, janitor closets, and chemical storage spaces must be separately ventilated and exhaust directly to outside; smoking prohibited in project boundary; conduct air quality testing at pre-occupancy & 9 months after
Y	Biophilia	Designed to include elements that nurture the innate human attraction to natural systems and processes

Y/?/N	Materials Petal	?
?	Red List	Project cannot contain any of the red list materials or chemicals
Y	Embodied Carbon Footprint	Project must account for the total footprint of embodied carbon from its construction and do a one time carbon offset
Y	Responsible Industry	Project must advocate for the creation and adoption of 3rd party certicied standards for sustainable resource extraction and fair labor practices. Applicable raw materials include stone and rock, metal, and timber
?	Appropriate Sourcing	Project must incorporate place-based solutions and contribute to the expansion of a regional economy rooted in sustainable practices, products and services
Y	Conservation & Reuse	All teams must strive to reduce or eliminate the production of waste during design, construction, operation, and end of life in order to conserve natural resources; must create a materail conservation management plan and divert the required wasted materials from landfills

Y/?/N	Equity Petal	Targeting
Y	Human Scale + Humane Places	Designed to create human-scaled rather than automobile-scaled places; there are specific maximum requirements for paved areas for each transect
Y	Democracy + Social Justice	ADA
Y	Rights to Nature	Project may not block access to, nor diminish the quality of fresh air, sunlight & natural waterways for any member of society or adjacent developments

Y/?/N	Beauty Petal	Targeting
Y	Beauty + Spirit	Project must contain design features intended solely for human delight and celebration of culture, spirit and place.
Y	Inspiration + Education	Educational materials about the performance and operation of the project must be provided to the public.

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LORD AECK SARGENT

National Park Service

Net Construction Budget (Class C)

Salt River Bay Marine Research & Education Center (Scheme 2A)

Prepared: May 9, 2011

Revised: June 6, 2011

Item			$/GSF	% Construction	Total
Construction			$721.60	100.0%	**$44,123,869**
Laboratory (Zone A)	*9,300*	*GSF*	*$815.80*	17.2%	*$7,586,913*
Laboratory (Zone C)	*5,700*	*GSF*	*$609.17*	7.9%	*$3,472,270*
Building Administration	*3,385*	*GSF*	*$653.42*	5.0%	*$2,211,825*
Lecture & Teaching	*4,234*	*GSF*	*$578.94*	5.6%	*$2,451,235*
Community Outreach and Collections	*4,400*	*GSF*	*$483.13*	4.8%	*$2,125,765*
Lobby/Comminuity Shared Space/Pavillion (Zone C)	*4,400*	*GSF*	*$349.63*	3.5%	*$1,538,384*
Housing (Director) Zone A	*1,308*	*GSF*	*$685.59*	2.0%	*$896,755*
Housing (Graduate) Zone C	*9,000*	*GSF*	*$718.62*	14.7%	*$6,467,583*
Housing (Undergraduate) Zone C	*8,550*	*GSF*	*$716.47*	13.9%	*$6,125,794*
Dining Pavillion (Zone C)	*2,800*	*GSF*	*$326.99*	2.1%	*$915,573*
Dining Support (Zone A)	*750*	*GSF*	*$523.84*	0.9%	*$392,884*
Boat Dock Facilities (Zone C)	*3,000*	*GSF*	*$367.05*	2.5%	*$1,101,157*
Maintenance Building (Zone C)	*4,320*	*GSF*	*$304.20*	3.0%	*$1,314,148*
Site Improvements	*38,452*	*SY*	*$195.66*	17.1%	*$7,523,583*
Exhibits			$3.60	0.5%	**$220,000**
Seawater Intake Piping Allownace			$8.99	1.2%	**$550,000**
Total Project Budget	***61,147***	*GSF*	***$734.20***	***101.75%***	***$44,893,869***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Laboratory (Zone A)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$10.99	2.5%	**$102,233**
A20 - Basement Construction				$35.64	8.2%	**$331,460**
B10 - Superstructure				$81.78	18.9%	**$760,553**
B20 - Exterior Enclosure				$68.26	15.8%	**$634,802**
B30 - Roofing				$30.10	6.9%	**$279,926**
C10 - Interior Construction				$11.48	2.6%	**$106,719**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$7.59	1.8%	**$70,626**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$30.00	6.9%	**$279,000**
D30 - Heating, Ventilating & Air Conditio		62%		$85.75	19.8%	**$797,484**
D40 - Fire Protection				$3.00	0.7%	**$27,900**
D50 - Electrical				$26.00	6.0%	**$241,800**
E10 - Equipment				$8.81	2.0%	**$81,900**
E20 - Furnishings				$31.13	7.2%	**$289,494**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$2.79	0.6%	**$25,988**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
Subtotal Direct Construction Costs				***$433.32***	***62.27%***	***$4,029,885***
Published Location Factor				-21.90%	4,029,885	($882,545)
Remoteness Factor				30.00%	3,147,340	$944,202
Federal Wage Rate Factor				0.00%	1,841,194	$0
State/Local Taxes				10.00%	2,250,348	$225,035
Design Contingency				10.00%	4,316,577	$431,658
Total Direct Construction Costs				***$510.56***		***$4,748,235***
Standard General Conditions				15.00%	4,748,235	$712,235
Governmental General Conditions				5.00%	5,460,470	$273,024
Historic Preservation Factor				0.00%	5,733,494	$0
Subtotal NET Construction Costs				***$616.50***		***$5,733,494***
Overhead				5.00%	5,733,494	$286,675
Profit				7.50%	6,020,168	$451,513
Estimated NET Construction Cost				***$695.88***	***85.30%***	***$6,471,681***
Contracting Method Adjustment				5.00%	6,471,681	$323,584
Escalation to 2014		32	MOS	10.00%	6,795,265	$679,527
Bond				1.50%	7,474,792	$112,122
Total Estimated NET Cost of Construction		***9,300***	***GSF***	***$815.80***	***/GSF***	***$7,586,913***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Laboratory (Zone A)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		9300.0	gsf	0.00	$0	**$102,233**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$65,033*
	continuous footing x'0	439.8	lf	133.33	$58,633	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	24.0	ea	266.67	$6,400	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$37,200*
	standard slab on grade	9300.0	sf	4.00	$37,200	
A20 - Basement Construction		9300.0	gsf	0.00	$0	**$331,460**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$90,106*
	excavation	6644.0	cy	5.00	$33,220	
	backfill & compaction	2491.1	cy	12.50	$31,139	
	haul off excess soil (on site)	5149.4	cy	5.00	$25,747	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$241,354*
	basement wall (cistern) x13'0	5716.8	sf	25.00	$142,919	
	vertical waterproofing	6574.3	sf	5.00	$32,871	
	foundation drain	549.7	lf	10.00	$5,497	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	15016.8	sf	4.00	$60,067	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		9300.0	gsf	0.00	$0	**$760,553**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$260,400*
	structural frame (precast)	9300.0	sf	25.00	$232,500	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	9300.0	sf	3.00	$27,900	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$500,153*
	structural frame (wood)	11114.5	sf	40.00	$444,580	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	11114.5	sf	5.00	$55,573	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		9300.0	gsf	0.00	$0	**$634,802**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$368,586*
	exterior skin (stone veneer) cistern x4'0	1715.0	sf	20.00	$34,301	
	exterior skin (board siding) stain x15'0	3298.1	sf	6.60	$21,768	
	exterior wall construction (wood framing) 2x6 @16"oc	7348.1	sf	1.63	$11,971	
	sheathing	3298.1	sf	1.79	$5,904	
	woven wire cloth (SS) fine	0.0	sf	2.74	$0	
	vapor barrier/insulation	3298.1	sf	2.29	$7,553	
	interior skin (gypsum board) water resistant	3298.1	sf	1.87	$6,167	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	0.0	sf	4.02	$0	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	3298.1	sf	0.50	$1,649	
	exterior louver	46.5	sf	60.00	$2,790	
	ornamental grilles/screens (wood framed)	0.0	sf	10.00	$0	
	ornamental grilles/screens (wood framed) clerestory x5'4	0.0	sf	10.00	$0	
	exterior protection devices (hurricane shutters)	4050.0	sf	60.00	$243,001	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	1814.5	sf	2.80	$5,081	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	9.0	ea	3155.75	$28,402	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$252,561*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	25% glazed curtain wall	1649.1	sf	40.00	$65,963	
	25% glazed curtain wall (hurricane rated)	1649.1	sf	75.00	$123,680	
	glazed curtain wall (clerestory) x4'5	751.9	sf	75.00	$56,392	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	2610.6	lf	2.50	$6,527	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$13,655*
	utility door/frame (single)	2.0	ea	932.00	$1,864	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	4.0	pr	1598.00	$6,392	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	114.0	lf	2.50	$285	
	sealant/caulking	114.0	lf	1.00	$114	
	finish hardware (single)	2.0	ea	500.00	$1,000	
	finish hardware (double)	4.0	ea	1000.00	$4,000	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		9300.0	gsf	0.00	$0	**$279,926**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$279,926*
	vapor barrier/ ~~insulation~~	11114.5	sf	2.00	$22,229	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	11114.5	sf	22.00	$244,519	
	flashing/sheet metal	527.1	lf	20.00	$10,543	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	1054.3	lf	2.50	$2,636	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		9300.0	gsf	0.00	$0	**$106,719**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$67,649*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	0.0	sf	9.67	$0	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	13556.9	sf	4.99	$67,649	
	balustrade/screen/railing	0.0	sf	0.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Laboratory (Zone A)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition	0.0	sf	0.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$25,120*
	wood door/frame (single)	0.0	ea	701.00	$0	
	wood door/frame (unequal)	0.0	pr	918.50	$0	
	wood door/frame (double)	0.0	pr	1136.00	$0	
	FRP door/frame (single)	8.0	ea	1132.00	$9,056	
	FRP door/frame (unequal)	3.0	pr	1474.00	$4,422	
	FRP door/frame (double)	2.0	pr	1816.00	$3,632	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	231.5	lf	2.50	$579	
	sealant/caulking	231.5	lf	1.00	$232	
	finish hardware (single)	8.0	ea	400.00	$3,200	
	finish hardware (double)	5.0	ea	800.00	$4,000	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		9300.0	gsf	1.50	$13,950	*$13,950*
C20 - Stairs		9300.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		9300.0	gsf	0.00	$0	**$70,626**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$28,279*
	wood board finish (paint)	0.0	sf	0.69	$0	
	gyp board finish	29863.4	sf	0.80	$23,891	
	tile	548.6	sf	8.00	$4,389	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$32,722*
	concrete (color stain & seal)	8835.0	sf	2.50	$22,088	
	5% tile	465.0	sf	10.00	$4,650	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	91.4	lf	9.00	$823	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Laboratory (Zone A)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	1032.2	lf	5.00	$5,161	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$9,626*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	10695.0	sf	0.90	$9,626	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		9300.0	gsf	0.00	$0	**$0**
D20 - Plumbing		9300.0	gsf	30.00	$279,000	**$279,000**
D2000 - Demolition		0.0	gsf	0.00	$0	*$279,000*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		9300.0	gsf	65.00	$604,500	**$797,484**
D3000 - Demolition		0.0	gsf	0.00	$0	*$604,500*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$192,984*
	solar collectors (Heliodyne)	1.0	ls	175364.00	$175,364	
	solar storage tank x8,000 gal	1.0	ls	17620.00	$17,620	
D40 - Fire Protection		9300.0	gsf	3.00	$27,900	**$27,900**
D4000 - Demolition		0.0	gsf	0.00	$0	*$27,900*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		9300.0	gsf	26.00	$241,800	**$241,800**
D5000 - Demolition		0.0	gsf	0.00	$0	*$241,800*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		9300.0	gsf	0.00	$0	**$81,900**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Laboratory (Zone A)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$81,900*
	audio-visual	0.0	ea	0.00	$0	
	laboratory (shelving) OFCI	5.0	ea	90.00	$450	
	laboratory (-80 deg freezer) OFCI	2.0	ea	150.00	$300	
	laboratory (4 deg reach-in freezer) OFCI	5.0	ea	150.00	$750	
	laboratory (equipment x10'0) OFCI	6.0	ea	150.00	$900	
	laboratory (ADA fume hood) x6'0	1.0	ea	9000.00	$9,000	
	laboratory (biosafety cabinet) type IIA x6'0	1.0	ea	10500.00	$10,500	
	laboratory (raceway tank) dbl x15'0	2.0	ea	15000.00	$30,000	
	laboratory (tank) x5'0 dia	3.0	ea	10000.00	$30,000	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$0*
	food service	0.0	ea	0.00	$0	
	residential	0.0	ea	0.00	$0	
E20 - Furnishings		9300.0	gsf	0.00	$0	**$289,494**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$289,494*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	0.0	lf	0.00	$0	
	casework (wall cabinet) x'0	112.0	lf	245.00	$27,440	
	casework (base cabinet) x24"	67.0	lf	350.00	$23,450	
	casework (countertop) x16"	2.7	lf	59.85	$160	
	casework (countertop) x22"	49.0	lf	82.35	$4,035	
	casework (countertop) x2'6	169.2	lf	112.50	$19,031	
	casework (fume hood) x3'0	4.0	ea	4500.00	$18,000	
	casework (fume hood) x4'0	10.0	ea	6000.00	$60,000	
	casework (flam/chem)	52.0	lf	175.00	$9,100	
	casework (lab table) 2'6 x5'0	35.0	ea	1225.00	$42,875	
	casework (util chase) vert x12'0	204.0	vlf	126.00	$25,704	
	casework (lab sink) single	10.0	ea	250.00	$2,500	
	casework (fixture) lab	10.0	ea	350.00	$3,500	
	casework (fixture) DI/RO	10.0	ea	300.00	$3,000	
	casework (eyewash) deck mtd	10.0	ea	390.00	$3,900	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	16.0	ea	2800.00	$44,800	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	0.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	799.7	lf	2.50	$1,999	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		9300.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		9300.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		9300.0	gsf	0.00	$0	**$25,988**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$4,443*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	516.7	cy	4.00	$2,067	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	594.2	cy	4.00	$2,377	

Construction Budget (Class C)

Laboratory (Zone A)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$21,544*
	grading x4'0	4133.3	cy	4.00	$16,533	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	835.2	lf	6.00	$5,011	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		9300.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		9300.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		9300.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		9300.0	gsf	0.00	$0	**$0**
Subtotal					$4,029,885	**$4,029,885**

Construction Budget (Class C)

Laboratory (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$11.80	3.6%	**$67,267**
A20 - Basement Construction				$43.78	13.5%	**$249,543**
B10 - Superstructure				$83.00	25.7%	**$473,093**
B20 - Exterior Enclosure				$63.62	19.7%	**$362,640**
B30 - Roofing				$31.02	9.6%	**$176,795**
C10 - Interior Construction				$9.50	2.9%	**$54,124**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$5.06	1.6%	**$28,835**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$18.00	5.6%	**$102,600**
D30 - Heating, Ventilating & Air Conditio	38%			$16.00	4.9%	**$91,200**
D40 - Fire Protection				$2.00	0.6%	**$11,400**
D50 - Electrical				$22.00	6.8%	**$125,400**
E10 - Equipment				$0.00	0.0%	**$0**
E20 - Furnishings				$14.91	4.6%	**$84,978**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$2.89	0.9%	**$16,466**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
	Subtotal Direct Construction Costs			***$323.57***	***62.27%***	***$1,844,340***
Published Location Factor				-21.90%	1,844,340	($403,910)
Remoteness Factor				30.00%	1,440,430	$432,129
Federal Wage Rate Factor				0.00%	842,651	$0
State/Local Taxes				10.00%	1,029,907	$102,991
Design Contingency				10.00%	1,975,549	$197,555
Total Direct Construction Costs				***$381.25***		***$2,173,104***
Standard General Conditions				15.00%	2,173,104	$325,966
Governmental General Conditions				5.00%	2,499,070	$124,953
Historic Preservation Factor				0.00%	2,624,023	$0
Subtotal NET Construction Costs				***$460.35***		***$2,624,023***
Overhead				5.00%	2,624,023	$131,201
Profit				7.50%	2,755,224	$206,642
Estimated NET Construction Cost				***$519.63***	***85.30%***	***$2,961,866***
Contracting Method Adjustment				5.00%	2,961,866	$148,093
Escalation to 2014		32	MOS	10.00%	3,109,959	$310,996
Bond				1.50%	3,420,955	$51,314
Total Estimated NET Cost of Construction		***5,700***	***GSF***	***$609.17***	***/GSF***	***$3,472,270***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Laboratory (Zone C)

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		5700.0	gsf	0.00	$0	**$67,267**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$44,467*
	continuous footing x'0	303.5	lf	133.33	$40,467	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	15.0	ea	266.67	$4,000	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$22,800*
	standard slab on grade	5700.0	sf	4.00	$22,800	
A20 - Basement Construction		5700.0	gsf	0.00	$0	**$249,543**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$64,750*
	excavation	4751.6	cy	5.00	$23,758	
	backfill & compaction	1822.7	cy	12.50	$22,784	
	haul off excess soil (on site)	3641.7	cy	5.00	$18,208	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$184,793*
	basement wall (cistern) x15'0	4552.5	sf	25.00	$113,813	
	vertical waterproofing	5235.4	sf	5.00	$26,177	
	foundation drain	379.4	lf	10.00	$3,794	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	10252.5	sf	4.00	$41,010	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		5700.0	gsf	0.00	$0	**$473,093**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$159,600*
	structural frame (precast)	5700.0	sf	25.00	$142,500	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	5700.0	sf	3.00	$17,100	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$313,493*
	structural frame (wood)	6966.5	sf	40.00	$278,660	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	6966.5	sf	5.00	$34,833	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		5700.0	gsf	0.00	$0	**$362,640**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$351,653*
	exterior skin (stone veneer) cistern x5'0	1365.8	sf	20.00	$27,315	
	exterior skin (board siding) stain x15'0	614.5	sf	6.60	$4,056	
	exterior wall construction (wood framing) 2x6 @16"oc	4936.3	sf	1.63	$8,042	
	sheathing	0.0	sf	1.79	$0	
	woven wire cloth (SS) fine	614.5	sf	2.74	$1,684	
	vapor barrier/insulation	0.0	sf	2.29	$0	
	interior skin (gypsum board) water resistant	0.0	sf	1.87	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Laboratory (Zone C)

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	614.5	sf	4.02	$2,470	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	614.5	sf	0.50	$307	
	exterior louver	28.5	sf	60.00	$1,710	
	ornamental grilles/screens (wood framed)	3938.0	sf	10.00	$39,380	
	ornamental grilles/screens (wood framed) clerestory x5'4	383.8	sf	10.00	$3,838	
	exterior protection devices (hurricane shutters)	4321.8	sf	60.00	$259,306	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	1266.5	sf	2.80	$3,546	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$0*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	0% glazed curtain wall	0.0	sf	40.00	$0	
	0% glazed curtain wall (hurricane rated)	0.0	sf	75.00	$0	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$10,987*
	utility door/frame (single)	2.0	ea	932.00	$1,864	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	3.0	pr	1598.00	$4,794	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	94.0	lf	2.50	$235	
	sealant/caulking	94.0	lf	1.00	$94	
	finish hardware (single)	2.0	ea	500.00	$1,000	
	finish hardware (double)	3.0	ea	1000.00	$3,000	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		5700.0	gsf	0.00	$0	**$176,795**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$176,795*
	vapor barrier/ ~~insulation~~	6966.5	sf	2.00	$13,933	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	6966.5	sf	22.00	$153,263	
	flashing/sheet metal	383.9	lf	20.00	$7,679	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	767.9	lf	2.50	$1,920	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		5700.0	gsf	0.00	$0	**$54,124**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$27,567*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	1455.0	sf	9.67	$14,069	
	wood partition (screen)	900.0	sf	6.00	$5,399	
	gyp board partition (water resistant)	0.0	sf	4.99	$0	
	balustrade/screen/railing	0.0	sf	0.00	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	1620.0	sf	5.00	$8,100	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$18,007*
	wood door/frame (single)	0.0	ea	701.00	$0	
	wood door/frame (unequal)	0.0	pr	918.50	$0	
	wood door/frame (double)	0.0	pr	1136.00	$0	
	FRP door/frame (single)	5.0	ea	1132.00	$5,660	
	FRP door/frame (unequal)	2.0	pr	1474.00	$2,948	
	FRP door/frame (double)	2.0	pr	1816.00	$3,632	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	162.0	lf	2.50	$405	
	sealant/caulking	162.0	lf	1.00	$162	
	finish hardware (single)	5.0	ea	400.00	$2,000	
	finish hardware (double)	4.0	ea	800.00	$3,200	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		5700.0	gsf	1.50	$8,550	*$8,550*
C20 - Stairs		5700.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		5700.0	gsf	0.00	$0	**$28,835**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$5,571*
	wood board finish (paint)	3095.0	sf	0.69	$2,136	
	gyp board finish	0.0	sf	0.80	$0	
	tile	429.5	sf	8.00	$3,436	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$17,364*
	concrete (color stain & seal)	5415.0	sf	2.50	$13,538	
	5% tile	285.0	sf	10.00	$2,850	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	71.6	lf	9.00	$644	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Laboratory (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	66.4	lf	5.00	$332	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$5,900*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	6555.0	sf	0.90	$5,900	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		5700.0	gsf	0.00	$0	**$0**
D20 - Plumbing		5700.0	gsf	18.00	$102,600	**$102,600**
D2000 - Demolition		0.0	gsf	0.00	$0	*$102,600*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		5700.0	gsf	16.00	$91,200	**$91,200**
D3000 - Demolition		0.0	gsf	0.00	$0	*$91,200*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		5700.0	gsf	2.00	$11,400	**$11,400**
D4000 - Demolition		0.0	gsf	0.00	$0	*$11,400*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		5700.0	gsf	22.00	$125,400	**$125,400**
D5000 - Demolition		0.0	gsf	0.00	$0	*$125,400*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		5700.0	gsf	0.00	$0	**$0**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	0.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Laboratory (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$0*
	food service	0.0	ea	0.00	$0	
	residential	0.0	ea	0.00	$0	
E20 - Furnishings		5700.0	gsf	0.00	$0	**$84,978**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$84,978*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	0.0	lf	0.00	$0	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	41.0	lf	350.00	$14,350	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	43.7	lf	82.35	$3,596	
	casework (countertop) x2'6	58.0	lf	112.50	$6,520	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	7.0	ea	980.00	$6,860	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	24.0	ea	1470.00	$35,280	
	casework (util chase) vert x12'0	48.0	vlf	126.00	$6,048	
	casework (lab sink) single	9.0	ea	250.00	$2,250	
	casework (fixture) lab	9.0	ea	350.00	$3,150	
	casework (fixture) DI/RO	9.0	ea	300.00	$2,700	
	casework (eyewash) deck mtd	9.0	ea	390.00	$3,510	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	0.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	285.3	lf	2.50	$713	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		5700.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		5700.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		5700.0	gsf	0.00	$0	**$16,466**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$2,723*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	316.7	cy	4.00	$1,267	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	364.2	cy	4.00	$1,457	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Laboratory (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$13,743*
	grading x4'0	2533.3	cy	4.00	$10,133	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	601.5	lf	6.00	$3,609	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		5700.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		5700.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		5700.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		5700.0	gsf	0.00	$0	**$0**
Subtotal					$1,844,340	**$1,844,340**

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$16.13	4.6%	**$54,607**
A20 - Basement Construction				$43.50	12.5%	**$147,233**
B10 - Superstructure				$82.39	23.7%	**$278,888**
B20 - Exterior Enclosure				$113.89	32.8%	**$385,504**
B30 - Roofing				$31.18	9.0%	**$105,547**
C10 - Interior Construction				$5.29	1.5%	**$17,911**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$5.28	1.5%	**$17,863**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$3.75	1.1%	**$12,694**
D30 - Heating, Ventilating & Air Conditio	A-75%/ C-25%			$20.00	5.8%	**$67,700**
D40 - Fire Protection				$1.85	0.5%	**$6,262**
D50 - Electrical				$18.00	5.2%	**$60,930**
E10 - Equipment				$0.00	0.0%	**$0**
E20 - Furnishings				$2.74	0.8%	**$9,284**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$3.08	0.9%	**$10,416**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
Subtotal Direct Construction Costs				***$347.07***	***62.27%***	***$1,174,839***
Published Location Factor				-21.90%	1,174,839	($257,290)
Remoteness Factor				30.00%	917,549	$275,265
Federal Wage Rate Factor				0.00%	536,766	$0
State/Local Taxes				10.00%	656,048	$65,605
Design Contingency				10.00%	1,258,419	$125,842
Total Direct Construction Costs				***$408.94***		***$1,384,261***
Standard General Conditions				15.00%	1,384,261	$207,639
Governmental General Conditions				5.00%	1,591,900	$79,595
Historic Preservation Factor				0.00%	1,671,495	$0
Subtotal NET Construction Costs				***$493.79***		***$1,671,495***
Overhead				5.00%	1,671,495	$83,575
Profit				7.50%	1,755,070	$131,630
Estimated NET Construction Cost				***$557.37***	***85.30%***	***$1,886,700***
Contracting Method Adjustment				5.00%	1,886,700	$94,335
Escalation to 2014		32	MOS	10.00%	1,981,035	$198,103
Bond				1.50%	2,179,138	$32,687
Total Estimated NET Cost of Construction		***3,385***	***GSF***	***$653.42***	***/GSF***	***$2,211,825***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Building Administration

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		3385.0	gsf	0.00	$0	**$54,607**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$41,067*
	continuous footing x'0	290.0	lf	133.33	$38,667	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	9.0	ea	266.67	$2,400	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$13,540*
	standard slab on grade	3385.0	sf	4.00	$13,540	
A20 - Basement Construction		3385.0	gsf	0.00	$0	**$147,233**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$29,293*
	excavation	2070.0	cy	5.00	$10,350	
	backfill & compaction	938.7	cy	12.50	$11,734	
	haul off excess soil (on site)	1441.8	cy	5.00	$7,209	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$117,940*
	basement wall (cistern) x10'0	2900.0	sf	25.00	$72,500	
	vertical waterproofing	3335.0	sf	5.00	$16,675	
	foundation drain	362.5	lf	10.00	$3,625	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	6285.0	sf	4.00	$25,140	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		3385.0	gsf	0.00	$0	**$278,888**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$94,780*
	structural frame (precast)	3385.0	sf	25.00	$84,625	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	3385.0	sf	3.00	$10,155	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$184,108*
	structural frame (wood)	4091.3	sf	40.00	$163,651	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	4091.3	sf	5.00	$20,456	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		3385.0	gsf	0.00	$0	**$385,504**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$262,003*
	exterior skin (stone veneer) cistern x3'0	870.0	sf	20.00	$17,400	
	exterior skin (board siding) stain x15'0	885.0	sf	6.60	$5,841	
	exterior wall construction (wood framing) 2x6 @16"oc	4350.0	sf	1.63	$7,087	
	sheathing	885.0	sf	1.79	$1,584	
	woven wire cloth (SS) fine	0.0	sf	2.74	$0	
	vapor barrier/insulation	885.0	sf	2.29	$2,027	
	interior skin (gypsum board) water resistant	885.0	sf	1.87	$1,655	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	0.0	sf	4.02	$0	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	885.0	sf	0.50	$443	
	exterior louver	16.9	sf	60.00	$1,016	
	ornamental grilles/screens (wood framed)	1507.5	sf	10.00	$15,075	
	ornamental grilles/screens (wood framed) clerestory x5'4	0.0	sf	10.00	$0	
	exterior protection devices (hurricane shutters)	3465.0	sf	60.00	$207,899	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	706.3	sf	2.80	$1,978	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$116,673*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	22% glazed curtain wall	957.0	sf	40.00	$38,280	
	23% glazed curtain wall (hurricane rated)	1000.5	sf	75.00	$75,038	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	1342.3	lf	2.50	$3,356	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$6,828*
	utility door/frame (single)	1.0	ea	932.00	$932	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	2.0	pr	1598.00	$3,196	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	57.0	lf	2.50	$143	
	sealant/caulking	57.0	lf	1.00	$57	
	finish hardware (single)	1.0	ea	500.00	$500	
	finish hardware (double)	2.0	ea	1000.00	$2,000	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		3385.0	gsf	0.00	$0	**$105,547**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$105,547*
	vapor barrier/ ~~insulation~~	4091.3	sf	2.00	$8,183	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	4091.3	sf	22.00	$90,008	
	flashing/sheet metal	294.2	lf	20.00	$5,885	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	588.5	lf	2.50	$1,471	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		3385.0	gsf	0.00	$0	**$17,911**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$3,780*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	0.0	sf	9.67	$0	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	757.5	sf	4.99	$3,780	
	balustrade/screen/railing	0.0	sf	0.00	$0	

LORD AECK SARGENT
Salt River Bay Marine Research & Education Center (Scheme 2A)
Construction Budget (Class C)
Building Administration
Prepared: May 9, 2011
Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	0.0	sf	5.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$9,054*
	wood door/frame (single)	3.0	ea	701.00	$2,103	
	wood door/frame (unequal)	2.0	pr	918.50	$1,837	
	wood door/frame (double)	1.0	pr	1136.00	$1,136	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	108.0	lf	2.50	$270	
	sealant/caulking	108.0	lf	1.00	$108	
	finish hardware (single)	3.0	ea	400.00	$1,200	
	finish hardware (double)	3.0	ea	800.00	$2,400	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		3385.0	gsf	1.50	$5,078	*$5,078*
C20 - Stairs		3385.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		3385.0	gsf	0.00	$0	**$17,863**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$3,860*
	wood board finish (paint)	0.0	sf	0.69	$0	
	gyp board finish	1515.0	sf	0.80	$1,212	
	tile	331.0	sf	8.00	$2,648	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$10,500*
	concrete (color stain & seal)	3215.8	sf	2.50	$8,039	
	5% tile	169.3	sf	10.00	$1,693	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	55.2	lf	9.00	$496	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	54.3	lf	5.00	$272	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$3,503*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	3892.8	sf	0.90	$3,503	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		3385.0	gsf	0.00	$0	**$0**
D20 - Plumbing		3385.0	gsf	3.75	$12,694	**$12,694**
D2000 - Demolition		0.0	gsf	0.00	$0	*$12,694*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		3385.0	gsf	20.00	$67,700	**$67,700**
D3000 - Demolition		0.0	gsf	0.00	$0	*$67,700*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		3385.0	gsf	1.85	$6,262	**$6,262**
D4000 - Demolition		0.0	gsf	0.00	$0	*$6,262*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		3385.0	gsf	18.00	$60,930	**$60,930**
D5000 - Demolition		0.0	gsf	0.00	$0	*$60,930*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		3385.0	gsf	0.00	$0	**$0**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	0.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Building Administration

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$0*
	food service	0.0	ea	0.00	$0	
	residential	0.0	ea	0.00	$0	
E20 - Furnishings		3385.0	gsf	0.00	$0	**$9,284**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$9,284*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	0.0	lf	0.00	$0	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	21.0	lf	350.00	$7,350	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	20.9	lf	82.35	$1,724	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	0.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	83.9	lf	2.50	$210	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		3385.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		3385.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		3385.0	gsf	0.00	$0	**$10,416**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$1,617*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	188.1	cy	4.00	$752	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	216.3	cy	4.00	$865	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Building Administration

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$8,799*
	grading x4'0	1504.4	cy	4.00	$6,018	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	463.6	lf	6.00	$2,781	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		3385.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		3385.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		3385.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		3385.0	gsf	0.00	$0	**$0**
Subtotal					$1,174,839	**$1,174,839**

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Lecture & Teaching

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$14.33	4.7%	**$60,669**
A20 - Basement Construction				$37.94	12.3%	**$160,642**
B10 - Superstructure				$82.39	26.8%	**$348,836**
B20 - Exterior Enclosure				$63.79	20.7%	**$270,071**
B30 - Roofing				$30.95	10.1%	**$131,045**
C10 - Interior Construction				$5.26	1.7%	**$22,275**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$5.04	1.6%	**$21,341**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$2.00	0.7%	**$8,468**
D30 - Heating, Ventilating & Air Conditio	A-47%/ C-53%			$20.00	6.5%	**$84,680**
D40 - Fire Protection				$2.00	0.7%	**$8,468**
D50 - Electrical				$32.00	10.4%	**$135,488**
E10 - Equipment				$0.79	0.3%	**$3,360**
E20 - Furnishings				$8.03	2.6%	**$34,000**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$2.99	1.0%	**$12,661**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
Subtotal Direct Construction Costs				***$307.51***	***62.27%***	***$1,302,004***
Published Location Factor				-21.90%	1,302,004	($285,139)
Remoteness Factor				30.00%	1,016,865	$305,060
Federal Wage Rate Factor				0.00%	594,866	$0
State/Local Taxes				10.00%	727,059	$72,706
Design Contingency				10.00%	1,394,631	$139,463
Total Direct Construction Costs				***$362.33***		***$1,534,094***
Standard General Conditions				15.00%	1,534,094	$230,114
Governmental General Conditions				5.00%	1,764,208	$88,210
Historic Preservation Factor				0.00%	1,852,418	$0
Subtotal NET Construction Costs				***$437.51***		***$1,852,418***
Overhead				5.00%	1,852,418	$92,621
Profit				7.50%	1,945,039	$145,878
Estimated NET Construction Cost				***$493.84***	***85.30%***	***$2,090,917***
Contracting Method Adjustment				5.00%	2,090,917	$104,546
Escalation to 2014		32	MOS	10.00%	2,195,463	$219,546
Bond				1.50%	2,415,009	$36,225
Total Estimated NET Cost of Construction		***4,234***	***GSF***	***$578.94***	***/GSF***	***$2,451,235***

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		4234.0	gsf	0.00	$0	**$60,669**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$43,733*
	continuous footing x'0	306.0	lf	133.33	$40,800	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	11.0	ea	266.67	$2,933	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$16,936*
	standard slab on grade	4234.0	sf	4.00	$16,936	
A20 - Basement Construction		4234.0	gsf	0.00	$0	**$160,642**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$33,546*
	excavation	2429.5	cy	5.00	$12,147	
	backfill & compaction	990.5	cy	12.50	$12,382	
	haul off excess soil (on site)	1803.4	cy	5.00	$9,017	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$127,096*
	basement wall (cistern) x10'0	3060.0	sf	25.00	$76,500	
	vertical waterproofing	3519.0	sf	5.00	$17,595	
	foundation drain	382.5	lf	10.00	$3,825	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	7294.0	sf	4.00	$29,176	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		4234.0	gsf	0.00	$0	**$348,836**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$118,552*
	structural frame (precast)	4234.0	sf	25.00	$105,850	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	4234.0	sf	3.00	$12,702	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$230,284*
	structural frame (wood)	5117.4	sf	40.00	$204,697	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	5117.4	sf	5.00	$25,587	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		4234.0	gsf	0.00	$0	**$270,071**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$172,646*
	exterior skin (stone veneer) cistern x3'0	918.0	sf	20.00	$18,360	
	exterior skin (board siding) stain x10'0	936.7	sf	6.60	$6,182	
	exterior wall construction (wood framing) 2x6 @16"oc	3060.0	sf	1.63	$4,985	
	sheathing	936.7	sf	1.79	$1,677	
	woven wire cloth (SS) fine	0.0	sf	2.74	$0	
	vapor barrier/insulation	936.7	sf	2.29	$2,145	
	interior skin (gypsum board) water resistant	936.7	sf	1.87	$1,752	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Lecture & Teaching

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	0.0	sf	4.02	$0	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	936.7	sf	0.50	$468	
	exterior louver	21.2	sf	60.00	$1,270	
	ornamental grilles/screens (wood framed)	593.3	sf	10.00	$5,933	
	ornamental grilles/screens (wood framed) clerestory x5'4	0.0	sf	10.00	$0	
	exterior protection devices (hurricane shutters)	2123.3	sf	60.00	$127,400	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	883.4	sf	2.80	$2,474	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$90,598*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	25% glazed curtain wall	765.0	sf	40.00	$30,600	
	25% glazed curtain wall (hurricane rated)	765.0	sf	75.00	$57,375	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	1049.1	lf	2.50	$2,623	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$6,828*
	utility door/frame (single)	1.0	ea	932.00	$932	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	2.0	pr	1598.00	$3,196	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	57.0	lf	2.50	$143	
	sealant/caulking	57.0	lf	1.00	$57	
	finish hardware (single)	1.0	ea	500.00	$500	
	finish hardware (double)	2.0	ea	1000.00	$2,000	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		4234.0	gsf	0.00	$0	**$131,045**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$131,045*
	vapor barrier/ ~~insulation~~	5117.4	sf	2.00	$10,235	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	5117.4	sf	22.00	$112,583	
	flashing/sheet metal	329.1	lf	20.00	$6,581	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	658.1	lf	2.50	$1,645	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		4234.0	gsf	0.00	$0	**$22,275**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$5,709*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	590.5	sf	9.67	$5,709	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	0.0	sf	4.99	$0	
	balustrade/screen/railing	0.0	sf	0.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Lecture & Teaching

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	0.0	sf	5.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$10,215*
	wood door/frame (single)	4.0	ea	701.00	$2,804	
	wood door/frame (unequal)	2.0	pr	918.50	$1,837	
	wood door/frame (double)	1.0	pr	1136.00	$1,136	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	125.0	lf	2.50	$313	
	sealant/caulking	125.0	lf	1.00	$125	
	finish hardware (single)	4.0	ea	400.00	$1,600	
	finish hardware (double)	3.0	ea	800.00	$2,400	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		4234.0	gsf	1.50	$6,351	*$6,351*
C20 - Stairs		4234.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		4234.0	gsf	0.00	$0	**$21,341**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$3,776*
	wood board finish (paint)	1180.9	sf	0.69	$815	
	gyp board finish	0.0	sf	0.80	$0	
	tile	370.1	sf	8.00	$2,961	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$13,183*
	concrete (color stain & seal)	4022.3	sf	2.50	$10,056	
	5% tile	211.7	sf	10.00	$2,117	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	61.7	lf	9.00	$555	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Lecture & Teaching

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	91.0	lf	5.00	$455	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$4,382*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	4869.1	sf	0.90	$4,382	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		4234.0	gsf	0.00	$0	**$0**
D20 - Plumbing		4234.0	gsf	2.00	$8,468	**$8,468**
D2000 - Demolition		0.0	gsf	0.00	$0	*$8,468*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		4234.0	gsf	20.00	$84,680	**$84,680**
D3000 - Demolition		0.0	gsf	0.00	$0	*$84,680*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		4234.0	gsf	2.00	$8,468	**$8,468**
D4000 - Demolition		0.0	gsf	0.00	$0	*$8,468*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		4234.0	gsf	32.00	$135,488	**$135,488**
D5000 - Demolition		0.0	gsf	0.00	$0	*$135,488*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		4234.0	gsf	0.00	$0	**$3,360**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$3,360*
	audio-visual	2.0	ea	1680.00	$3,360	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$0*
	food service	0.0	ea	0.00	$0	
	residential	0.0	ea	0.00	$0	
E20 - Furnishings		4234.0	gsf	0.00	$0	**$34,000**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$34,000*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	0.0	lf	0.00	$0	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	0.0	lf	350.00	$0	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	0.0	lf	82.35	$0	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	80.0	ea	425.00	$34,000	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		4234.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		4234.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		4234.0	gsf	0.00	$0	**$12,661**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$2,023*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	235.2	cy	4.00	$941	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	270.5	cy	4.00	$1,082	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$10,638*
	grading x4'0	1881.8	cy	4.00	$7,527	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	518.4	lf	6.00	$3,111	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		4234.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		4234.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		4234.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		4234.0	gsf	0.00	$0	**$0**
Subtotal					$1,302,004	**$1,302,004**

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Community Outreach and Collections

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$12.24	4.8%	**$53,867**
A20 - Basement Construction				$31.53	12.3%	**$138,753**
B10 - Superstructure				$82.39	32.1%	**$362,513**
B20 - Exterior Enclosure				$54.13	21.1%	**$238,187**
B30 - Roofing				$30.91	12.0%	**$136,020**
C10 - Interior Construction				$7.14	2.8%	**$31,438**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$5.47	2.1%	**$24,089**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$1.50	0.6%	**$6,600**
D30 - Heating, Ventilating & Air Conditio	M-14%/ A-7%/ C-79%			$7.50	2.9%	**$33,000**
D40 - Fire Protection				$1.85	0.7%	**$8,140**
D50 - Electrical				$15.00	5.8%	**$66,000**
E10 - Equipment				$0.00	0.0%	**$0**
E20 - Furnishings				$3.96	1.5%	**$17,425**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$2.98	1.2%	**$13,095**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
Subtotal Direct Construction Costs				***$256.62***	***62.27%***	***$1,129,127***
Published Location Factor				-21.90%	1,129,127	($247,279)
Remoteness Factor				30.00%	881,848	$264,554
Federal Wage Rate Factor				0.00%	515,881	$0
State/Local Taxes				10.00%	630,521	$63,052
Design Contingency				10.00%	1,209,455	$120,945
Total Direct Construction Costs				***$302.36***		***$1,330,400***
Standard General Conditions				15.00%	1,330,400	$199,560
Governmental General Conditions				5.00%	1,529,960	$76,498
Historic Preservation Factor				0.00%	1,606,458	$0
Subtotal NET Construction Costs				***$365.10***		***$1,606,458***
Overhead				5.00%	1,606,458	$80,323
Profit				7.50%	1,686,781	$126,509
Estimated NET Construction Cost				***$412.11***	***85.30%***	***$1,813,290***
Contracting Method Adjustment				5.00%	1,813,290	$90,664
Escalation to 2014		32	MOS	10.00%	1,903,954	$190,395
Bond				1.50%	2,094,350	$31,415
Total Estimated NET Cost of Construction		***4,400***	***GSF***	***$483.13***	***/GSF***	***$2,125,765***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Community Outreach and Collections

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		4400.0	gsf	0.00	$0	**$53,867**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$36,267*
	continuous footing x'0	250.0	lf	133.33	$33,333	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	11.0	ea	266.67	$2,933	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$17,600*
	standard slab on grade	4400.0	sf	4.00	$17,600	
A20 - Basement Construction		4400.0	gsf	0.00	$0	**$138,753**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$31,153*
	excavation	2333.3	cy	5.00	$11,667	
	backfill & compaction	809.3	cy	12.50	$10,116	
	haul off excess soil (on site)	1874.1	cy	5.00	$9,370	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$107,600*
	basement wall (cistern) x10'0	2500.0	sf	25.00	$62,500	
	vertical waterproofing	2875.0	sf	5.00	$14,375	
	foundation drain	312.5	lf	10.00	$3,125	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	6900.0	sf	4.00	$27,600	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		4400.0	gsf	0.00	$0	**$362,513**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$123,200*
	structural frame (precast)	4400.0	sf	25.00	$110,000	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	4400.0	sf	3.00	$13,200	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$239,313*
	structural frame (wood)	5318.1	sf	40.00	$212,723	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	5318.1	sf	5.00	$26,590	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		4400.0	gsf	0.00	$0	**$238,187**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$231,360*
	exterior skin (stone veneer) cistern x3'0	750.0	sf	20.00	$15,000	
	exterior skin (board siding) stain x15'0	1000.0	sf	6.60	$6,600	
	exterior wall construction (wood framing) 2x6 @16"oc	3750.0	sf	1.63	$6,109	
	sheathing	0.0	sf	1.79	$0	
	woven wire cloth (SS) fine	1000.0	sf	2.74	$2,740	
	vapor barrier/insulation	0.0	sf	2.29	$0	
	interior skin (gypsum board) water resistant	0.0	sf	1.87	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	1000.0	sf	4.02	$4,020	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	1000.0	sf	0.50	$500	
	exterior louver	22.0	sf	60.00	$1,320	
	ornamental grilles/screens (wood framed)	2750.0	sf	10.00	$27,500	
	ornamental grilles/screens (wood framed) clerestory x5'4	0.0	sf	10.00	$0	
	exterior protection devices (hurricane shutters)	2750.0	sf	60.00	$165,000	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	918.1	sf	2.80	$2,571	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$0*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	0% glazed curtain wall	0.0	sf	40.00	$0	
	0% glazed curtain wall (hurricane rated)	0.0	sf	75.00	$0	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$6,828*
	utility door/frame (single)	1.0	ea	932.00	$932	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	2.0	pr	1598.00	$3,196	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	57.0	lf	2.50	$143	
	sealant/caulking	57.0	lf	1.00	$57	
	finish hardware (single)	1.0	ea	500.00	$500	
	finish hardware (double)	2.0	ea	1000.00	$2,000	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		4400.0	gsf	0.00	$0	**$136,020**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$136,020*
	vapor barrier/ ~~insulation~~	5318.1	sf	2.00	$10,636	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	5318.1	sf	22.00	$116,997	
	flashing/sheet metal	335.5	lf	20.00	$6,709	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	670.9	lf	2.50	$1,677	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		4400.0	gsf	0.00	$0	**$31,438**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$14,623*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	1512.4	sf	9.67	$14,623	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	0.0	sf	4.99	$0	
	balustrade/screen/railing	0.0	sf	0.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Community Outreach and Collections

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	0.0	sf	5.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$10,215*
	wood door/frame (single)	4.0	ea	701.00	$2,804	
	wood door/frame (unequal)	2.0	pr	918.50	$1,837	
	wood door/frame (double)	1.0	pr	1136.00	$1,136	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	125.0	lf	2.50	$313	
	sealant/caulking	125.0	lf	1.00	$125	
	finish hardware (single)	4.0	ea	400.00	$1,600	
	finish hardware (double)	3.0	ea	800.00	$2,400	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		4400.0	gsf	1.50	$6,600	*$6,600*
C20 - Stairs		4400.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		4400.0	gsf	0.00	$0	**$24,089**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$5,796*
	wood board finish (paint)	4024.8	sf	0.69	$2,777	
	gyp board finish	0.0	sf	0.80	$0	
	tile	377.3	sf	8.00	$3,019	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$13,739*
	concrete (color stain & seal)	4180.0	sf	2.50	$10,450	
	5% tile	220.0	sf	10.00	$2,200	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	62.9	lf	9.00	$566	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Community Outreach and Collections

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	104.6	lf	5.00	$523	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$4,554*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	5060.0	sf	0.90	$4,554	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		4400.0	gsf	0.00	$0	**$0**
D20 - Plumbing		4400.0	gsf	1.50	$6,600	**$6,600**
D2000 - Demolition		0.0	gsf	0.00	$0	*$6,600*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		4400.0	gsf	7.50	$33,000	**$33,000**
D3000 - Demolition		0.0	gsf	0.00	$0	*$33,000*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		4400.0	gsf	1.85	$8,140	**$8,140**
D4000 - Demolition		0.0	gsf	0.00	$0	*$8,140*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		4400.0	gsf	15.00	$66,000	**$66,000**
D5000 - Demolition		0.0	gsf	0.00	$0	*$66,000*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		4400.0	gsf	0.00	$0	**$0**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	1680.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Community Outreach and Collections

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$0*
	food service	0.0	ea	0.00	$0	
	residential	0.0	ea	0.00	$0	
E20 - Furnishings		4400.0	gsf	0.00	$0	**$17,425**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$17,425*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	0.0	lf	0.00	$0	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	0.0	lf	350.00	$0	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	0.0	lf	82.35	$0	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	41.0	ea	425.00	$17,425	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		4400.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		4400.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		4400.0	gsf	0.00	$0	**$13,095**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$2,102*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	244.4	cy	4.00	$978	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	281.1	cy	4.00	$1,124	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Community Outreach and Collections

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$10,993*
	grading x4'0	1955.6	cy	4.00	$7,822	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	528.5	lf	6.00	$3,171	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		4400.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		4400.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		4400.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		4400.0	gsf	0.00	$0	**$0**
Subtotal					$1,129,127	**$1,129,127**

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Lobby/Comminuity Shared Space/Pavillion (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$14.52	7.8%	**$63,867**
A20 - Basement Construction				$38.60	20.8%	**$169,843**
B10 - Superstructure				$82.39	44.4%	**$362,513**
B20 - Exterior Enclosure				$4.43	2.4%	**$19,500**
B30 - Roofing				$30.91	16.6%	**$136,020**
C10 - Interior Construction				$1.50	0.8%	**$6,600**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$3.54	1.9%	**$15,554**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$0.00	0.0%	**$0**
D30 - Heating, Ventilating & Air Conditioning				$2.50	1.3%	**$11,000**
D40 - Fire Protection				$1.85	1.0%	**$8,140**
D50 - Electrical				$2.50	1.3%	**$11,000**
E10 - Equipment				$0.00	0.0%	**$0**
E20 - Furnishings				$0.00	0.0%	**$0**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$2.98	1.6%	**$13,095**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
	Subtotal Direct Construction Costs			***$185.71***	***62.27%***	***$817,132***
Published Location Factor				-21.90%	817,132	($178,952)
Remoteness Factor				30.00%	638,180	$191,454
Federal Wage Rate Factor				0.00%	373,335	$0
State/Local Taxes				10.00%	456,299	$45,630
Design Contingency				10.00%	875,264	$87,526
Total Direct Construction Costs				***$218.82***		***$962,790***
Standard General Conditions				15.00%	962,790	$144,419
Governmental General Conditions				5.00%	1,107,209	$55,360
Historic Preservation Factor				0.00%	1,162,569	$0
Subtotal NET Construction Costs				***$264.22***		***$1,162,569***
Overhead				5.00%	1,162,569	$58,128
Profit				7.50%	1,220,698	$91,552
Estimated NET Construction Cost				***$298.24***	***85.30%***	***$1,312,250***
Contracting Method Adjustment				5.00%	1,312,250	$65,613
Escalation to 2014		32	MOS	10.00%	1,377,863	$137,786
Bond				1.50%	1,515,649	$22,735
Total Estimated NET Cost of Construction		***4,400***	***GSF***	***$349.63***	***/GSF***	***$1,538,384***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Lobby/Comminuity Shared Space/Pavillion (Zone C)

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		4400.0	gsf	0.00	$0	**$63,867**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$46,267*
	continuous footing x'0	325.0	lf	133.33	$43,333	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	11.0	ea	266.67	$2,933	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$17,600*
	standard slab on grade	4400.0	sf	4.00	$17,600	
A20 - Basement Construction		4400.0	gsf	0.00	$0	**$169,843**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$35,243*
	excavation	2544.4	cy	5.00	$12,722	
	backfill & compaction	1052.0	cy	12.50	$13,150	
	haul off excess soil (on site)	1874.1	cy	5.00	$9,370	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$134,600*
	basement wall (cistern) x10'0	3250.0	sf	25.00	$81,250	
	vertical waterproofing	3737.5	sf	5.00	$18,688	
	foundation drain	406.3	lf	10.00	$4,063	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	7650.0	sf	4.00	$30,600	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		4400.0	gsf	0.00	$0	**$362,513**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$123,200*
	structural frame (precast)	4400.0	sf	25.00	$110,000	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	4400.0	sf	3.00	$13,200	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$239,313*
	structural frame (wood)	5318.1	sf	40.00	$212,723	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	5318.1	sf	5.00	$26,590	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		4400.0	gsf	0.00	$0	**$19,500**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$19,500*
	exterior skin (stone veneer) cistern x3'0	975.0	sf	20.00	$19,500	
	exterior skin (board siding) stain x0'0	0.0	sf	6.60	$0	
	exterior wall construction (wood framing) 2x6 @16"oc	0.0	sf	1.63	$0	
	sheathing	0.0	sf	1.79	$0	
	woven wire cloth (SS) fine	0.0	sf	2.74	$0	
	vapor barrier/insulation	0.0	sf	2.29	$0	
	interior skin (gypsum board) water resistant	0.0	sf	1.87	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Lobby/Comminuity Shared Space/Pavillion (Zone C)

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	0.0	sf	4.02	$0	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	0.0	sf	0.50	$0	
	exterior louver	0.0	sf	60.00	$0	
	ornamental grilles/screens (wood framed)	0.0	sf	10.00	$0	
	ornamental grilles/screens (wood framed) clerestory x5'4	0.0	sf	10.00	$0	
	exterior protection devices (hurricane shutters)	0.0	sf	60.00	$0	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	0.0	sf	2.80	$0	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$0*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	0% glazed curtain wall	0.0	sf	40.00	$0	
	0% glazed curtain wall (hurricane rated)	0.0	sf	75.00	$0	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$0*
	utility door/frame (single)	0.0	ea	932.00	$0	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	0.0	pr	1598.00	$0	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	lf	1.00	$0	
	finish hardware (single)	0.0	ea	500.00	$0	
	finish hardware (double)	0.0	ea	1000.00	$0	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		4400.0	gsf	0.00	$0	**$136,020**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$136,020*
	vapor barrier/ ~~insulation~~	5318.1	sf	2.00	$10,636	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	5318.1	sf	22.00	$116,997	
	flashing/sheet metal	335.5	lf	20.00	$6,709	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	670.9	lf	2.50	$1,677	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		4400.0	gsf	0.00	$0	**$6,600**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$0*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	0.0	sf	9.67	$0	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	0.0	sf	4.99	$0	
	balustrade/screen/railing	0.0	sf	0.00	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	0.0	sf	5.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$0*
	wood door/frame (single)	0.0	ea	701.00	$0	
	wood door/frame (unequal)	0.0	pr	918.50	$0	
	wood door/frame (double)	0.0	pr	1136.00	$0	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	lf	1.00	$0	
	finish hardware (single)	0.0	ea	400.00	$0	
	finish hardware (double)	0.0	ea	800.00	$0	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		4400.0	gsf	1.50	$6,600	*$6,600*
C20 - Stairs		4400.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		4400.0	gsf	0.00	$0	**$15,554**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$0*
	wood board finish (paint)	0.0	sf	0.69	$0	
	gyp board finish	0.0	sf	0.80	$0	
	tile	0.0	sf	8.00	$0	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$11,000*
	concrete (color stain & seal)	4400.0	sf	2.50	$11,000	
	0% tile	0.0	sf	10.00	$0	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	0.0	lf	9.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Lobby/Comminuity Shared Space/Pavillion (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	0.0	lf	5.00	$0	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$4,554*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	5060.0	sf	0.90	$4,554	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		4400.0	gsf	0.00	$0	**$0**
D20 - Plumbing		4400.0	gsf	0.00	$0	**$0**
D2000 - Demolition		0.0	gsf	0.00	$0	*$0*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		4400.0	gsf	2.50	$11,000	**$11,000**
D3000 - Demolition		0.0	gsf	0.00	$0	*$11,000*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		4400.0	gsf	1.85	$8,140	**$8,140**
D4000 - Demolition		0.0	gsf	0.00	$0	*$8,140*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		4400.0	gsf	2.50	$11,000	**$11,000**
D5000 - Demolition		0.0	gsf	0.00	$0	*$11,000*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		4400.0	gsf	0.00	$0	**$0**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	1680.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Lobby/Comminuity Shared Space/Pavillion (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$0*
	food service	0.0	ea	0.00	$0	
	residential	0.0	ea	0.00	$0	
E20 - Furnishings		4400.0	gsf	0.00	$0	**$0**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$0*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	0.0	lf	0.00	$0	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	0.0	lf	350.00	$0	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	0.0	lf	82.35	$0	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	425.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		4400.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		4400.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		4400.0	gsf	0.00	$0	**$13,095**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$2,102*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	244.4	cy	4.00	$978	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	281.1	cy	4.00	$1,124	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Lobby/Comminuity Shared Space/Pavillion (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$10,993*
	grading x4'0	1955.6	cy	4.00	$7,822	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	528.5	lf	6.00	$3,171	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		4400.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		4400.0	gsf	0.00	$0	**$0**
G40 - Electrical Utilities		4400.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		4400.0	gsf	0.00	$0	**$0**
Subtotal					$817,132	**$817,132**

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$27.34	7.5%	**$35,765**
A20 - Basement Construction				$78.02	21.4%	**$102,052**
B10 - Superstructure				$91.00	25.0%	**$119,028**
B20 - Exterior Enclosure				$81.11	22.3%	**$106,091**
B30 - Roofing				$37.07	10.2%	**$48,485**
C10 - Interior Construction				$4.88	1.3%	**$6,387**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$6.57	1.8%	**$8,590**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$3.00	0.8%	**$3,924**
D30 - Heating, Ventilating & Air Conditioning				$14.00	3.8%	**$18,312**
D40 - Fire Protection				$1.85	0.5%	**$2,420**
D50 - Electrical				$8.00	2.2%	**$10,464**
E10 - Equipment				$3.44	0.9%	**$4,500**
E20 - Furnishings				$4.40	1.2%	**$5,760**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$3.47	1.0%	**$4,544**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
Subtotal Direct Construction Costs				***$364.16***	***62.27%***	***$476,323***
Published Location Factor				-21.90%	476,323	($104,315)
Remoteness Factor				30.00%	372,008	$111,602
Federal Wage Rate Factor				0.00%	217,625	$0
State/Local Taxes				10.00%	265,986	$26,599
Design Contingency				10.00%	510,209	$51,021
Total Direct Construction Costs				***$429.07***		***$561,230***
Standard General Conditions				15.00%	561,230	$84,184
Governmental General Conditions				5.00%	645,414	$32,271
Historic Preservation Factor				0.00%	677,685	$0
Subtotal NET Construction Costs				***$518.11***		***$677,685***
Overhead				5.00%	677,685	$33,884
Profit				7.50%	711,569	$53,368
Estimated NET Construction Cost				***$584.81***	***85.30%***	***$764,937***
Contracting Method Adjustment				5.00%	764,937	$38,247
Escalation to 2014		32	MOS	10.00%	803,184	$80,318
Bond				1.50%	883,502	$13,253
Total Estimated NET Cost of Construction		***1,308***	***GSF***	***$685.59***	***/GSF***	***$896,755***
		1	***EA***			***$896,755***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Housing (Director) Zone A

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		1308.0	gsf	0.00	$0	**$35,765**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$30,533*
	continuous footing x'0	221.0	lf	133.33	$29,467	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	4.0	ea	266.67	$1,067	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$5,232*
	standard slab on grade	1308.0	sf	4.00	$5,232	
A20 - Basement Construction		1308.0	gsf	0.00	$0	**$102,052**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$17,260*
	excavation	1106.5	cy	5.00	$5,533	
	backfill & compaction	715.4	cy	12.50	$8,942	
	haul off excess soil (on site)	557.1	cy	5.00	$2,786	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$84,792*
	basement wall (cistern) x10'0	2210.0	sf	25.00	$55,250	
	vertical waterproofing	2541.5	sf	5.00	$12,708	
	foundation drain	276.3	lf	10.00	$2,763	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	3518.0	sf	4.00	$14,072	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		1308.0	gsf	0.00	$0	**$119,028**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$36,624*
	structural frame (precast)	1308.0	sf	25.00	$32,700	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	1308.0	sf	3.00	$3,924	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$82,404*
	structural frame (wood)	1831.2	sf	40.00	$73,248	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	1831.2	sf	5.00	$9,156	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		1308.0	gsf	0.00	$0	**$106,091**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$87,039*
	exterior skin (stone veneer) cistern x3'0	663.0	sf	20.00	$13,260	
	exterior skin (board siding) stain x10'0	1614.1	sf	6.60	$10,653	
	exterior wall construction (wood framing) 2x6 @16"oc	2318.3	sf	1.63	$3,777	
	sheathing	1614.1	sf	1.79	$2,889	
	woven wire cloth (SS) fine	0.0	sf	2.74	$0	
	vapor barrier/insulation	1614.1	sf	2.29	$3,696	
	interior skin (gypsum board) water resistant	1614.1	sf	1.87	$3,018	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	0.0	sf	4.02	$0	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	1614.1	sf	0.50	$807	
	exterior louver	6.5	sf	60.00	$392	
	ornamental grilles/screens (wood framed)	374.9	sf	10.00	$3,749	
	ornamental grilles/screens (wood framed) clerestory x4'4	108.3	sf	10.00	$1,083	
	exterior protection devices (hurricane shutters)	704.2	sf	60.00	$42,249	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	523.2	sf	2.80	$1,465	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$13,086*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	5% glazed curtain wall	110.5	sf	40.00	$4,420	
	5% glazed curtain wall (hurricane rated)	110.5	sf	75.00	$8,288	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	151.5	lf	2.50	$379	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$5,966*
	utility door/frame (single)	4.0	ea	932.00	$3,728	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	0.0	pr	1598.00	$0	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	68.0	lf	2.50	$170	
	sealant/caulking	68.0	lf	1.00	$68	
	finish hardware (single)	4.0	ea	500.00	$2,000	
	finish hardware (double)	0.0	ea	1000.00	$0	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		1308.0	gsf	0.00	$0	**$48,485**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$48,485*
	vapor barrier/ ~~insulation~~	1831.2	sf	2.00	$3,662	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	1831.2	sf	22.00	$40,286	
	flashing/sheet metal	181.4	lf	20.00	$3,629	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	362.9	lf	2.50	$907	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		1308.0	gsf	0.00	$0	**$6,387**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$2,104*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	0.0	sf	9.67	$0	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	421.7	sf	4.99	$2,104	
	balustrade/screen/railing	0.0	sf	0.00	$0	

LORD AECK SARGENT
Salt River Bay Marine Research & Education Center (Scheme 2A)
Construction Budget (Class C)
Housing (Director) Zone A
Prepared: May 9, 2011
Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	0.0	sf	5.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$2,321*
	wood door/frame (single)	2.0	ea	701.00	$1,402	
	wood door/frame (unequal)	0.0	pr	918.50	$0	
	wood door/frame (double)	0.0	pr	1136.00	$0	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	34.0	lf	2.50	$85	
	sealant/caulking	34.0	lf	1.00	$34	
	finish hardware (single)	2.0	ea	400.00	$800	
	finish hardware (double)	0.0	ea	800.00	$0	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		1308.0	gsf	1.50	$1,962	*$1,962*
C20 - Stairs		1308.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		1308.0	gsf	0.00	$0	**$8,590**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$2,321*
	wood board finish (paint)	0.0	sf	0.69	$0	
	gyp board finish	843.4	sf	0.80	$675	
	tile	205.7	sf	8.00	$1,646	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$4,916*
	concrete (color stain & seal)	1242.6	sf	2.50	$3,107	
	5% tile	65.4	sf	10.00	$654	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	34.3	lf	9.00	$309	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	169.3	lf	5.00	$846	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$1,354*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	1504.2	sf	0.90	$1,354	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		1308.0	gsf	0.00	$0	**$0**
D20 - Plumbing		1308.0	gsf	3.00	$3,924	**$3,924**
D2000 - Demolition		0.0	gsf	0.00	$0	*$3,924*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		1308.0	gsf	14.00	$18,312	**$18,312**
D3000 - Demolition		0.0	gsf	0.00	$0	*$18,312*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		1308.0	gsf	1.85	$2,420	**$2,420**
D4000 - Demolition		0.0	gsf	0.00	$0	*$2,420*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		1308.0	gsf	8.00	$10,464	**$10,464**
D5000 - Demolition		0.0	gsf	0.00	$0	*$10,464*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		1308.0	gsf	0.00	$0	**$4,500**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	1680.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Housing (Director) Zone A

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$4,500*
	food service	0.0	ea	0.00	$0	
	residential	1.0	ls	4500.00	$4,500	
E20 - Furnishings		1308.0	gsf	0.00	$0	**$5,760**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$5,760*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	16.0	lf	350.00	$5,600	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	0.0	lf	350.00	$0	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	0.0	lf	82.35	$0	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	425.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	64.0	lf	2.50	$160	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		1308.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		1308.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		1308.0	gsf	0.00	$0	**$4,544**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$625*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	72.7	cy	4.00	$291	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	83.6	cy	4.00	$334	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Housing (Director) Zone A

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$3,919*
	grading x4'0	581.3	cy	4.00	$2,325	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	265.6	lf	6.00	$1,594	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		1308.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		1308.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		1308.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		1308.0	gsf	0.00	$0	**$0**
Subtotal					$476,323	**$476,323**

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Housing (Graduate) Zone C

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$21.19	5.6%	**$38,133**
A20 - Basement Construction				$54.07	14.2%	**$97,326**
B10 - Superstructure				$100.00	26.2%	**$180,000**
B20 - Exterior Enclosure				$112.71	29.5%	**$202,870**
B30 - Roofing				$44.36	11.6%	**$79,853**
C10 - Interior Construction				$11.99	3.1%	**$21,590**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$6.34	1.7%	**$11,416**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$6.00	1.6%	**$10,800**
D30 - Heating, Ventilating & Air Conditioning				$5.00	1.3%	**$9,000**
D40 - Fire Protection				$1.85	0.5%	**$3,330**
D50 - Electrical				$8.00	2.1%	**$14,400**
E10 - Equipment				$2.50	0.7%	**$4,500**
E20 - Furnishings				$4.40	1.2%	**$7,920**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$3.29	0.9%	**$5,929**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
	Subtotal Direct Construction Costs			***$381.70***	***62.27%***	***$687,068***
	Published Location Factor			-21.90%	687,068	($150,468)
	Remoteness Factor			30.00%	536,600	$160,980
	Federal Wage Rate Factor			0.00%	313,911	$0
	State/Local Taxes			10.00%	383,669	$38,367
	Design Contingency			10.00%	735,947	$73,595
	Total Direct Construction Costs			***$449.75***		***$809,541***
	Standard General Conditions			15.00%	809,541	$121,431
	Governmental General Conditions			5.00%	930,973	$46,549
	Historic Preservation Factor			0.00%	977,521	$0
	Subtotal NET Construction Costs			***$543.07***		***$977,521***
	Overhead			5.00%	977,521	$48,876
	Profit			7.50%	1,026,397	$76,980
	Estimated NET Construction Cost			***$612.99***	***85.30%***	***$1,103,377***
	Contracting Method Adjustment			5.00%	1,103,377	$55,169
	Escalation to 2014	32	MOS	10.00%	1,158,546	$115,855
	Bond			1.50%	1,274,401	$19,116
Total Estimated NET Cost of Construction		***1,800***	***GSF***	***$718.62***	***/GSF***	***$1,293,517***
		5	***EA***			***$6,467,583***

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		1800.0	gsf	0.00	$0	**$38,133**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$30,933*
	continuous footing x'0	222.0	lf	133.33	$29,600	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	5.0	ea	266.67	$1,333	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$7,200*
	standard slab on grade	1800.0	sf	4.00	$7,200	
A20 - Basement Construction		1800.0	gsf	0.00	$0	**$97,326**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$17,920*
	excavation	1192.0	cy	5.00	$5,960	
	backfill & compaction	680.8	cy	12.50	$8,510	
	haul off excess soil (on site)	690.0	cy	5.00	$3,450	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$79,406*
	basement wall (cistern) x9'0	1998.0	sf	25.00	$49,950	
	vertical waterproofing	2297.7	sf	5.00	$11,489	
	foundation drain	277.5	lf	10.00	$2,775	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	3798.0	sf	4.00	$15,192	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		1800.0	gsf	0.00	$0	**$180,000**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$50,400*
	structural frame (precast)	1800.0	sf	25.00	$45,000	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	1800.0	sf	3.00	$5,400	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$129,600*
	structural frame (wood)	2880.0	sf	40.00	$115,200	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	2880.0	sf	5.00	$14,400	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		1800.0	gsf	0.00	$0	**$202,870**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$188,663*
	exterior skin (stone veneer) cistern x3'0	599.4	sf	20.00	$11,988	
	exterior skin (board siding) stain x10'0	161.9	sf	6.60	$1,069	
	exterior wall construction (wood framing) 2x6 @16"oc	2563.6	sf	1.63	$4,177	
	sheathing	0.0	sf	1.79	$0	
	woven wire cloth (SS) fine	161.9	sf	2.74	$444	
	vapor barrier/insulation	0.0	sf	2.29	$0	
	interior skin (gypsum board) water resistant	0.0	sf	1.87	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Housing (Graduate) Zone C

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	161.9	sf	4.02	$651	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	161.9	sf	0.50	$81	
	exterior louver	0.0	sf	60.00	$0	
	ornamental grilles/screens (wood framed)	1969.3	sf	10.00	$19,693	
	ornamental grilles/screens (wood framed) clerestory x4'4	343.6	sf	10.00	$3,436	
	exterior protection devices (hurricane shutters)	2401.7	sf	60.00	$144,101	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	1080.0	sf	2.80	$3,024	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$5,258*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	2% glazed curtain wall	44.4	sf	40.00	$1,776	
	2% glazed curtain wall (hurricane rated)	44.4	sf	75.00	$3,330	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	60.9	lf	2.50	$152	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$8,949*
	utility door/frame (single)	6.0	ea	932.00	$5,592	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	0.0	pr	1598.00	$0	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	102.0	lf	1.00	$102	
	sealant/caulking	102.0	lf	1.00	$102	
	finish hardware (single)	6.0	ea	500.00	$3,000	
	finish hardware (double)	0.0	ea	1000.00	$0	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		1800.0	gsf	0.00	$0	**$79,853**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$79,853*
	vapor barrier/ ~~insulation~~	2880.0	sf	2.00	$5,760	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	2880.0	sf	22.00	$63,360	
	flashing/sheet metal	429.3	lf	20.00	$8,587	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	858.7	lf	2.50	$2,147	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		1800.0	gsf	0.00	$0	**$21,590**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$10,767*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	1113.5	sf	9.67	$10,767	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	0.0	sf	4.99	$0	
	balustrade/screen/railing	0.0	sf	0.00	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	0.0	sf	5.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$8,124*
	wood door/frame (single)	7.0	ea	701.00	$4,907	
	wood door/frame (unequal)	0.0	pr	918.50	$0	
	wood door/frame (double)	0.0	pr	1136.00	$0	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	119.0	lf	2.50	$298	
	sealant/caulking	119.0	lf	1.00	$119	
	finish hardware (single)	7.0	ea	400.00	$2,800	
	finish hardware (double)	0.0	ea	800.00	$0	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		1800.0	gsf	1.50	$2,700	*$2,700*
C20 - Stairs		1800.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		1800.0	gsf	0.00	$0	**$11,416**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$3,579*
	wood board finish (paint)	2388.9	sf	0.69	$1,648	
	gyp board finish	0.0	sf	0.80	$0	
	tile	241.3	sf	8.00	$1,931	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$5,974*
	concrete (color stain & seal)	1710.0	sf	2.50	$4,275	
	5% tile	90.0	sf	10.00	$900	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	40.2	lf	9.00	$362	

LORD AECK SARGENT
Salt River Bay Marine Research & Education Center (Scheme 2A)
Construction Budget (Class C)
Housing (Graduate) Zone C
Prepared: May 9, 2011
Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	87.3	lf	5.00	$437	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$1,863*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	2070.0	sf	0.90	$1,863	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		1800.0	gsf	0.00	$0	**$0**
D20 - Plumbing		1800.0	gsf	6.00	$10,800	**$10,800**
D2000 - Demolition		0.0	gsf	0.00	$0	*$10,800*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		1800.0	gsf	5.00	$9,000	**$9,000**
D3000 - Demolition		0.0	gsf	0.00	$0	*$9,000*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		1800.0	gsf	1.85	$3,330	**$3,330**
D4000 - Demolition		0.0	gsf	0.00	$0	*$3,330*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		1800.0	gsf	8.00	$14,400	**$14,400**
D5000 - Demolition		0.0	gsf	0.00	$0	*$14,400*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		1800.0	gsf	0.00	$0	**$4,500**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	1680.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$4,500*
	food service	0.0	ea	0.00	$0	
	residential	1.0	ls	4500.00	$4,500	
E20 - Furnishings		1800.0	gsf	0.00	$0	**$7,920**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$7,920*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	22.0	lf	350.00	$7,700	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	0.0	lf	350.00	$0	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	0.0	lf	82.35	$0	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	425.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	88.0	lf	2.50	$220	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		1800.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		1800.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		1800.0	gsf	0.00	$0	**$5,929**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$860*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	100.0	cy	4.00	$400	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	115.0	cy	4.00	$460	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Housing (Graduate) Zone C

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$5,069*
	grading x4'0	800.0	cy	4.00	$3,200	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	311.6	lf	6.00	$1,869	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		1800.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		1800.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		1800.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		1800.0	gsf	0.00	$0	**$0**
Subtotal					$687,068	**$687,068**

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Housing (Undergraduate) Zone C

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$25.21	6.6%	**$21,553**
A20 - Basement Construction				$71.01	18.7%	**$60,714**
B10 - Superstructure				$82.00	21.5%	**$70,110**
B20 - Exterior Enclosure				$116.43	30.6%	**$99,551**
B30 - Roofing				$32.55	8.6%	**$27,827**
C10 - Interior Construction				$12.13	3.2%	**$10,372**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$6.83	1.8%	**$5,838**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$6.00	1.6%	**$5,130**
D30 - Heating, Ventilating & Air Conditioning				$5.00	1.3%	**$4,275**
D40 - Fire Protection				$1.85	0.5%	**$1,582**
D50 - Electrical				$8.00	2.1%	**$6,840**
E10 - Equipment				$2.63	0.7%	**$2,250**
E20 - Furnishings				$7.16	1.9%	**$6,120**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$3.76	1.0%	**$3,217**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
Subtotal Direct Construction Costs				***$380.56***	***62.27%***	***$325,379***
Published Location Factor				-21.90%	325,379	($71,258)
Remoteness Factor				30.00%	254,121	$76,236
Federal Wage Rate Factor				0.00%	148,661	$0
State/Local Taxes				10.00%	181,697	$18,170
Design Contingency				10.00%	348,527	$34,853
Total Direct Construction Costs				***$448.40***		***$383,380***
Standard General Conditions				15.00%	383,380	$57,507
Governmental General Conditions				5.00%	440,887	$22,044
Historic Preservation Factor				0.00%	462,931	$0
Subtotal NET Construction Costs				***$541.44***		***$462,931***
Overhead				5.00%	462,931	$23,147
Profit				7.50%	486,078	$36,456
Estimated NET Construction Cost				***$611.15***	***85.30%***	***$522,534***
Contracting Method Adjustment				5.00%	522,534	$26,127
Escalation to 2014		32	MOS	10.00%	548,660	$54,866
Bond				1.50%	603,527	$9,053
Total Estimated NET Cost of Construction		***855***	***GSF***	***$716.47***	***/GSF***	***$612,579***
		10	***EA***			***$6,125,794***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Housing (Undergraduate) Zone C

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		855.0	gsf	0.00	$0	**$21,553**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$18,133*
	continuous footing x'0	130.0	lf	133.33	$17,333	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	3.0	ea	266.67	$800	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$3,420*
	standard slab on grade	855.0	sf	4.00	$3,420	
A20 - Basement Construction		855.0	gsf	0.00	$0	**$60,714**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$10,494*
	excavation	682.6	cy	5.00	$3,413	
	backfill & compaction	420.8	cy	12.50	$5,260	
	haul off excess soil (on site)	364.2	cy	5.00	$1,821	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$50,220*
	basement wall (cistern) x10'0	1300.0	sf	25.00	$32,500	
	vertical waterproofing	1495.0	sf	5.00	$7,475	
	foundation drain	162.5	lf	10.00	$1,625	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	2155.0	sf	4.00	$8,620	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		855.0	gsf	0.00	$0	**$70,110**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$23,940*
	structural frame (precast)	855.0	sf	25.00	$21,375	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	855.0	sf	3.00	$2,565	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$46,170*
	structural frame (wood)	1026.0	sf	40.00	$41,040	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	1026.0	sf	5.00	$5,130	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		855.0	gsf	0.00	$0	**$99,551**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$91,998*
	exterior skin (stone veneer) cistern x3'0	390.0	sf	20.00	$7,800	
	exterior skin (board siding) stain x10'0	158.2	sf	6.60	$1,044	
	exterior wall construction (wood framing) 2x6 @16"oc	1300.0	sf	1.63	$2,118	
	sheathing	0.0	sf	1.79	$0	
	woven wire cloth (SS) fine	158.2	sf	2.74	$433	
	vapor barrier/insulation	0.0	sf	2.29	$0	
	interior skin (gypsum board) water resistant	0.0	sf	1.87	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	158.2	sf	4.02	$636	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	158.2	sf	0.50	$79	
	exterior louver	0.0	sf	60.00	$0	
	ornamental grilles/screens (wood framed)	1089.8	sf	10.00	$10,898	
	ornamental grilles/screens (wood framed) clerestory x4'4	0.0	sf	10.00	$0	
	exterior protection devices (hurricane shutters)	1141.8	sf	60.00	$68,510	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	171.0	sf	2.80	$479	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$3,079*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	2% glazed curtain wall	26.0	sf	40.00	$1,040	
	2% glazed curtain wall (hurricane rated)	26.0	sf	75.00	$1,950	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	35.7	lf	2.50	$89	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$4,475*
	utility door/frame (single)	3.0	ea	932.00	$2,796	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	0.0	pr	1598.00	$0	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	51.0	lf	2.50	$128	
	sealant/caulking	51.0	lf	1.00	$51	
	finish hardware (single)	3.0	ea	500.00	$1,500	
	finish hardware (double)	0.0	ea	1000.00	$0	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		855.0	gsf	0.00	$0	**$27,827**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$27,827*
	vapor barrier/ ~~insulation~~	1026.0	sf	2.00	$2,052	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	1026.0	sf	22.00	$22,572	
	flashing/sheet metal	128.1	lf	20.00	$2,562	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	256.2	lf	2.50	$641	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		855.0	gsf	0.00	$0	**$10,372**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$4,448*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	460.0	sf	9.67	$4,448	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	0.0	sf	4.99	$0	
	balustrade/screen/railing	0.0	sf	0.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Housing (Undergraduate) Zone C

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	0.0	sf	5.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$4,642*
	wood door/frame (single)	4.0	ea	701.00	$2,804	
	wood door/frame (unequal)	0.0	pr	918.50	$0	
	wood door/frame (double)	0.0	pr	1136.00	$0	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	68.0	lf	2.50	$170	
	sealant/caulking	68.0	lf	1.00	$68	
	finish hardware (single)	4.0	ea	400.00	$1,600	
	finish hardware (double)	0.0	ea	800.00	$0	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		855.0	gsf	1.50	$1,283	*$1,283*
C20 - Stairs		855.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		855.0	gsf	0.00	$0	**$5,838**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$2,075*
	wood board finish (paint)	1078.2	sf	0.69	$744	
	gyp board finish	0.0	sf	0.80	$0	
	tile	166.3	sf	8.00	$1,331	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$2,878*
	concrete (color stain & seal)	812.3	sf	2.50	$2,031	
	5% tile	42.8	sf	10.00	$428	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	27.7	lf	9.00	$250	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	34.1	lf	5.00	$170	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$885*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	983.3	sf	0.90	$885	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		855.0	gsf	0.00	$0	**$0**
D20 - Plumbing		855.0	gsf	6.00	$5,130	**$5,130**
D2000 - Demolition		0.0	gsf	0.00	$0	*$5,130*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		855.0	gsf	5.00	$4,275	**$4,275**
D3000 - Demolition		0.0	gsf	0.00	$0	*$4,275*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		855.0	gsf	1.85	$1,582	**$1,582**
D4000 - Demolition		0.0	gsf	0.00	$0	*$1,582*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		855.0	gsf	8.00	$6,840	**$6,840**
D5000 - Demolition		0.0	gsf	0.00	$0	*$6,840*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		855.0	gsf	0.00	$0	**$2,250**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	1680.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

LORD AECK SARGENT
Salt River Bay Marine Research & Education Center (Scheme 2A)
Construction Budget (Class C)
Housing (Undergraduate) Zone C
Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$2,250*
	food service	0.0	ea	0.00	$0	
	residential	0.5	ls	4500.00	$2,250	
E20 - Furnishings		855.0	gsf	0.00	$0	**$6,120**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$6,120*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	17.0	lf	350.00	$5,950	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	0.0	lf	350.00	$0	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	0.0	lf	82.35	$0	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	425.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	68.0	lf	2.50	$170	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		855.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		855.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		855.0	gsf	0.00	$0	**$3,217**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$409*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	47.5	cy	4.00	$190	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	54.6	cy	4.00	$219	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Housing (Undergraduate) Zone C

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$2,808*
	grading x4'0	380.0	cy	4.00	$1,520	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	214.7	lf	6.00	$1,288	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		855.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		855.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		855.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		855.0	gsf	0.00	$0	**$0**
Subtotal					$325,379	**$325,379**

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Dining Pavillion (Zone C)

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$5.53	3.2%	**$15,489**
A20 - Basement Construction				$0.00	0.0%	**$0**
B10 - Superstructure				$64.75	37.3%	**$181,305**
B20 - Exterior Enclosure				$4.03	2.3%	**$11,286**
B30 - Roofing				$37.14	21.4%	**$103,996**
C10 - Interior Construction				$1.50	0.9%	**$4,200**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$1.04	0.6%	**$2,898**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$22.00	12.7%	**$61,600**
D30 - Heating, Ventilating & Air Conditioning				$12.00	6.9%	**$33,600**
D40 - Fire Protection				$2.75	1.6%	**$7,700**
D50 - Electrical				$18.00	10.4%	**$50,400**
E10 - Equipment				$0.00	0.0%	**$0**
E20 - Furnishings				$1.79	1.0%	**$5,000**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$3.16	1.8%	**$8,845**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
	Subtotal Direct Construction Costs			***$173.69***	***62.27%***	***$486,318***
Published Location Factor				-21.90%	486,318	($106,504)
Remoteness Factor				30.00%	379,815	$113,944
Federal Wage Rate Factor				0.00%	222,192	$0
State/Local Taxes				10.00%	271,568	$27,157
Design Contingency				10.00%	520,916	$52,092
Total Direct Construction Costs				***$204.65***		***$573,007***
Standard General Conditions				15.00%	573,007	$85,951
Governmental General Conditions				5.00%	658,959	$32,948
Historic Preservation Factor				0.00%	691,907	$0
Subtotal NET Construction Costs				***$247.11***		***$691,907***
Overhead				5.00%	691,907	$34,595
Profit				7.50%	726,502	$54,488
Estimated NET Construction Cost				***$278.92***	***85.30%***	***$780,989***
Contracting Method Adjustment				5.00%	780,989	$39,049
Escalation to 2014		32	MOS	10.00%	820,039	$82,004
Bond				1.50%	902,043	$13,531
Total Estimated NET Cost of Construction		***2,800***	***GSF***	***$326.99***	***/GSF***	***$915,573***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Dining Pavillion (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		2800.0	gsf	0.00	$0	**$15,489**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$4,289*
	continuous footing x'0	193.0	lf	22.22	$4,289	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	0.0	ea	266.67	$0	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$11,200*
	standard slab on grade	2800.0	sf	4.00	$11,200	
A20 - Basement Construction		2800.0	gsf	0.00	$0	**$0**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$0*
	excavation	0.0	cy	5.00	$0	
	backfill & compaction	0.0	cy	12.50	$0	
	haul off excess soil (on site)	0.0	cy	5.00	$0	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$0*
	basement wall (cistern) x0'0	0.0	sf	25.00	$0	
	vertical waterproofing	0.0	sf	5.00	$0	
	foundation drain	0.0	lf	10.00	$0	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	0.0	sf	4.00	$0	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		2800.0	gsf	0.00	$0	**$181,305**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$0*
	structural frame (precast)	0.0	sf	25.00	$0	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	0.0	sf	3.00	$0	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$181,305*
	structural frame (wood)	4029.0	sf	40.00	$161,160	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	4029.0	sf	5.00	$20,145	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		2800.0	gsf	0.00	$0	**$11,286**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$11,286*
	exterior skin (stone veneer) cistern x0'0	0.0	sf	20.00	$0	
	exterior skin (board siding) stain x0'0	0.0	sf	6.60	$0	
	exterior wall construction (wood framing) 2x6 @16"oc	970.5	sf	1.63	$1,581	
	sheathing	0.0	sf	1.79	$0	
	woven wire cloth (SS) fine	0.0	sf	2.74	$0	
	vapor barrier/insulation	0.0	sf	2.29	$0	
	interior skin (gypsum board) water resistant	0.0	sf	1.87	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Dining Pavillion (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	0.0	sf	4.02	$0	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	0.0	sf	0.50	$0	
	exterior louver	0.0	sf	60.00	$0	
	ornamental grilles/screens (wood framed)	970.5	sf	10.00	$9,705	
	ornamental grilles/screens (wood framed) clerestory x5'4	0.0	sf	10.00	$0	
	exterior protection devices (hurricane shutters)	0.0	sf	60.00	$0	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	0.0	sf	2.80	$0	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$0*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	0% glazed curtain wall	0.0	sf	40.00	$0	
	0% glazed curtain wall (hurricane rated)	0.0	sf	75.00	$0	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$0*
	utility door/frame (single)	0.0	ea	932.00	$0	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	0.0	pr	1598.00	$0	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	lf	1.00	$0	
	finish hardware (single)	0.0	ea	500.00	$0	
	finish hardware (double)	0.0	ea	1000.00	$0	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		2800.0	gsf	0.00	$0	**$103,996**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$103,996*
	vapor barrier/ ~~insulation~~	4029.0	sf	2.00	$8,058	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	4029.0	sf	22.00	$88,638	
	flashing/sheet metal	292.0	lf	20.00	$5,840	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	584.0	lf	2.50	$1,460	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		2800.0	gsf	0.00	$0	**$4,200**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$0*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	0.0	sf	9.67	$0	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	0.0	sf	4.99	$0	
	balustrade/screen/railing	0.0	sf	0.00	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	0.0	sf	5.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$0*
	wood door/frame (single)	0.0	ea	701.00	$0	
	wood door/frame (unequal)	0.0	pr	918.50	$0	
	wood door/frame (double)	0.0	pr	1136.00	$0	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	lf	1.00	$0	
	finish hardware (single)	0.0	ea	400.00	$0	
	finish hardware (double)	0.0	ea	800.00	$0	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		2800.0	gsf	1.50	$4,200	*$4,200*
C20 - Stairs		2800.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		2800.0	gsf	0.00	$0	**$2,898**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$0*
	wood board finish (paint)	0.0	sf	0.69	$0	
	gyp board finish	0.0	sf	0.80	$0	
	tile	0.0	sf	8.00	$0	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$0*
	concrete (color stain & seal)	0.0	sf	2.50	$0	
	0% tile	0.0	sf	10.00	$0	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	0.0	lf	9.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Dining Pavillion (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	0.0	lf	5.00	$0	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$2,898*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	3220.0	sf	0.90	$2,898	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		2800.0	gsf	0.00	$0	**$0**
D20 - Plumbing		2800.0	gsf	22.00	$61,600	**$61,600**
D2000 - Demolition		0.0	gsf	0.00	$0	*$61,600*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		2800.0	gsf	12.00	$33,600	**$33,600**
D3000 - Demolition		0.0	gsf	0.00	$0	*$33,600*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		2800.0	gsf	2.75	$7,700	**$7,700**
D4000 - Demolition		0.0	gsf	0.00	$0	*$7,700*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		2800.0	gsf	18.00	$50,400	**$50,400**
D5000 - Demolition		0.0	gsf	0.00	$0	*$50,400*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		2800.0	gsf	0.00	$0	**$0**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	1680.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Dining Pavillion (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$0*
	food service	0.0	ls	0.00	$0	
	residential	0.0	ea	0.00	$0	
E20 - Furnishings		2800.0	gsf	0.00	$0	**$5,000**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$5,000*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	20.0	lf	250.00	$5,000	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	0.0	lf	350.00	$0	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	0.0	lf	82.35	$0	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	425.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		2800.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		2800.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		2800.0	gsf	0.00	$0	**$8,845**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$1,338*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	155.6	cy	4.00	$622	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	178.9	cy	4.00	$716	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Dining Pavillion (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$7,507*
	grading x4'0	1244.4	cy	4.00	$4,978	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	421.6	lf	6.00	$2,530	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		2800.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		2800.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		2800.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		2800.0	gsf	0.00	$0	**$0**
Subtotal					$486,318	**$486,318**

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$7.38	2.7%	**$5,533**
A20 - Basement Construction				$0.00	0.0%	**$0**
B10 - Superstructure				$35.00	12.6%	**$26,250**
B20 - Exterior Enclosure				$45.84	16.5%	**$34,376**
B30 - Roofing				$38.18	13.7%	**$28,635**
C10 - Interior Construction				$5.93	2.1%	**$4,444**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$6.95	2.5%	**$5,216**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$22.00	7.9%	**$16,500**
D30 - Heating, Ventilating & Air Conditioning				$20.00	7.2%	**$15,000**
D40 - Fire Protection				$2.75	1.0%	**$2,063**
D50 - Electrical				$20.00	7.2%	**$15,000**
E10 - Equipment				$43.00	15.5%	**$32,250**
E20 - Furnishings				$27.36	9.8%	**$20,520**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$3.86	1.4%	**$2,898**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
Subtotal Direct Construction Costs				***$278.25***	***62.27%***	***$208,685***
Published Location Factor				-21.90%	208,685	($45,702)
Remoteness Factor				30.00%	162,983	$48,895
Federal Wage Rate Factor				0.00%	95,345	$0
State/Local Taxes				10.00%	116,533	$11,653
Design Contingency				10.00%	223,531	$22,353
Total Direct Construction Costs				***$327.85***		***$245,884***
Standard General Conditions				15.00%	245,884	$36,883
Governmental General Conditions				5.00%	282,767	$14,138
Historic Preservation Factor				0.00%	296,905	$0
Subtotal NET Construction Costs				***$395.87***		***$296,905***
Overhead				5.00%	296,905	$14,845
Profit				7.50%	311,751	$23,381
Estimated NET Construction Cost				***$446.84***	***85.30%***	***$335,132***
Contracting Method Adjustment				5.00%	335,132	$16,757
Escalation to 2014		32	MOS	10.00%	351,889	$35,189
Bond				1.50%	387,078	$5,806
Total Estimated NET Cost of Construction		***750***	***GSF***	***$523.84***	***/GSF***	***$392,884***
		1	***EA***			***$392,884***

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		750.0	gsf	0.00	$0	**$5,533**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$2,533*
	continuous footing x'0	114.0	lf	22.22	$2,533	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	0.0	ea	266.67	$0	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$3,000*
	standard slab on grade	750.0	sf	4.00	$3,000	
A20 - Basement Construction		750.0	gsf	0.00	$0	**$0**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$0*
	excavation	0.0	cy	5.00	$0	
	backfill & compaction	0.0	cy	12.50	$0	
	haul off excess soil (on site)	0.0	cy	5.00	$0	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$0*
	basement wall (cistern) x0'0	0.0	sf	25.00	$0	
	vertical waterproofing	0.0	sf	5.00	$0	
	foundation drain	0.0	lf	10.00	$0	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	0.0	sf	4.00	$0	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		750.0	gsf	0.00	$0	**$26,250**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$0*
	structural frame (precast)	0.0	sf	25.00	$0	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	0.0	sf	3.00	$0	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$26,250*
	structural frame (wood)	1050.0	sf	20.00	$21,000	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	1050.0	sf	5.00	$5,250	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		750.0	gsf	0.00	$0	**$34,376**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$23,152*
	exterior skin (stone veneer) cistern x0'0	0.0	sf	20.00	$0	
	exterior skin (board siding) stain x10'0	1026.0	sf	6.60	$6,772	
	exterior wall construction (wood framing) 2x6 @16"oc	1140.0	sf	1.63	$1,857	
	sheathing	1026.0	sf	1.79	$1,837	
	woven wire cloth (SS) fine	0.0	sf	2.74	$0	
	vapor barrier/insulation	1026.0	sf	2.29	$2,350	
	interior skin (gypsum board) water resistant	1026.0	sf	1.87	$1,919	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Dining Support (Zone A)

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	0.0	sf	4.02	$0	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	1026.0	sf	0.50	$513	
	exterior louver	3.8	sf	60.00	$225	
	ornamental grilles/screens (wood framed)	0.0	sf	10.00	$0	
	ornamental grilles/screens (wood framed) clerestory x4'4	0.0	sf	10.00	$0	
	exterior protection devices (hurricane shutters)	114.0	sf	60.00	$6,840	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	300.0	sf	2.80	$840	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$6,750*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	5% glazed curtain wall	57.0	sf	40.00	$2,280	
	5% glazed curtain wall (hurricane rated)	57.0	sf	75.00	$4,275	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	78.2	lf	2.50	$195	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$4,475*
	utility door/frame (single)	3.0	ea	932.00	$2,796	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	0.0	pr	1598.00	$0	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	51.0	lf	2.50	$128	
	sealant/caulking	51.0	lf	1.00	$51	
	finish hardware (single)	3.0	ea	500.00	$1,500	
	finish hardware (double)	0.0	ea	1000.00	$0	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		750.0	gsf	0.00	$0	**$28,635**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$28,635*
	vapor barrier/ ~~insulation~~	1050.0	sf	2.00	$2,100	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	1050.0	sf	22.00	$23,100	
	flashing/sheet metal	137.4	lf	20.00	$2,748	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	274.8	lf	2.50	$687	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		750.0	gsf	0.00	$0	**$4,444**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$998*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	0.0	sf	9.67	$0	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	200.0	sf	4.99	$998	
	balustrade/screen/railing	0.0	sf	0.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Dining Support (Zone A)

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	0.0	sf	5.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$2,321*
	wood door/frame (single)	2.0	ea	701.00	$1,402	
	wood door/frame (unequal)	0.0	pr	918.50	$0	
	wood door/frame (double)	0.0	pr	1136.00	$0	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	34.0	lf	2.50	$85	
	sealant/caulking	34.0	lf	1.00	$34	
	finish hardware (single)	2.0	ea	400.00	$800	
	finish hardware (double)	0.0	ea	800.00	$0	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		750.0	gsf	1.50	$1,125	*$1,125*
C20 - Stairs		750.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		750.0	gsf	0.00	$0	**$5,216**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$1,566*
	wood board finish (paint)	0.0	sf	0.69	$0	
	gyp board finish	400.0	sf	0.80	$320	
	tile	155.8	sf	8.00	$1,246	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$2,873*
	concrete (color stain & seal)	712.5	sf	2.50	$1,781	
	5% tile	37.5	sf	10.00	$375	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	26.0	lf	9.00	$234	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	96.6	lf	5.00	$483	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$776*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	862.5	sf	0.90	$776	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		750.0	gsf	0.00	$0	**$0**
D20 - Plumbing		750.0	gsf	22.00	$16,500	**$16,500**
D2000 - Demolition		0.0	gsf	0.00	$0	*$16,500*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		750.0	gsf	20.00	$15,000	**$15,000**
D3000 - Demolition		0.0	gsf	0.00	$0	*$15,000*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		750.0	gsf	2.75	$2,063	**$2,063**
D4000 - Demolition		0.0	gsf	0.00	$0	*$2,063*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		750.0	gsf	20.00	$15,000	**$15,000**
D5000 - Demolition		0.0	gsf	0.00	$0	*$15,000*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		750.0	gsf	0.00	$0	**$32,250**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	1680.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Dining Support (Zone A)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$32,250*
	food service (allowance)	1.0	ls	30000.00	$30,000	
	residential	0.5	ls	4500.00	$2,250	
E20 - Furnishings		750.0	gsf	0.00	$0	**$20,520**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$20,520*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	57.0	lf	350.00	$19,950	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	0.0	lf	350.00	$0	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	0.0	lf	82.35	$0	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	425.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	228.0	lf	2.50	$570	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		750.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		750.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		750.0	gsf	0.00	$0	**$2,898**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$358*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	41.7	cy	4.00	$167	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	47.9	cy	4.00	$192	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Dining Support (Zone A)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$2,540*
	grading x4'0	333.3	cy	4.00	$1,333	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	201.1	lf	6.00	$1,207	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		750.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		750.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		750.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		750.0	gsf	0.00	$0	**$0**
Subtotal					$208,685	**$208,685**

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Boat Dock Facilities (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$23.56	12.1%	**$17,667**
A20 - Basement Construction				$0.00	0.0%	**$0**
B10 - Superstructure				$63.00	32.3%	**$47,250**
B20 - Exterior Enclosure				$50.92	26.1%	**$38,189**
B30 - Roofing				$38.18	19.6%	**$28,635**
C10 - Interior Construction				$4.59	2.4%	**$3,446**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$4.85	2.5%	**$3,639**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$1.00	0.5%	**$750**
D30 - Heating, Ventilating & Air Conditioning				$1.00	0.5%	**$750**
D40 - Fire Protection				$0.00	0.0%	**$0**
D50 - Electrical				$4.00	2.1%	**$3,000**
E10 - Equipment				$0.00	0.0%	**$0**
E20 - Furnishings				$0.00	0.0%	**$0**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$3.86	2.0%	**$2,898**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
	Subtotal Direct Construction Costs			***$194.96***	***62.27%***	***$146,223***
	Published Location Factor			-21.90%	146,223	($32,023)
	Remoteness Factor			30.00%	114,200	$34,260
	Federal Wage Rate Factor			0.00%	66,807	$0
	State/Local Taxes			10.00%	81,653	$8,165
	Design Contingency			10.00%	156,626	$15,663
	Total Direct Construction Costs			***$229.72***		***$172,288***
	Standard General Conditions			15.00%	172,288	$25,843
	Governmental General Conditions			5.00%	198,132	$9,907
	Historic Preservation Factor			0.00%	208,038	$0
	Subtotal NET Construction Costs			***$277.38***		***$208,038***
	Overhead			5.00%	208,038	$10,402
	Profit			7.50%	218,440	$16,383
	Estimated NET Construction Cost			***$313.10***	***85.30%***	***$234,823***
	Contracting Method Adjustment			5.00%	234,823	$11,741
	Escalation to 2014	32	MOS	10.00%	246,564	$24,656
	Bond			1.50%	271,221	$4,068
	Total Estimated NET Cost of Construction	***750***	***GSF***	***$367.05***	***/GSF***	***$275,289***
		4	***EA***			***$1,101,157***

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		750.0	gsf	0.00	$0	**$17,667**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$14,667*
	continuous footing x'0	110.0	lf	133.33	$14,667	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	0.0	ea	266.67	$0	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$3,000*
	standard slab on grade	750.0	sf	4.00	$3,000	
A20 - Basement Construction		750.0	gsf	0.00	$0	**$0**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$0*
	excavation	0.0	cy	5.00	$0	
	backfill & compaction	0.0	cy	12.50	$0	
	haul off excess soil (on site)	0.0	cy	5.00	$0	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$0*
	basement wall (cistern) x0'0	0.0	sf	25.00	$0	
	vertical waterproofing	0.0	sf	5.00	$0	
	foundation drain	0.0	lf	10.00	$0	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	0.0	sf	4.00	$0	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		750.0	gsf	0.00	$0	**$47,250**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$0*
	structural frame (precast)	0.0	sf	25.00	$0	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	0.0	sf	3.00	$0	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$47,250*
	structural frame (wood)	1050.0	sf	40.00	$42,000	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	1050.0	sf	5.00	$5,250	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		750.0	gsf	0.00	$0	**$38,189**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$32,600*
	exterior skin (stone veneer) cistern x0'0	0.0	sf	20.00	$0	
	exterior skin (board siding) stain x10'0	829.9	sf	6.60	$5,477	
	exterior wall construction (wood framing) 2x6 @16"oc	1100.0	sf	1.63	$1,792	
	sheathing	0.0	sf	1.79	$0	
	woven wire cloth (SS) fine	829.9	sf	2.74	$2,274	
	vapor barrier/insulation	0.0	sf	2.29	$0	
	interior skin (gypsum board) water resistant	0.0	sf	1.87	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Boat Dock Facilities (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	829.9	sf	4.02	$3,336	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	829.9	sf	0.50	$415	
	exterior louver	0.0	sf	60.00	$0	
	ornamental grilles/screens (wood framed)	226.1	sf	10.00	$2,261	
	ornamental grilles/screens (wood framed) clerestory x4'4	0.0	sf	10.00	$0	
	exterior protection devices (hurricane shutters)	270.1	sf	60.00	$16,205	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	300.0	sf	2.80	$840	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$2,605*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	2% glazed curtain wall	22.0	sf	40.00	$880	
	2% glazed curtain wall (hurricane rated)	22.0	sf	75.00	$1,650	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	30.2	lf	2.50	$75	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$2,983*
	utility door/frame (single)	2.0	ea	932.00	$1,864	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	0.0	pr	1598.00	$0	
	large special door/frame (OH coiling)	0.0	sf	50.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	34.0	lf	1.00	$34	
	sealant/caulking	34.0	lf	1.00	$34	
	finish hardware (single)	2.0	ea	500.00	$1,000	
	finish hardware (double)	0.0	ea	1000.00	$0	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		750.0	gsf	0.00	$0	**$28,635**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$28,635*
	vapor barrier/ ~~insulation~~	1050.0	sf	2.00	$2,100	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	1050.0	sf	22.00	$23,100	
	flashing/sheet metal	137.4	lf	20.00	$2,748	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	274.8	lf	2.50	$687	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		750.0	gsf	0.00	$0	**$3,446**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$0*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	0.0	sf	9.67	$0	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	0.0	sf	4.99	$0	
	balustrade/screen/railing	0.0	sf	0.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Boat Dock Facilities (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	0.0	sf	5.00	$0	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$2,321*
	wood door/frame (single)	2.0	ea	701.00	$1,402	
	wood door/frame (unequal)	0.0	pr	918.50	$0	
	wood door/frame (double)	0.0	pr	1136.00	$0	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	34.0	lf	2.50	$85	
	sealant/caulking	34.0	lf	1.00	$34	
	finish hardware (single)	2.0	ea	400.00	$800	
	finish hardware (double)	0.0	ea	800.00	$0	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		750.0	gsf	1.50	$1,125	*$1,125*
C20 - Stairs		750.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		750.0	gsf	0.00	$0	**$3,639**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$573*
	wood board finish (paint)	829.9	sf	0.69	$573	
	gyp board finish	0.0	sf	0.80	$0	
	tile	0.0	sf	8.00	$0	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$2,290*
	concrete (color stain & seal)	750.0	sf	2.50	$1,875	
	0% tile	0.0	sf	10.00	$0	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	0.0	lf	9.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Boat Dock Facilities (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	83.0	lf	5.00	$415	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$776*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	862.5	sf	0.90	$776	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		750.0	gsf	0.00	$0	**$0**
D20 - Plumbing		750.0	gsf	1.00	$750	**$750**
D2000 - Demolition		0.0	gsf	0.00	$0	*$750*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		750.0	gsf	1.00	$750	**$750**
D3000 - Demolition		0.0	gsf	0.00	$0	*$750*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		750.0	gsf	0.00	$0	**$0**
D4000 - Demolition		0.0	gsf	0.00	$0	*$0*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		750.0	gsf	4.00	$3,000	**$3,000**
D5000 - Demolition		0.0	gsf	0.00	$0	*$3,000*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		750.0	gsf	0.00	$0	**$0**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	1680.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$0*
	food service	0.0	ea	0.00	$0	
	residential	0.0	ls	4500.00	$0	
E20 - Furnishings		750.0	gsf	0.00	$0	**$0**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$0*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	0.0	lf	350.00	$0	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	0.0	lf	350.00	$0	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	0.0	lf	82.35	$0	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	425.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		750.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		750.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		750.0	gsf	0.00	$0	**$2,898**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$358*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	41.7	cy	4.00	$167	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	47.9	cy	4.00	$192	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$2,540*
	grading x4'0	333.3	cy	4.00	$1,333	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	201.1	lf	6.00	$1,207	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		750.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		750.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		750.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		750.0	gsf	0.00	$0	**$0**
Subtotal					$146,223	**$146,223**

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Maintenance Building (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$12.18	7.5%	**$52,613**
A20 - Basement Construction				$0.00	0.0%	**$0**
B10 - Superstructure				$54.39	33.7%	**$234,962**
B20 - Exterior Enclosure				$34.28	21.2%	**$148,069**
B30 - Roofing				$30.93	19.1%	**$133,623**
C10 - Interior Construction				$3.56	2.2%	**$15,394**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$4.21	2.6%	**$18,183**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$3.50	2.2%	**$15,120**
D30 - Heating, Ventilating & Air Conditioning				$5.00	3.1%	**$21,600**
D40 - Fire Protection				$1.55	1.0%	**$6,696**
D50 - Electrical				$9.00	5.6%	**$38,880**
E10 - Equipment				$0.00	0.0%	**$0**
E20 - Furnishings				$0.00	0.0%	**$0**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$2.98	1.8%	**$12,886**
G20 - Site Improvements				$0.00	0.0%	**$0**
G30 - Site Civil/Mechanical Utilities				$0.00	0.0%	**$0**
G40 - Site Electrical Utilities				$0.00	0.0%	**$0**
G90 - Other Site Construction				$0.00	0.0%	**$0**
Subtotal Direct Construction Costs				***$161.58***	***62.27%***	***$698,026***
Published Location Factor				-21.90%	698,026	($152,868)
Remoteness Factor				30.00%	545,159	$163,548
Federal Wage Rate Factor				0.00%	318,918	$0
State/Local Taxes				10.00%	389,788	$38,979
Design Contingency				10.00%	747,685	$74,769
Total Direct Construction Costs				***$190.38***		***$822,454***
Standard General Conditions				15.00%	822,454	$123,368
Governmental General Conditions				5.00%	945,822	$47,291
Historic Preservation Factor				0.00%	993,113	$0
Subtotal NET Construction Costs				***$229.89***		***$993,113***
Overhead				5.00%	993,113	$49,656
Profit				7.50%	1,042,768	$78,208
Estimated NET Construction Cost				***$259.49***	***85.30%***	***$1,120,976***
Contracting Method Adjustment				5.00%	1,120,976	$56,049
Escalation to 2014		32	MOS	10.00%	1,177,025	$117,702
Bond				1.50%	1,294,727	$19,421
Total Estimated NET Cost of Construction		***4,320***	***GSF***	***$304.20***	***/GSF***	***$1,314,148***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Maintenance Building (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		4320.0	gsf	0.00	$0	**$52,613**
A1010 - Standard Foundations		0.0	lf	0.00	$0	*$35,333*
	continuous footing x'0	265.0	lf	133.33	$35,333	
	foundation wall x0'0	0.0	sf	25.00	$0	
	spread footing x4'0	0.0	ea	266.67	$0	
A1020 - Special Foundations		0.0	sf	0.00	$0	*$0*
A1030 - Slab on Grade		0.0	sf	0.00	$0	*$17,280*
	standard slab on grade	4320.0	sf	4.00	$17,280	
A20 - Basement Construction		4320.0	gsf	0.00	$0	**$0**
A2010 - Basement Excavation		0.0	cy	0.00	$0	*$0*
	excavation	0.0	cy	5.00	$0	
	backfill & compaction	0.0	cy	12.50	$0	
	haul off excess soil (on site)	0.0	cy	5.00	$0	
A2020 - Basement Wall		0.0	sf	0.00	$0	*$0*
	basement wall (cistern) x0'0	0.0	sf	25.00	$0	
	vertical waterproofing	0.0	sf	5.00	$0	
	foundation drain	0.0	lf	10.00	$0	
	damproofing	0.0	sf	0.00	$0	
	vapor retarder / insulation	0.0	sf	0.00	$0	
	interior skin (liner)	0.0	sf	4.00	$0	
	other basement wall	0.0	sf	0.00	$0	
B10 - Superstructure		4320.0	gsf	0.00	$0	**$234,962**
B1010 - Floor Construction		0.0	sf	0.00	$0	*$0*
	structural frame (precast)	0.0	sf	25.00	$0	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & topping (concrete)	0.0	sf	3.00	$0	
	exterior stair	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	lf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other floor constuction	0.0	sf	0.00	$0	
B1020 - Roof Construction		0.0	sf	0.00	$0	*$234,962*
	structural frame (wood)	5221.4	sf	40.00	$208,855	
	structural interior wall	0.0	sf	0.00	$0	
	deck, slab & sheathing (wood) composite	5221.4	sf	5.00	$26,107	
	canopy	0.0	sf	0.00	$0	
	vapor barrier/insulation	0.0	sf	0.00	$0	
	fireproofing	0.0	sf	0.00	$0	
	firestopping	0.0	lf	0.00	$0	
	other roof construction	0.0	sf	0.00	$0	
B20 - Exterior Enclosure		4320.0	gsf	0.00	$0	**$148,069**
B2010 - Exterior Walls		0.0	sf	0.00	$0	*$128,794*
	exterior skin (stone veneer) cistern x0'0	0.0	sf	20.00	$0	
	exterior skin (board siding) stain x15'0	2845.6	sf	6.60	$18,781	
	exterior wall construction (wood framing) 2x6 @16"oc	3975.0	sf	1.63	$6,476	
	sheathing	0.0	sf	1.79	$0	
	woven wire cloth (SS) fine	2845.6	sf	2.74	$7,797	
	vapor barrier/insulation	0.0	sf	2.29	$0	
	interior skin (gypsum board) water resistant	0.0	sf	1.87	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior skin (board siding) 1x8	2845.6	sf	4.02	$11,439	
	expansion control	0.0	lf	0.00	$0	
	parapet	0.0	sf	0.00	$0	
	sealant/caulking	2845.6	sf	0.50	$1,423	
	exterior louver	21.6	sf	60.00	$1,296	
	ornamental grilles/screens (wood framed)	1129.4	sf	10.00	$11,294	
	ornamental grilles/screens (wood framed) clerestory x5'4	0.0	sf	10.00	$0	
	exterior protection devices (hurricane shutters)	1129.4	sf	60.00	$67,764	
	balcony wall/railing	0.0	lf	0.00	$0	
	soffit	901.4	sf	2.80	$2,524	
	rough carpentry	0.0	lf	2.50	$0	
	other exterior wall (thermal chimney)	0.0	ea	3155.75	$0	
B2020 - Exterior Windows		0.0	sf	0.00	$0	*$0*
	standard window	0.0	sf	0.00	$0	
	storefront	0.0	sf	0.00	$0	
	0% glazed curtain wall	0.0	sf	40.00	$0	
	0% glazed curtain wall (hurricane rated)	0.0	sf	75.00	$0	
	glazed curtain wall (clerestory) x4'5	0.0	sf	75.00	$0	
	other exterior window	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
B2030 - Exterior Doors		0.0	ea	0.00	$0	*$19,276*
	utility door/frame (single)	1.0	ea	932.00	$932	
	utility door/frame (unequal)	0.0	pr	1265.00	$0	
	utility door/frame (double)	2.0	pr	1598.00	$3,196	
	large special door/frame (OH coiling)	240.0	sf	50.00	$12,000	
	special use door/frame	0.0	ea	0.00	$0	
	exterior gate	0.0	ea	0.00	$0	
	rough carpentry	185.0	lf	2.50	$463	
	sealant/caulking	185.0	lf	1.00	$185	
	finish hardware (single)	1.0	ea	500.00	$500	
	finish hardware (double)	2.0	ea	1000.00	$2,000	
	other exterior door/frame	0.0	ea	0.00	$0	
B30 - Roofing		4320.0	gsf	0.00	$0	**$133,623**
B3010 - Roof Coverings		0.0	sf	0.00	$0	*$133,623*
	vapor barrier/ ~~insulation~~	5221.4	sf	2.00	$10,443	
	shingle/roofing tile	0.0	sf	0.00	$0	
	membrane roofing	0.0	sf	0.00	$0	
	sheet metal roofing (copper)	5221.4	sf	22.00	$114,870	
	flashing/sheet metal	332.4	lf	20.00	$6,648	
	specialties/accessories	0.0	ea	0.00	$0	
	manufactured exterior specialties	0.0	ea	0.00	$0	
	rough carpentry	664.8	lf	2.50	$1,662	
B3020 - Roof Openings		0.0	sf	0.00	$0	*$0*
C10 - Interior Construction		4320.0	gsf	0.00	$0	**$15,394**
C1010 - Interior Partitions		0.0	sf	0.00	$0	*$5,433*
	cmu partition	0.0	sf	0.00	$0	
	wood partition (board siding)	0.0	sf	9.67	$0	
	wood partition (screen)	0.0	sf	6.00	$0	
	gyp board partition (water resistant)	0.0	sf	4.99	$0	
	balustrade/screen/railing	0.0	sf	0.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Maintenance Building (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	interior window	0.0	sf	0.00	$0	
	glazed partition/storefront	0.0	sf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
	sealant/caulking	0.0	sf	0.00	$0	
	other interior partition (chain link fence) x6'0	1086.5	sf	5.00	$5,433	
C1020 - Interior Doors		0.0	ea	0.00	$0	*$3,482*
	wood door/frame (single)	3.0	ea	701.00	$2,103	
	wood door/frame (unequal)	0.0	pr	918.50	$0	
	wood door/frame (double)	0.0	pr	1136.00	$0	
	FRP door/frame (single)	0.0	ea	1132.00	$0	
	FRP door/frame (unequal)	0.0	pr	1474.00	$0	
	FRP door/frame (double)	0.0	pr	1816.00	$0	
	metal door/frame (single)	0.0	ea	932.00	$0	
	metal door/frame (unequal)	0.0	pr	1265.00	$0	
	metal door/frame (double)	0.0	pr	1598.00	$0	
	fire rating (single)	0.0	ea	0.00	$0	
	fire rating (double)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (single)	0.0	ea	0.00	$0	
	entrance door/frame/hardware (double)	0.0	pr	0.00	$0	
	sliding door/frame	0.0	ea	0.00	$0	
	folding door/frame	0.0	ea	0.00	$0	
	large door/frame	0.0	ea	0.00	$0	
	special use door/frame	0.0	ea	0.00	$0	
	interior gate	0.0	ea	0.00	$0	
	access door	0.0	ea	0.00	$0	
	rough carpentry	51.0	lf	2.50	$128	
	sealant/caulking	51.0	lf	1.00	$51	
	finish hardware (single)	3.0	ea	400.00	$1,200	
	finish hardware (double)	0.0	ea	800.00	$0	
	other interior door	0.0	ea	0.00	$0	
C1030 - Specialties		4320.0	gsf	1.50	$6,480	*$6,480*
C20 - Stairs		4320.0	gsf	0.00	$0	**$0**
C30 - Interior Finishes		4320.0	gsf	0.00	$0	**$18,183**
C3010 - Wall Finishes		0.0	sf	0.00	$0	*$1,963*
	wood board finish (paint)	2845.6	sf	0.69	$1,963	
	gyp board finish	0.0	sf	0.80	$0	
	tile	0.0	sf	8.00	$0	
	interior wall painting	0.0	sf	0.00	$0	
	wall covering	0.0	sf	0.00	$0	
	trim/decoration	0.0	sf	0.00	$0	
	other wall finishes	0.0	sf	0.00	$0	
C3020 - Floor Finishes		0.0	sf	0.00	$0	*$11,749*
	concrete (color stain & seal)	4320.0	sf	2.50	$10,800	
	0% tile	0.0	sf	10.00	$0	
	wood	0.0	sf	10.00	$0	
	resilient flooring	0.0	sf	2.50	$0	
	carpet	0.0	sy	35.00	$0	
	floor painting	0.0	sf	1.00	$0	
	floor topping	0.0	sf	0.00	$0	
	tile base	0.0	lf	9.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Maintenance Building (Zone C)

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	wood base	189.7	lf	5.00	$949	
	resilient base	0.0	lf	1.50	$0	
C3030 - Ceiling Finishes		0.0	sf	0.00	$0	*$4,471*
	concrete	0.0	sf	0.00	$0	
	paneling (wood)	0.0	sf	0.00	$0	
	plaster ceiling	0.0	sf	0.00	$0	
	gyp board ceiling	0.0	sf	0.00	$0	
	soffit (gb)	0.0	sf	0.00	$0	
	veneer plaster ceiling	0.0	sf	0.00	$0	
	acoustical ceiling treatment	0.0	sf	0.00	$0	
	ceiling painting	4968.0	sf	0.90	$4,471	
	ceiling trim/decoration	0.0	sf	0.00	$0	
	other ceiling finishes	0.0	sf	0.00	$0	
D10 - Conveying		4320.0	gsf	0.00	$0	**$0**
D20 - Plumbing		4320.0	gsf	3.50	$15,120	**$15,120**
D2000 - Demolition		0.0	gsf	0.00	$0	*$15,120*
D2010 - Plumbing Fixtures		0.0	ea	0.00	$0	*$0*
D2020 - Domestic Water Distribution		0.0	gsf	0.00	$0	*$0*
D2030 - Sanitary Waste Systems		0.0	gsf	0.00	$0	*$0*
D2040 - Rain Water Drainage Systems		0.0	gsf	0.00	$0	*$0*
D2090 - Other Plumbing Systems		0.0	gsf	0.00	$0	*$0*
D30 - Heating, Ventilating & Air Conditioning		4320.0	gsf	5.00	$21,600	**$21,600**
D3000 - Demolition		0.0	gsf	0.00	$0	*$21,600*
D3010 - Energy Supply		0.0	gsf	0.00	$0	*$0*
D3020 - Heat Generation		0.0	gsf	0.00	$0	*$0*
D3030 - Refrigeration		0.0	gsf	0.00	$0	*$0*
D3040 - HVAC Distribution		0.0	gsf	0.00	$0	*$0*
D3050 - Terminal & Package Units		0.0	gsf	0.00	$0	*$0*
D3060 - HVAC Instrumentation & Controls		0.0	gsf	0.00	$0	*$0*
D3070 - Testing, Adjusting & Balancing		0.0	gsf	0.00	$0	*$0*
D3090 - Other Special HVAC Systems & Equipment		0.0	gsf	0.00	$0	*$0*
D40 - Fire Protection		4320.0	gsf	1.55	$6,696	**$6,696**
D4000 - Demolition		0.0	gsf	0.00	$0	*$6,696*
D4010 - Sprinklers		0.0	gsf	0.00	$0	*$0*
D4020 - Standpipes		0.0	gsf	0.00	$0	*$0*
D4030 - Fire Protection Specialties		0.0	ea	0.00	$0	*$0*
D4090 - Other Fire Protection Systems		0.0	gsf	0.00	$0	*$0*
D50 - Electrical		4320.0	gsf	9.00	$38,880	**$38,880**
D5000 - Demolition		0.0	gsf	0.00	$0	*$38,880*
D5010 - Electrical Service & Distribution		0.0	gsf	0.00	$0	*$0*
D5020 - Lighting & Branch Wiring		0.0	gsf	0.00	$0	*$0*
D5030 - Communication & Security		0.0	gsf	0.00	$0	*$0*
D5090 - Other Electrical Systems		0.0	gsf	0.00	$0	*$0*
E10 - Equipment		4320.0	gsf	0.00	$0	**$0**
E1010 - Commercial Equipment		0.0	ls	0.00	$0	*$0*
E1020 - Institutional Equipment		0.0	ls	0.00	$0	*$0*
	audio-visual	0.0	ea	1680.00	$0	
	laboratory (shelving) OFCI	0.0	ea	90.00	$0	

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Maintenance Building (Zone C)

Prepared: May 9, 2011 *Revised: June 6, 2011*

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	laboratory (-80 deg freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (4 deg reach-in freezer) OFCI	0.0	ea	150.00	$0	
	laboratory (equipment x10'0) OFCI	0.0	ea	150.00	$0	
	laboratory (ADA fume hood) x6'0	0.0	ea	9000.00	$0	
	laboratory (biosafety cabinet) type IIA x6'0	0.0	ea	10500.00	$0	
	laboratory (raceway tank) dbl x15'0	0.0	ea	15000.00	$0	
	laboratory (tank) x5'0 dia	0.0	ea	10000.00	$0	
E1030 - Vehicular Equipment		0.0	ls	0.00	$0	*$0*
E1090 - Other Equipment		0.0	ls	0.00	$0	*$0*
	food service	0.0	ea	0.00	$0	
	residential	0.0	ea	0.00	$0	
E20 - Furnishings		4320.0	gsf	0.00	$0	**$0**
E2010 - Fixed Furnishings		0.0	lf	0.00	$0	*$0*
	artwork (NIC)	0.0	ls	0.00	$0	
	millwork	0.0	lf	0.00	$0	
	casework (wall cabinet) x'0	0.0	lf	245.00	$0	
	casework (base cabinet) x22"	0.0	lf	350.00	$0	
	casework (countertop) x16"	0.0	lf	59.85	$0	
	casework (countertop) x22"	0.0	lf	82.35	$0	
	casework (countertop) x2'6	0.0	lf	112.50	$0	
	casework (fume hood) x3'0	0.0	ea	4500.00	$0	
	casework (fume hood) x4'0	0.0	ea	6000.00	$0	
	casework (flam/chem)	0.0	lf	175.00	$0	
	casework (lab table) 2'6 x4'0	0.0	ea	980.00	$0	
	casework (lab table) 2'6 x5'0	0.0	ea	1225.00	$0	
	casework (lab table) 2'6 x6'0	0.0	ea	1470.00	$0	
	casework (util chase) vert x12'0	0.0	vlf	126.00	$0	
	casework (lab sink) single	0.0	ea	250.00	$0	
	casework (fixture) lab	0.0	ea	350.00	$0	
	casework (fixture) DI/RO	0.0	ea	300.00	$0	
	casework (eyewash) deck mtd	0.0	ea	390.00	$0	
	casework (modular bench) 2'6 x5'0 C frame w/reag shelf x2	0.0	ea	2800.00	$0	
	window treatment	0.0	sf	0.00	$0	
	floor grilles & mats	0.0	sf	0.00	$0	
	fixed seating	0.0	ea	425.00	$0	
	interior landscaping (NIC)	0.0	lf	0.00	$0	
	rough carpentry	0.0	lf	2.50	$0	
E2020 - Movable Furnishings		0.0	gsf	0.00	$0	*$0*
F10 - Special Construction		4320.0	gsf	0.00	$0	**$0**
F20 - Selective Demolition		4320.0	gsf	0.00	$0	**$0**
G10 - Site Preparation		4320.0	gsf	0.00	$0	**$12,886**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$2,064*
	sod stripping	0.0	sy	0.00	$0	
	strip & pile topsoil x1'0	240.0	cy	4.00	$960	
	clearing & grubbing	0.0	sy	0.00	$0	
	shrub & tree removal	0.0	ea	0.00	$0	
	haul off debris	276.0	cy	4.00	$1,104	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$0*

Construction Budget (Class C)

Maintenance Building (Zone C)

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$10,822*
	grading x4'0	1920.0	cy	4.00	$7,680	
	excavating	0.0	cy	0.00	$0	
	backfilling & compaction	0.0	cy	0.00	$0	
	soil stabilization	0.0	cy	0.00	$0	
	slope protection & erosion control	523.7	lf	6.00	$3,142	
	earth dams	0.0	cy	0.00	$0	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation		0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		4320.0	gsf	0.00	$0	**$0**
G30 - Site Civil/Mechanical Utilities		4320.0	gsf	0.00	$0	**$0**
G40 - Site Electrical Utilities		4320.0	gsf	0.00	$0	**$0**
G90 - Other Site Construction		4320.0	gsf	0.00	$0	**$0**
Subtotal					$698,026	**$698,026**

Construction Budget (Class C)

Site Improvements

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations				$0.00	0.0%	**$0**
A20 - Basement Construction				$0.00	0.0%	**$0**
B10 - Superstructure				$0.00	0.0%	**$0**
B20 - Exterior Enclosure				$0.00	0.0%	**$0**
B30 - Roofing				$0.00	0.0%	**$0**
C10 - Interior Construction				$0.00	0.0%	**$0**
C20 - Stairs				$0.00	0.0%	**$0**
C30 - Interior Finishes				$0.00	0.0%	**$0**
D10 - Conveying				$0.00	0.0%	**$0**
D20 - Plumbing				$0.00	0.0%	**$0**
D30 - Heating, Ventilating & Air Conditioning				$0.00	0.0%	**$0**
D40 - Fire Protection				$0.00	0.0%	**$0**
D50 - Electrical				$0.00	0.0%	**$0**
E10 - Equipment				$0.00	0.0%	**$0**
E20 - Furnishings				$0.00	0.0%	**$0**
F10 - Special Construction				$0.00	0.0%	**$0**
F20 - Selective Demolition				$0.00	0.0%	**$0**
G10 - Site Preparation				$7.53	7.2%	**$289,367**
G20 - Site Improvements				$22.69	21.8%	**$872,418**
G30 - Site Civil/Mechanical Utilities				$13.24	12.7%	**$509,032**
G40 - Site Electrical Utilities				$60.48	58.2%	**$2,325,430**
G90 - Other Site Construction				$0.00	0.0%	**$0**
	Subtotal Direct Construction Costs			***$103.93***	***62.27%***	***$3,996,246***
Published Location Factor				-21.90%	3,996,246	($875,178)
Remoteness Factor				30.00%	3,121,068	$936,321
Federal Wage Rate Factor				0.00%	1,825,825	$0
State/Local Taxes				10.00%	2,231,564	$223,156
Design Contingency				10.00%	4,280,545	$428,055
Total Direct Construction Costs				***$122.46***		***$4,708,600***
Standard General Conditions				15.00%	4,708,600	$706,290
Governmental General Conditions				5.00%	5,414,890	$270,744
Historic Preservation Factor				0.00%	5,685,634	$0
Subtotal NET Construction Costs				***$147.86***		***$5,685,634***
Overhead				5.00%	5,685,634	$284,282
Profit				7.50%	5,969,916	$447,744
Estimated NET Construction Cost				***$166.90***	***85.30%***	***$6,417,660***
Contracting Method Adjustment				5.00%	6,417,660	$320,883
Escalation to 2014		32	MOS	10.00%	6,738,543	$673,854
Bond				1.50%	7,412,397	$111,186
Total Estimated NET Cost of Construction		***38,452***	***SY***	***$195.66***	***/SY***	***$7,523,583***

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Site Improvements

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
A10 - Foundations		38451.6	sy	0.00	$0	**$0**
A20 - Basement Construction		38451.6	sy	0.00	$0	**$0**
B10 - Superstructure		38451.6	sy	0.00	$0	**$0**
B20 - Exterior Enclosure		38451.6	sy	0.00	$0	**$0**
B30 - Roofing		38451.6	sy	0.00	$0	**$0**
C10 - Interior Construction		38451.6	sy	0.00	$0	**$0**
C20 - Stairs		38451.6	sy	0.00	$0	**$0**
C30 - Interior Finishes		38451.6	sy	0.00	$0	**$0**
D10 - Conveying		38451.6	sy	0.00	$0	**$0**
D20 - Plumbing		38451.6	sy	0.00	$0	**$0**
D30 - Heating, Ventilating & Air Conditioning		38451.6	sy	0.00	$0	**$0**
D40 - Fire Protection		38451.6	sy	0.00	$0	**$0**
D50 - Electrical		38451.6	sy	0.00	$0	**$0**
E10 - Equipment		38451.6	sy	0.00	$0	**$0**
E20 - Furnishings		38451.6	sy	0.00	$0	**$0**
F10 - Special Construction		38451.6	sy	0.00	$0	**$0**
F20 - Selective Demolition		38451.6	sy	0.00	$0	**$0**
G10 - Site Preparation		38451.6	sy	0.00	$0	**$289,367**
G1010 - Site Clearing		0.0	acr	0.00	$0	*$71,003*
	strip & pile topsoil x1'0	6408.6	cy	4.00	$25,634	
	clearing & grubbing	7.9	acr	2000.00	$15,889	
	haul off debris (spoil on site)	7369.9	cy	4.00	$29,480	
G1020 - Site Demolition & Relocation		0.0	ls	0.00	$0	*$8,203*
	builidng demolition	0.0	gsf	6.00	$0	
	1% site elements demolition	3460.6	sf	2.00	$6,921	
	utility relocation	0.0	lf	0.00	$0	
	haul off debris	64.1	cy	20.00	$1,282	
G1030 - Site Earthwork		0.0	cy	0.00	$0	*$210,161*
	rough grading x3'0	38451.6	cy	4.00	$153,806	
	finish grading	38451.6	sy	0.75	$28,839	
	slope protection & erosion control	4586.0	lf	6.00	$27,516	
	haul off excess soil /in structural fill	0.0	cy	0.00	$0	
G1040 - Hazardous Waste Remediation	*NIC*	0.0	ls	0.00	$0	*$0*
G20 - Site Improvements		38451.6	sy	0.00	$0	**$872,418**

LORD AECK SARGENT

Salt River Bay Marine Research & Education Center (Scheme 2A)

Construction Budget (Class C)

Site Improvements

Prepared: May 9, 2011

Revised: June 6, 2011

Item	Reference	Qty	U/M	U/C	Subtotal	Total
G2010 - Roadways	*asphalt paving (patching allowance)*	370.7	sy	40.00	$14,827	*$153,336*
	asphalt paving (permeable) x12'0	3663.1	sy	35.00	$128,209	
	asphalt paving (permeable) x24'0	0.0	sy	35.00	$0	
	unit paver	0.0	sf	12.00	$0	
	concrete paving (permeable) x10"	780.0	sf	10.00	$7,800	
	curb & gutter (NA)	0.0	lf	25.00	$0	
	appurtenances	1.0	ls	2500.00	$2,500	
G2020 - Parking Lots		0.0	sy	0.00	$0	*$33,410*
	asphalt paving (permeable)	1041.7	sy	30.00	$31,250	
	unit paver	0.0	sf	0.00	$0	
	rigid paving	0.0	sf	0.00	$0	
	curb & gutter	0.0	lf	0.00	$0	
	appurtenances	27.0	ea	80.00	$2,160	
	parking booth/equipment	0.0	ea	0.00	$0	
G2030 - Pedestrian Paving		0.0	sf	0.00	$0	*$268,314*
	unit paver	0.0	sf	0.00	$0	
	concrete paving (permeable) 6" x8'0	44719.0	sf	6.00	$268,314	
	steps & ramps	0.0	lf	35.00	$0	
	appurtenances	0.0	ea	0.00	$0	
G2040 - Site Development		0.0	ls	0.00	$0	*$117,990*
	fences & gates	0.0	lf	0.00	$0	
	site/street furnishings	0.0	ea	0.00	$0	
	exterior signs	0.0	ea	0.00	$0	
	footbridges & underpasses (dock) dry	1100.0	sf	20.00	$22,000	
	footbridges & underpasses (dock) wet	850.0	sf	70.00	$59,500	
	site walls (amphitheatre) x50 people	585.0	sf	62.38	$36,490	
	pads & bases	0.0	sf	0.00	$0	
G2050 - Landscaping		0.0	ls	0.00	$0	*$299,369*
	vegetated buffer	1700.0	sf	8.75	$14,875	
	green space	9028.0	sf	5.47	$49,341	
	green space (water collection)	21864.0	sf	7.71	$168,565	
	constructed wetland	9342.0	sf	5.47	$51,057	
	irrigation systems	0.0	sf	0.00	$0	
	shrub & tree transplanting	0.0	ea	0.00	$0	
	soil preparartion	776.6	cy	20.00	$15,531	
	lawns & grasses	0.0	sf	0.00	$0	
	trees	0.0	ea	0.00	$0	
	shrubs	0.0	ea	0.00	$0	
	plants	0.0	ea	0.00	$0	
	groundcover	0.0	sf	0.00	$0	
	plant maintenance	0.0	ls	0.00	$0	
	plant accessories	0.0	ls	0.00	$0	
G30 - Site Civil/Mechanical Utilities		38451.6	sy	0.00	$0	**$509,032**
G3010 - Water Supply		0.0	ls	0.00	$0	*$128,240*
	water wells	0.0	ea	0.00	$0	
	piping (domestic) x"	0.0	lf	0.00	$0	
	valves (domestic)	0.0	ea	0.00	$0	
	structure (domestic) x'0	0.0	ea	0.00	$0	
	equipment (domestic)	0.0	ls	0.00	$0	
	piping (fire protection) x"	0.0	lf	0.00	$0	

Item	Reference	Qty	U/M	U/C	Subtotal	Total
	valves (fire protection)	0.0	ea	0.00	$0	
	structure (fire protection) x'0	0.0	ea	0.00	$0	
	equipment (fire protection)	0.0	ls	0.00	$0	
	piping (potable) x"	1021.0	lf	40.00	$40,840	
	valves (potable)	0.0	ea	0.00	$0	
	structure (potable) filter & pump x'0	2.0	ea	7500.00	$15,000	
	structure (potable) cistern x'0	2.0	ea	10000.00	$20,000	
	equipment (potable)	0.0	ls	0.00	$0	
	piping (salt water) x"	1310.0	lf	40.00	$52,400	
	valves (salt water)	0.0	ea	0.00	$0	
	structure (salt water) x'0	0.0	ea	0.00	$0	
	equipment (salt water)	0.0	ls	0.00	$0	
G3020 - Sanitary Sewer		0.0	ls	0.00	$0	*$330,792*
	piping x"	3204.0	lf	40.00	$128,160	
	structure (manhole) x'0	17.0	ea	2000.00	$34,000	
	structure (cistern) grey water x'0	1.0	ea	10000.00	$10,000	
	fittings	0.0	ea	0.00	$0	
	septic systems (tank & pump)	6.0	ea	7500.00	$45,000	
	equipment (lift station) package	1.0	ea	7500.00	$7,500	
	equipment (filter & pump) wetland	1.0	ea	7500.00	$7,500	
	sewage ponds (structure) constructed wetland	9342.0	sf	10.56	$98,632	
G3030 - Storm Sewer	*allowance*	1.0	ls	50000.00	$50,000	*$50,000*
	piping	0.0	lf	0.00	$0	
	structure	0.0	ea	0.00	$0	
	fittings	0.0	ea	0.00	$0	
	equipment	0.0	ls	0.00	$0	
	ponds & reservoirs	0.0	sf	0.00	$0	
G3040 - Heating Distribution		0.0	ls	0.00	$0	*$0*
G3050 - Cooling Distribution		0.0	ls	0.00	$0	*$0*
G3060 - Fuel Distribution		0.0	ls	0.00	$0	*$0*
G3090 - Other Site Mechanical Utilities		0.0	ls	0.00	$0	*$0*
G40 - Site Electrical Utilities		38451.6	sy	6.80	$261,430	**$2,325,430**
G4010 - Electrical Distribution		0.0	ls	0.00	$0	*$261,430*
G4020 - Site Lighting		0.0	ls	0.00	$0	*$0*
G4030 - Site Communication & Security		0.0	ls	0.00	$0	*$0*
G4090 - Other Site Electrical Utilities		0.0	ls	0.00	$0	*$2,064,000*
	photovoltaics	30000.0	sf	68.80	$2,064,000	
G90 - Other Site Construction		38451.6	sy	0.00	$0	**$0**
Subtotal					$3,996,246	**$3,996,246**

Initial Requirements and Design Parameters of the Seawater Supply, Filtration, Storage, Control and Distribution System for the Proposed Salt River Bay Marine Research and Educational Center (MREC) in St. Croix, USVI

APRIL 2011

Prepared by the Joint Institute of Caribbean and Marine Studies
Seawater System Advisory Team:
Bori Olla
Ron Moore
Dennis Allen
Robert Wicklund

PREFACE

The dynamic nature of the marine environment in which seawater will be drawn presents a number of challenges in designing a seawater system for the proposed Salt River Bay facility. Through time, seawater will be used a multiplicity of ways. The main thread that transcends whatever way seawater is to be used is that the quality be consistent, especially in terms of salinity, turbidity and other runoff contaminants. Since the area in which water will be drawn is subjected to large and sometimes lengthy freshwater intrusions during major rain events, salinity may drop precipitously from freshwater runoff, which would also increase turbidity and the potential for contaminant enrichment. Wide swings in water quality such as these can have a devastating effect on marine organisms, the degree depending on species and life stage. To preclude what might translate into enormous losses in research investment, it is critical that the seawater system be designed to take ambient conditions into account. We therefore included some design parameters that, at least in part, deal with these potential problems by providing:

(1) inflow of seawater from the source at a rate sufficient to provide an adequate supply of water when environmental conditions cause water quality to be compromised, e.g. precipitous drops in salinity, and mandate that seawater be pumped only intermittently during any 24-hr cycle, e.g., certain periods of a flood tide;

(2) large seawater storage to mitigate the effects of intermittent source inflow so that seawater may still be supplied to researchers, albeit at a reduced level during non-intake periods.

Another critical and integral part of the design is concerned with back-up electrical power generation. Given the vagaries of power disruptions of the local electric grid, it is vitally important that emergency generation of power be included in the design. We have accounted for this in our report.

Joint Institute of Caribbean and Marine Studies:
Seawater System Advisory Team:

Bori Olla
Ron Moore
Dennis Allen
Robert Wicklund

SEAWATER SUPPLY AND DELIVERY

Note: Due to the specialized nature of certain components of this design, specifications, in some instances, refer to various components by trade or manufacturer name. These are used for informational purposes to describe a standard of required function, dimension, appearance and quality and do not preclude other products as long as they are equivalent to those that are listed.

STRUCTURES ASSOCIATED WITH THE SEAWATER DELIVERY SYSTEM

1. The intake pipes (two) shall be secured above the sea floor.

2. The source water pumps need to be in a building/shed to minimize direct environmental assaults. We assume that the delivery pumps will be in another environmentally controlled environment.

3. A motor control center that comprises controls for all of the pumps needs to be physically separated from all wet areas.

4. The raw water needs to go into a tall tank (about 8000 gal.) to allow for sediment settlement and degassing.

5. The filtration infrastructure needs to be in an environmentally controlled structure.

6. The temperature controlling systems for the filtered water delivery system need to be protected from the weather.

Seawater Source Piping

1. Two identical supply lines, each with the capacity to supply 300 gpm, will be needed to deliver from the source. These lines will terminate in a switching station where the water from whichever line is in service can be sent to both the filtered water and raw water branches. For the filtered water branch, two lines (redundancy, one in use at a time) will be available for delivery to the filter station. For the raw water branch, two lines (redundancy, one in use at a time) will be available for delivery to the settlement/degassing tank. All pipes shall be chemically inert to seawater (e.g. PVC) and of sufficient structurally integrity (not less than Schedule 80 PVC) to withstand the dynamic nature of the highly variable sea conditions.

2. Periodic cleaning the pipes requires back washing capabilities, and the use of “pigs” or some equally effective alternate to remove fouling organisms. Reasonably spaced cleanouts (Y-shaped couplings) will be required for long runs of pipe.

3. Screening for the supply end of the pipes shall consist of titanium of a mesh size of 3/16” with the final size to be determined by the seasonal water column debris field.

4. Foot valves, if required, shall be made of titanium.

5. All flanges, valves, Ts, or any other connectors should be of PVC or of an equivalent material inert to seawater.

Seawater Supply Pumps

1. These pumps shall be functionally redundant, so that one is ready to take over immediately should the first one fail. They shall be self priming types equipped with capacitors and each must have the capability to supply 300 gpm. These shall be interfaced electrically to water level measurement and feedback control devices from the holding tank to insure a continuous and stable level of seawater delivery. One additional pump shall be available as a replacement should a pump fail.

2. Construction of internal parts such as the impellers or any surface that comes in contact with seawater should be made of titanium (coated), or inert plastic. Quality should be equal or exceed that of ITT Goulds Pumps of Seneca, New York.

RAW SEAWATER BRANCH

1. Two lines (redundant) will supply raw seawater from the switching station to an elevated cylindrical tank where sedimentation and degassing can occur.

2. The tank should have the capacity to allow a short turnover time between acquisition at the source and delivery to the tanks. We estimate that if the desired delivery rate at the tanks is 300 gal/min, the degassing tank should have a capacity of about 8000 gal.

3. The cylindrical tank shall be of fiberglass construction. The lower one third shall be cone-shaped bottom to allow for the collection and flushing of settled sediment. An overflow pipe at the top will allow for excess supply water to run off; this can be returned to the environment. The pipe for delivering water to the distribution pumps (as described below) shall exit the tank at the top of the cone.

FILTERED SEAWATER BRANCH: FILTRATION AND CONTROL

General requirements: The specified level of filtration provides for a standard level of treatment. A higher degree of filtration can be achieved at the location of investigator specified needs. To insure that each item of apparatus is properly sized to perform with every other item, it is essential to use the filter manufacturer as a single source of supply for items of equipment as listed and described. The recommendation is that the equipment supplier be Neptune-Benson, Inc. of Coventry Rhode Island or a supplier of equal or superior quality.

Fiberglass Filter Tanks

1. The filter tank shall be suitable for the working pressure of the system and hydrostatically tested to 75psi and designed with a 4:1 safety factor.

2. Saddle style bases shall be provided for tank support. Where stacked tanks become necessary, similar bases and mounting saddles should be provided for the upper vessel. Access to the tank(s) shall be provided with a manhole as large a possible to accommodate maintenance personnel with a two bolt, 4 point yoke. The manhole seal shall be complete with a one piece neoprene gasket and positioned so that the internal pressure from the filter will augment the seal. External bolt-on covers are not acceptable.

3. Drain out system shall consist of a 3/4" fiberglass coupling mounted to the tank bottom with each coupling fitted with a slotted PVC sand retainer. Air relief connection shall be a 3/4" coupling on top of the tank. Bulkhead fittings are not acceptable.

4. Each filter tank should be equipped with the necessary flanges and connections for the internal and external piping. Connections should be comprised of 1" minimum thickness fiberglass flanges. Connections requiring bolt-thru hardware are unacceptable.

5. The resin used in construction should be commercial grade, premium resistant vinylester that has been evaluated in a laminate by tests in accordance with ASTM C-581 in service comparable to the intended service. Other generic types of resin such as isophthalics or general purpose polyester resins are not acceptable.

6. The inner surfaces exposed to seawater shall be followed with a layer composed of vinylester resin, reinforced with non continuous glass filler strands applied to a minimum thickness of 0.100 to 0.130 inches and in no case be less than 0.100 inches.

7. Provisions need to be made for handling the backflushed water which can be returned to the environment.

Filter Piping-Internal

1. The upper and lower internal distribution system shall be a horizontal header, lateral arrangement. Headers should be Schedule-80 PVC capped on one end and flanged on the other. Lateral connections shall be spaced no more than 6" on the centers with 1 ½" connections.

2. Under drain laterals shall consist of 1 ½" Schedule-80 PVC with machined double slotted openings on 1/8" centers. Machined openings shall be designed to retain all media particles as small as .30 mm particle size. Molded or drilled openings or retainer screens are not acceptable. Each lateral will be fabricated complete with a socket cap on one end and a male adapter on the other. Laterals shall be fitted with rubber o-rings to allow for proper positioning of the machined openings.

3. Upper laterals shall consist of 1 ½" Schedule-80 PVC with ½" wide machined double slotted openings on 1 1/4" centers. These laterals shall be designed and sized at the factory so as to provide uniform distribution and unrestricted water flow during filter and backwash cycles. Laterals shall be fitted with a rubber o-ring to allow for proper positioning of the machined openings.

4. All hardware in wetted areas shall be inert in seawater.

Face Piping

1. All external face piping shall be Schedule-80 PVC pipe and fittings. All fittings, including 10"-12" sizes shall be molded type. Fabricated or fiberglass wrapped fittings are not acceptable. Flanges should be located so as to allow for easy dismantling of face piping. All fittings shall be solvent cemented.

2. Standard accessory items shall include sight glass rated for 50 psi with polycarbonate glass, remote mounted gauge panel with two 4 ½" diameter pressure gauges, 1/4" peacocks, 1/4" poly vent tubing with PVC compression adapters.

Automatic Air Relief Valve

1. A 1" valve shall be provided to automatically and continuously release air in each filter. This valve shall be fabricated of plastic with Buna-N seals. Also provided shall be two PVC ball valves to allow manual air relief and isolation of the automatic valves. Valves fabricated of cast iron, bronze or stainless steel shall not be acceptable.

Valve Control Assembly

1. Simultaneous movement of valves that are operated by pilot actuated mechanisms using air or fresh water shall be required.

2. All linkage parts shall be 316L stainless steel.

Automatic Controller

1. The operation of the filter system shall be governed by means of a programmable logic controller housed in a Nema 4x fiberglass polyester enclosure.

2. The controller should include at a minimum a 4 row x 24 character LCD display with 16 button numeric tactile feedback keypad and programmable function keys with LEDs. The unit will display system operations and status functions.

3. Included shall be 5 miniature plug-in double pole/ double throw relays and 4 quick disconnect fuse holders fully integrated to manage system functions.

4. A pressure switch shall be installed to sense and signal for backwash actuation based on preset pressure drops.

5. The controller shall provide the following operational features:

A. Manual backwash initiation
B. Automatic backwash initiation (pressure and/or time options
C. Timer for time clock back washing
D. Fixed backwash duration and delay features
E. Real time clock with battery backup of data entry to maintain time during power outages
F. Capability of controlling up to 4 or more filters

Digital Management System

A computer-based management system needs to be incorporated so that basic functions of the system can be monitored and adjusted as necessary. The monitoring component shall track all water quality and performance variables including: water temperature, salinity, flow rates (supply pumps, post-treatment pumps), pressure on both sides of all pumps and filters, and storage and degassing tank water levels. The program shall provide the operator with capacity to adjust controls to achieve the desired level. Alarms must be a part of this system. The management system with its alarm system should include the capability for off-site monitoring and control through a web site.

Filtrate Material

1. Gravel support media shall be of a coarse aggregate with a subangular grain shape with a particle size of 1/8”x1/4”and shall be placed by hand so as to avoid damage to the under drain system and leveled before the addition of the upper layer of filter media. Support media shall be provided in 100 lb bags for ease of handling and elimination of possible contamination. Media shall be free from minerals which could precipitate into the seawater supply.

2. Sand shall be a carefully selected grade of hard, uniformly graded silica material with naturally rounded particles of silica quartz. Particle size should be between .44mm and .55mm (#20). No more than 1.5% shall be allowed to pass through a #40 sieve (.0164”). Uniformity coefficient shall not exceed 1.53. Specific gravity must be not less than 22.5. Sand will be provided in 100 lb bags for ease of handling and elimination of possible contamination. It should also be free from minerals that may precipitate into the seawater.

FILTERED SEAWATER SUPPLY STORAGE

1. The seawater supply storage capacity should be 300,000 gallons. The tank(s) shall be constructed of cement with epoxy coated rebar and be fully enclosed (vented).

2. Seawater exchanges in tanks at the delivery end of the system will need to be changed at rates that will vary from 20 to 50% per day, depending on the needs of the contained living materials. If the standing water capacity of all tanks in the facility amount to 200,000 gal., a 50% exchange rate would allow for a 3 day supply of filtered water from the 300,000 gal. storage tank.

3. High pressure water hose capability shall be available for cleaning out of each supply tank.

HIGH VOLUME, LOW PRESSURE AIR SYSTEM

1. Ambient air needs to be delivered to all areas where running seawater is supplied. This is provided to supply airstones for both routine use and periods when seawater supply is unavailable or restricted.

2. All pressurized air lines, valves, and taps shall be PVC. Redundancy is necessary for the air pumps.

DISTRIBUTION PUMPS TO RESEARCH LABORATORY, TEACHING AREAS, EXHIBIT AREA, SEAWATER LAB, AND OUTDOOR RACEWAYS/TANKS

1. For each of the two delivery branches, raw and filtered, two centrifugal pumps will be needed with one operating at a time (redundancy). Each of these four pumps shall have the capacity to supply 300 gpm.

2. Construction of internal parts such as the impellers or any surface that comes in contact with seawater should be made of titanium (coated), or inert plastic. Quality should be equal to or exceed that of ITT Goulds Pumps of Seneca, New York.

3. Piping from the pumps shall be redundant with the potential to clean one while the other is operative.

TEMPERATURE CONTROL

1. Following filtration, accommodation shall be made with regard to power requirements and seawater valving to a heat exchanger to maintain seawater at any chosen temperature (+/- 1°C) between 20 and 30°C at a flow rate of 100 gpm. This infrastructure will need to be available at each secondary distribution location (e.g. research lab, teaching area, exhibit area, seawater lab)

2. All internal exchanger parts shall be constructed of titanium or other inert to seawater material.

BACKUP GENERATORS

1. Each of three backup generators shall have the power output capability to run all components of the seawater system in the event of loss of power from the grid.

2. Generators shall be redundant.

3. Startup shall be automatic.

4. Fuel storage shall be sufficient to operate at full power for thirty (30 days) and have an incorporated polishing system to maintain optimum quality.

Michael and Steve,

I'd like to thank the Seawater team for pulling together the Initial Requirements and Design Parameters of the Seawater Supply, Filtration, Storage, Control and Distribution System for the Proposed Salt River Bay Marine Research and Educational Center (MREC) in St. Croix, USVI (Seawater Report). The effort was clearly substantial and will help the design team create an outstanding facility that will serve the JICMS's research needs and align them with the site constraints and budget. We have attached a copy of the report for everyone's reference.

In reviewing the Seawater Report, LAS would like to propose a series of recommendations. We have created a working lab diagram that outlines our understanding of the central seawater distribution system. Because the report had no drawings showing the desired locations of components (such as the settlement tank and the primary holding tank) we have attached this drawing for your review to ensure that we have properly understood the requirements; it is diagrammatic only.

Specific to some of the stated requirements in the report, we are planning to proceed with the following proposed system adjustments that in our experience will not compromise the quality or integrity of the system as outlined in the Seawater System Report:

Temperature Control: The report states several parameters for seawater temperature control that include providing the capacity to chill marine tank water to 20C. At face value, this request creates strain on the power infrastructure of the project. We propose adjusting the following base assumptions:

The seawater report states that chilled seawater is required at all seawater locations. We propose that chilled seawater is needed only for research use, not for education or touch tanks, etc. We propose to provide point-of-use heat exchangers at the filtered water outlets at each marine tank location in the main lab building on an as-needed basis to support the marine research. We are assuming that the marine tanks which will be located at the Dive/Boat Facility, and at the Outreach Building, will not require this feed water cooling functionality, as this is not a 'research function'.

The seawater report requests water chilling capacity to of 20-30 C. After reviewing the temperature data in and around St. Croix, this minimum temperature seems lower than needed, considering that the historical data suggests that at 10 meters the coldest water temperature ever recorded was 25.2 C in 1993 and in 2001 (with this temperature occurring once in 1993 and twice in 2001). We plan to provide filtered water cooling over a range of 22C-30C based on this historical data.

We have assumed that there would be some diversity in the temperature requirements. The report requests that seawater be available from 20-30C. See point above regarding overall recommended temperature ranges. Beyond this, some level of diversity is required, as not all the tanks will be at 22C all the time. Our diversity assumes 25% of the chilled seawater reduced to 22C, with other 25% tiers at 25C, 27.5C, and 30C. This translates to 4500 gallons of chilled water capacity at each of four temperature points, assuming research tanks only, and assuming the future capacity for the mariculture facility (80,000 gallons) will require a similar distribution of temperature (4 tiers of temperature capacity).

Water Volume Storage: The report requests filtered sea water storage of 300,000 gallons. Based on our calculations, this seems like an excessive amount of sea water storage. Our Seawater usage (worst case scenario) for the whole site is about 150,000 gallons; please see attached assumptions. This includes 80,000 gallons of future expansion for mariculture activities (about 5000 sf of site area used for this activity).

Assuming that the rate of replacement in all the tanks varies (diversity) based on use and research needs, the flow rates for these tanks could vary between 25% and 50%. Assuming that 1/3 of the tanks flow at 25%, 1/3 at 35% and 1/3 at 50% (a reasonable flow diversity), we have an average of 35% flow. Using our worst case scenario total volume, then a 3 day supply at full capacity is 150,000 gallons (1/3 of 150,000 times 3 days). A three day supply is what was requested in the Seawater Report.

At initial construction, without the mariculture program, even this capacity is double what should be needed based on the diversity and flow calculations since 80,000 of the 150,000 gallons of seawater projected use is for a future program.

The project currently is anticipating 600,000 gallons of fresh water storage for potable water but a reserve on this amount would be a benefit for the project. As such, we propose to plan the site for the full requested capacity (600,000+300,000=900,000 gallons) of 900,000 gallons. This would allow for 750,000 of fresh water and 150,000 of seawater. In addition, this capacity could be shared or interchangeable based on actual needs after construction since the cisterns need to be sub-divided for both utility and seismic reasons.

Power Supply: The report asks for quadruple redundancy of the power supply for the Seawater system (grid plus 3 generators). We propose the following power system set up which will offer triple redundancy from the most reliable sources available. Our primary supply will be solar (this is the primary supply for the whole project). The Seawater pumps will need to run only 2.5 -3 hours a day to meet the 50,000 gallon per day need, so it is reasonable that this could be done while the sun is up and the power availability is at its greatest. To back this system up at night, we will provide a battery bank.

The secondary power supply will be from the grid. We plan to net meter the project (this is a newer development) so we will have a power source in the event of a series of cloudy days or other similar event. In addition to these primary and secondary power supplies, we will provide a generator with sufficient capacity to power the seawater system as well as other functions that require emergency power giving us a third back up.

Please note that this is about the power supply, and not the pump redundancy which is a separate issue; we plan on proceeding as indicated in the Seawater report with primary and back-up pumps. Specifically we propose that the pumps will perform in the following manner:

- Two intakes of source water (redundant).
- Each source water line split into two source pumps (primary source pump 1, redundant source pump 2).
- One set of source water pumps (primary source pump 1, redundant source pump 2) delivering raw water to a single sediment/degassing tank, and this water split into two distribution pumps (primary distribution pump 1, redundant distribution pump 2) delivering degassed raw water to all marine tank locations.
- The other set of source water pumps (primary source pump 3, redundant source pump 4) delivering raw water to a single filter system tank, and this filtered water delivered to a 150,000 Gallon storage; from storage it will be delivered to marine tanks via primary distribution pump 3 and redundant distribution pump

An additional TBD volume is noted for both cooling Zone A spaces and for point-of-use cooling marine tank exchange water.

- Source pumps 1, 3, and distribution pumps 1, 3 will be battery-powered electric pumps, 300 GPM, with generator back-up for pumps and controls.
- Source pumps 2, 4, and distribution pumps 2, 4 will be diesel-powered pumps, 300 GPM, with generator back-up for pumps and controls.

Please let me know if there are any questions concerning our recommended direction above. We look forward to seeing everyone next week. Thanks.

Joshua R. Gassman, RA, LEED® AP
Associate
Direct Phone 404-253-1421 | Direct Fax 404-253-1321

LORD, AECK & SARGENT ARCHITECTURE

appendix .80

seawater intake system report .05

Dear Joshua:

I appreciate the LAS team meeting with me last Friday to work out some of the sticking points on the proposed seawater system for the Salt River Bay Marine Research and Educational Center. It appears that, at least for this phase of the MREC facilities design, we agree on the basics of its onshore seawater system.

I want to reiterate that, although the Seawater System Advisory Team was not originally tasked with providing information regarding the onshore phase of the MREC design, as we proceeded with our development of the water quality protocol it became apparent that the expertise of the team could provide needed input to the onshore side of the design as well. It followed that during a meeting at UNCW in April we drafted the report "Initial Requirements and Design Parameters of the Seawater Supply, Filtration, Storage, Control and Distribution System for the Proposed Salt River Bay Marine Research and Educational Center (MREC) in St. Croix, USVI" and sent it to Michael Bayer for distribution. This report and your response are added as addenda to this letter.

Of paramount importance to the successful operation and support of marine science projects at the MREC is the recent change in how we approach the power requirements. We had been concerned from the beginning regarding the proposal to exclude the grid from the mix of power generating systems. Now, with the grid as primary and alternative systems tied in, the options for us are far greater. You assumed that we needed a quadruple power system which was just a miscommunication. Any combination of three -- primary, backup and second backup (generator[s]) -- is our recommendation which appears to fit your intentions. In terms of power and cooling of the seawater, again this was just a miscommunication. We recommend point-of-use heat exchangers, not cooling all the stored seawater.

You were concerned that providing a cooling range of 20-30 C would put too much strain on the power system and recommended 22-30 C instead. You based this on local history of temperature measurements at 10 meters offshore depth that never went lower than 25.2 C. Future research at MREC will include deep-water as well as local shallow-water species. Corals, sponges and many other important species live beyond 70 meters and some are much deeper. Also, since the research will occur in other places in the Caribbean, we may even be working in regions of upwelling. We agreed to leave the temperature range at 20-30 C for this phase of the design; however, there may be occasional requirements for seawater temperatures below 20C in the future and we can deal with that when it happens.

The assumption that the facilities at the dock area will not have a "research function" is incorrect. Support facilities necessary for science projects should include this area and we agreed on that at the meeting.

The assumption that mariculture and/or restoration of depleted reef species is off in the future and that the estimated 80,000 gallons of seawater storage should be deferred is unlikely and it is wholly possible that it may be one of the first projects started at MREC. For example, the grassbed ecology of the bay is conducive to research on restoring Nassau groupers to St. Croix waters. We strongly recommend that the seawater storage for mariculture be included in the original design.

To segue into the issue of seawater storage in general, your proposal includes 600,000 gallons of freshwater storage and 300,000 gallons of additional storage, which we recommend be used for seawater. However, of the 300,000 you propose to use 150,000 gallons for fresh- and 150,000 gallons for seawater storage, with 150,000 able to be used interchangeably as needed. As mentioned at our meeting, this seems to be an awkward approach and it could be not only a difficult logistical problem in terms of collecting fresh water during an unexpected rain event or making sure fresh water doesn't drain off roofs into tanks with seawater, but it may also leave one or the other with a shortage.

At least 300,000 gallons of seawater storage is of paramount importance for MREC to be able to provide successful support to marine research and to attract the best scientists in the world. We all saw that rain, sometimes heavy, fell the whole week we were in St. Croix. That illustrates how it is very possible we would not be able to pump good quality seawater for some time, perhaps for a week or longer. We can't rely on just averages; we must consider extremes. It is these periods of extremes that could leave scientists high and dry without a surplus to draw on.

Without a doubt MREC can be the best in the Caribbean and other tropic regions if there is a reasonable guarantee that our program can provide reliable power, full logistical support in terms of boats and other equipment, administrative and personnel support, and a reliable source of seawater for experiments. Anything less would put us in the category of just another substandard facility.

So, we continue to recommend in the strongest way possible that the MREC be designed to store all the fresh- and seawater it needs to be both a world-class research and educational facility and program, and as we discussed on Friday that would include a standing supply of 300,000 gallons of seawater.

Looking forward to reviewing the final design of MREC…if you have any further questions please contact me directly.

Bob Wicklund

choosing by advantages

The design and owner teams gathered in May of 2011 to evaluate the progress of the project and to evaluate three site plan alternatives that had been developed to date. The three schemes were all conducive to the goals of the project and would have created a facility that allowed the project mission to prosper.

The Choosing By Advantages (CBA) process was used to evaluate the three alternates which proposed to solve the program in three different ways: the first proposed a colonnade to tie the buildings together and provide solar and rain protection, the second was focused on taking advantage of the views from the site by framing them with openings between buildings, the third was proposing to create a series of collegiate courtyards or quads which would anchor varying portions of the project. For additional detail and drawings of these alternates, please refer to the Master Planning Concept Options section of the report.

Each of these three alternates offered a different list of pro's and con's, and as such, the CBA process was used to evaluate them. Stakeholders from the local community and government joined the design team, OIA, NPS and JICMS in the evaluation and analysis of concepts resulting in a variety of positions and great feedback on the proposed MREC.

Through this 2-day workshop, it was agreed that the paramount advantage to be evaluated was the clarity of the entry sequence. Since this has an impact on visitors, operations and the enjoyment of the Park, everyone agreed that this was an appropriate paramount advantage. For further detail on the CBA, please refer to the appendix which details the discussions as well as the other major advantages that were reviewed.

In the end, it was Alternate 1 that was clearly the preferred alternative. Alternate 3 scored next with not too great a separation and Alternate 2 scored significantly weaker on the scorecard the team had created. Since Alternates 1 and 3 were both deemed to be advantageous, the group reviewed the options for moving certain components from one scheme to the other to create a hybrid that would offer even greater advantage. It was determined that the living accomodations, wet lab configuration, and maintenance facility location in Alternate 3 could be moved to Alternate 1 to create a hybrid that is the preferred alternative. Please refer to the following Design Solutions section for detail on the preferred alternative and the hybrid design.

Salt River Bay Marine Research and Education Center

Choosing by Advantages process

	FACTORS	ALTERNATIVES					
		Scheme 2 Colonnade		Scheme 3 Framed Views		Scheme 4 Courtyards	
A	**Function: Protect Cultural/Natural Resources**						
A1	**Site: Minimize Development Footprint**						
	Attributes	6.5 Acres		7.7 Acres		7.3 Acres	
	Advantages	*Allows for Most Site Restoration*	3	*No Advantage*	0	*Allows for Site Restoration*	1
A2	**Labs: Solar Orientation to Minimize Solar Gain and Optimize Daylighting**						
	Attributes	Long Axis E-W		Building slightly askew		Long Axis E-W	
	Advantages	*Best Orientation*	50	*No Advantage*	0	*Best Orientation*	50
A3	**Housing: Access to Natural Ventilation**						
	Attributes	Housing is in bigger building; reduced cross ventilation		Units have better opertunity for cross ventilation		Best opertunity for cross ventilation with smaller units	
	Advantages	*No Advantage*	0	*No Advantage*	0	*Greatest Access*	65
A4	**Labs: Access to Natural Ventilation**						
	Attributes						
	Advantages	*Access to wind from multiple directions*	19	*No Advantage*	0	*Greatest Access from multiple directions*	20
A5	**Education: Access to Natural Ventilation**						
	Attributes	Access to summer (south) and east winds		Outreach blocks adminestration access to south wind			
	Advantages	*Best Orientation for Wind Capture*	40	*No Advantage*	0	*Slightly better wind access*	25
B	**Function: Health Safety and Welfare**						
B1	**Site: Pedestrian vs. Vehicular Traffic Circulation**						
	Attributes	Crossing of Service Road/Drop Off		Crossing of Service Road/Drop Off		Crossing of Service Road/Drop Off	
	Advantages	*None*	0	*None*	0	*None*	0
B2	**Housing: Separation from the Public**						
	Attributes	Better separation		No distinction of public vs private space		best distinction of public and private spaces for residents	
	Advantages	*Some Advantage*	20	*No Advantage*	0	*Greatest Advantage*	25
B3	**Overall Site Security**						
	Attributes	Visible/clarity of where you are "suppose to be'; delineation of student zone.		Easy to gain access to housing, reduced visibility from other campus spaces in housing		Visible/clarity of where you are "suppose to be'; delineation of student zone.	
	Advantages	*Good delineation of student zone.*	35	*No Advantage*	0	*Good delineation of student zone.*	35
C	**Function: JICMS Importance: Fiscal Sustainability**						
C1	**Housing: Separation of Grads/Faculty and Undergrads**						
	Attributes	Desired separation for privacy between these two groups.		No separation		Desired separation for privacy between these two groups.	
	Advantages	*Greatest Separation*	50	*No Advantage*	0	*Some separation*	40
C2	**Housing: Foster Community through Shared Spaces**						
	Attributes	Centralized Dining offers good gathering in addition to courtyards		No Courtyard for Gathering		Courtyard for gathering	
	Advantages	*Greatest Advantage*	90	*No Advantage*	0	*Some Advantage*	60
C3	**Housing: Access to Views from Dining**						
	Attributes	Views blocked by other buildings		Best views of site, highest location		Good views to the east	
	Advantages	*No Advantage*	0	*Greatest Advantage*	10	*Some Advantage*	5
C4	**Housing: Access to Views from Housing**						
	Attributes	Views out to site and beyond		Views out to site and beyond		Views out to site and beyond	
	Advantages	*No Advantage*	0	*Greatest Advantage*	20	*Greatest Advantage*	20
C5	**Labs: Quality of the Work Environment**						
	Attributes	Views of Courtyard		Views of SARI and Water		Best views of site, some views of courtyard too.	
	Advantages	*No Advantage*	0	*No Advantage*	0	*No Advantage*	0
D	**Function: Provide for Visitor Enjoyment**						
D1	**Site: Clarity of Entry Sequence**						
	Attributes	Very clear sequence, easy to find the front door, separation of entry and post entry circulation.		Entry sequence is not as clear, may lead to visitor confusion.		Arrival across the wetlands.	
	Advantages	*Greatest Advantage*	##	*No Advantage*	0	*Some Advantage*	75
D2	**Site: Quality of Public Outdoor Spaces (Courtyards)**						
	Attributes	Clear Campus Courtyard		Open public space, not as well defined		Series of courtyards, allows for different group gatherings, opportunity for diverse experience	
	Advantages	*Good Advantage*	50	*No Advantage*	0	*Good Advantage*	35
D3	**Site: Recreational Access**						
	Attributes	Pass by Maintenance for		Must pass past Lab and access to get to trails		Access from parking does not require travel through program components.	
	Advantages	*Some Advantage*	2	*No Advantage*	0	*Greatest Advantage*	10
D4	**Site: Educational Opportunity (k-12)**						
	Attributes: Scored Elsewhere, All Alternatives Offer Oportunity	Good Gathering and Sorting Spaces Available				Good Gathering and Sorting Spaces Available	
	Advantages	*Some Advantage*	0	*No Advantage*	0	*Some Advantage*	0
E	**Function: Operational Effeciency**						
E1	**Labs: Lab/Dock/Maintenance Triangle Work Flow**						
	Attributes	Dock to Lab: 260' Dock to Maint: 88'		Dock to Lab: 176' Dock to Maint: 360'; Lab relationship is most critical.		Dock to Lab: 400' Dock to Maint: 260'	
	Advantages	*Some Advantage(move Maintenace to north for greatest advantage)*	75	*Greatest Advantage*	88	*No Advantage*	0
E2	**Labs: Flexibility for Lab future Expansion**						
	Attributes	Lab in one building, could be re-configured in the future; some room for Lab expansion		Foot Print is in two pieces; land locked lab modules		Foot Print in one piece, plus other program in foot print, room to grow lab modules	
	Advantages	*Some Advantage*	40	*No Advantage*	0	*Greatest Advantage*	65
E3	**Housing: Proximity to Dining**						
	Attributes						
	Advantages		0		0		0
E4	**Housing: Serviceability of Dining**						
	Attributes: Dependant on Service Strategy	Clear access to Loading Dock at Maintenance Building				Clear access to Loading Dock at Maintenance Building	
	Advantages	*Some Advantage*	1	*No Advantage*	0	*Some Advantage*	1
	TOTAL IMPORTANCE OF ADVANTAGES	536		108		482	

CBA scorecard (with cost being considered)

Salt River Bay Marine Research and Education Center - Combined

Choosing by Advantages process

	FACTORS	ALTERNATIVES					
		Scheme 2A Colonnade		Scheme 3 Framed Views		Scheme 4 Courtyards	
A	**Function: Protect Cultural/Natural Resources**						
A1	**Site: Minimize Development Footprint**						
	Attributes	6.5 Acres		7.7 Acres		7.3 Acres	
	Advantages	*Allows for Most Site Restoration*	3	*No Advantage*	0	*Allows for Site Restoration*	1
A2	**Labs: Solar Orientation to Minimize Solar Gain and Optimize Daylighting**						
	Attributes	Long Axis E-W		Building slightly askew		Long Axis E-W	
	Advantages	*Best Orientation*	50	*No Advantage*	0	*Best Orientation*	50
A3	**Housing: Access to Natural Ventilation**						
	Attributes: Move Housing from 4 to 2A	Housing is in bigger buillding; reduced cross ventilation		Units have better opertunity for cross ventilation		Best opertunity for cross ventilation with smaller units	
	Advantages	*No Advantage*	65	*No Advantage*	0	*Greatest Access*	65
A4	**Labs: Access to Natural Ventilation**						
	Attributes: Use Pentagonal End for Labs						
	Advantages	*Access to wind from multiple directions*	20	*No Advantage*	0	*Greatest Access from multiple directions*	20
A5	**Education: Access to Natural Ventilation**						
	Attributes	Access to summer (south) and east winds		Outreach blocks adminestration access to south wind			
	Advantages	*Best Orientation for Wind Capture*	40	*No Advantage*	0	*Slightly better wind access*	25
B	**Function: Health Safety and Welfare**						
B1	**Site: Pedestrian vs. Vehicular Traffic Circulation**						
	Attributes	Crossing of Service Road/Drop Off		Crossing of Service Road/Drop Off		Crossing of Service Road/Drop Off	
	Advantages	*None*	0	*None*	0	*None*	0
B2	**Housing: Separation from the Public**						
	Attributes	Better separation		No distinction of public vs private space		best distinction of public and private spaces for residents	
	Advantages	*Some Advantage*	20	*No Advantage*	0	*Greatest Advantage*	25
B3	**Overall Site Security**						
	Attributes	Visible/clarity of where you are "suppose to be"; delineation of student zone.		Easy to gain access to housing, reduced visibility from other campus spaces in housing		Visible/clarity of where you are "suppose to be"; delineation of student zone.	
	Advantages	*Good delineation of student zone.*	35	*No Advantage*	0	*Good delineation of student zone.*	35
C	**Function: JICMS Importance: Fiscal Sustainability**						
C1	**Housing: Separation of Grads/Faculty and Undergrads**						
	Attributes	Desired separation for privacy between these two groups.		No separation		Desired separation for privacy between these two groups.	
	Advantages	*Greatest Separation*	50	*No Advantage*	0	*Some separation*	40
C2	**Housing: Foster Community through Shared Spaces**						
	Attributes	Centralized Dining offers good gathering in addition to courtyards		No Courtyard for Gathering		Courtyard for gathering	
	Advantages	*Greatest Advantage*	90	*No Advantage*	0	*Some Advantage*	60
C3	**Housing: Access to Views from Dining**						
	Attributes	Views blocked by other buildings		Best views of site, highest location		Good views to the east	
	Advantages	*No Advantage*	0	*Greatest Advantage*	10	*Some Advantage*	5
C4	**Housing: Access to Views from Housing**						
	Attributes: Move Housing From 4 to 2A	Views out to site and beyond		Views out to site and beyond		Views out to site and beyond	
	Advantages	*No Advantage*	20	*Greatest Advantage*	20	*Greatest Advantage*	20
C5	**Labs: Quality of the Work Environment**						
	Attributes	Views of Courtyard		Views of SARI and Water		Best views of site, some views of courtyard too.	
	Advantages	*No Advantage*	0	*No Advantage*	0	*No Advantage*	0
D	**Function: Provide for Visitor Enjoyment**						
D1	**Site: Clarity of Entry Sequence**						
	Attributes	Very clear sequence, easy to find the front door, separation of entry and post entry circulation.		Entry sequence is not as clear, may lead to visitor confusion.		Arrival across the wetlands.	
	Advantages	*Greatest Advantage*	100	*No Advantage*	0	*Some Advantage*	75
D2	**Site: Quality of Public Outdoor Spaces (Courtyards)**						
	Attributes	Clear Campus Courtyard		Open public space, not as well defined		Series of courtyards, allows for different group gatherings, opportunity for diverse experience	
	Advantages	*Good Advantage*	50	*No Advantage*	0	*Good Advantage*	35
D3	**Site: Recreational Access**						
	Attributes: Move Maintneace BLDG North	Pass by Maintenance for		Must pass past Lab and access to get to trails		Access from parking does not require travel through program components.	
	Advantages	*Some Advantage*	10	*No Advantage*	0	*Greatest Advantage*	10
D4	**Site: Educational Opportunity (k-12)**						
	Attributes: Scored Elsewhere, All Alternatives Offer Oportunity	Good Gathering and Sorting Spaces Available				Good Gathering and Sorting Spaces Available	
	Advantages	*Some Advantage*	0	*No Advantage*	0	*Some Advantage*	0
E	**Function: Operational Effeciency**						
E1	**Labs: Lab/Dock/Maintenance Triangle Work Flow**						
	Attributes	Dock to Lab: 260' Dock to Maint: 88'		Dock to Lab: 176' Dock to Maint: 360'; Lab relationship is most critical.		Dock to Lab: 400' Dock to Maint: 260'	
	Advantages	*Some Advantage(move Maintenace to north for greatest advantage)*	75	*Greatest Advantage*	88	*No Advantage*	0
E2	**Labs: Flexibility for Lab future Expansion**						
	Attributes	Lab in one building, could be re-configured in the future; some room for Lab expansion		Foot Print is in two pieces; land locked lab modules		Foot Print in one piece, plus other program in foot print, room to grow lab modules	
	Advantages	*Some Advantage*	40	*No Advantage*	0	*Greatest Advantage*	65
E3	**Housing: Proximity to Dining**						
	Attributes						
	Advantages		0		0		0
E4	**Housing: Serviceability of Dining**						
	Attributes: Dependant on Service Strategy	Clear access to Loading Dock at Maintenance Building				Clear access to Loading Dock at Maintenance Building	
	Advantages	*Some Advantage*	1	*No Advantage*	0	*Some Advantage*	1
	TOTAL IMPORTANCE OF ADVANTAGES		629		108		482
	Cost		$41.2 Million		$35.0 Million		$40.7 Million

CBA summary

PROJECT NAME	PROJECT NUMBER
MREC Master Plan & Program	10076-00
DATE OF MEETING	**TIME / WEATHER**
May 10-11, 2011	9:00am - 6:00pm
MEETING LOCATION	**PURPOSE**
NPS Headquarters, St. Croix, VI	Choosing By Advantages

PARTICIPANTS	PRESENT
Karen Koltes, OIA, DOI	Yes
Amy Sebring, NPS-DSC	Yes
Andrea Lind, NPS-DSC	Yes
Joel Tutein, NPS-STX	Yes
Zandy Hills-Star, NPS, SARI	Yes
Dennis McCarthy, NPS	Yes
Michael Bayer, JICMS	Yes
Stephen Meinhold, JICMS	Yes
Camille McKayle, UVI	Yes
Lorena Harris, NPS	Yes
Marcia Taylor, UVI/VIMAS	Yes
Bob Wicklund, JICMS	Yes
Johanna Bernadet, Cane Bay Films	Yes
Gary Kaller, Cane Bay Films	Yes
Brooke Persons, DPNR/SHPO	Yes
Richard I., Estates Judith Fancy	Yes
Kycoch Reale Munroe, UVI	Yes
Rich Lutz, Rutgers	Yes
Karl Knight, Governor's Office	Yes
Basil Ottly, DOI	Yes
Jim Morris, USC	Yes
William Tobias, Ecosystems	Yes
Susan Duke, NPS-CHRI	Yes
Mike DeLuca, Rutgers/JICMS	Yes
Joe Greco, LAS	Yes
Joshua Gassman, LAS	Yes
Laurie Dunton, Ancor Dive	Yes
Virdon Brown, STX retired	Yes
Jose Castro, Atkins	Yes
Doug Crook, Atkins	Yes
Henry Tonnemacher, 7-Seasons LTD.	Yes
Carol Burke, S.E.A.	Yes
Ben Ridderbos, LAS	

ISSUE NO.	DATE	ISSUE	ACTION BY DATE DUE STATUS
1	5/10/2011	Current Goal: Conceptual Approval from the NPS.	
2	5/10/2011	What is a CBA? Choosing by Advantages: assigning value to elements that are important to the mission of the project.	
3	5/10/2011	Project Overview: Site Location is near Salt River Bay at the North end of Judith Fancy development in St. Croix, USVI	
4	5/10/2011	Climate & Site Considerations: All the elements that were taken into consideration for the design so far such as: Average temperature, solar radiation, Monthly Diurnal Averages, relative humidity, wind velocity, frequency and direction, wind energy potential, building orientation.	
5	5/10/2011	St. Croix Environmental Issues: There are five main environmental issues that were taken into consideration. They are air quality, sewage, erosion and sedimentation, limited fresh water and intermittent and expensive electrical supply.	
6	5/10/2011	There are three sustainability measuring sticks available for the MREC. They are the Living Building Challenge, Island Green Buildings Checklist (a.k.a. LEED "Tropical" formed by a group in St. John), and LEED Platinum.	
7	5/10/2011	Deep Green – Concepts. The Living Building Challenge offers the following concepts: Do good, not "less bad", requires Net Zero energy use annually, requires Net Zero water use annually, and forces designers and owners to fundamentally rethink assumptions and processes.	
8	5/10/2011	Deep Green – MREC Design: Project will collect all of its potable water from rainwater. Project will treat all waste water on-site and reuse it. All required power will be produced on-site from Photovoltaic and Wind with battery backup power. It was noted that net-metering was a more feasible option than earlier investigations informed us – so the project will be net metered. The project will create comfortable spaces without conventional mechanical systems through natural ventilation and dehumidification.	
9	5/10/2011	Deep Green – MREC Strategies: The two main strategies are to create climatically and culturally appropriate designs that take advantage of plentiful resources such as the sun and wind and value the use of the precious ones such as water.	
10	5/10/2011	The project goals were read to the group again by Joshua.	
11	5/10/2011	Many attendees worked at the former West Indies Laboratory (WIL) and gave a brief history of the facility and provided useful feedback on many meeting items.	
12	5/10/2011	Former Senator Vernon Brown voiced concerns about code compliance for cisterns. The design team has and will abide by all codes for cisterns and other elements of the facility.	
13	5/10/2011	Zone "M" Space – what is it and where will it be? The zone M space will have the most stringent environmental control (dehumidification, cooling). It will be housed in either the Outreach Center or the Laboratory building. It will be an NPS-managed space. The space will hold natural and cultural history specimens. The purpose of the space is to be able to store St. Croix specimens and artifacts in St. Croix for the students and residents of St. Croix.	

14	5/10/2011	Water Collection Concerns were voiced: What about dry season? The design team explained that dry seasons were considered and with the volume of water the MREC will collect, there should not be any concern. What about Fire Suppression? The design team is investigating the use of sea water for fire suppression.
15	5/10/2011	Micro-Climate Factors: Joshua explained that no on-site analysis has been done or will be done for mico-climate factors. The design team is using the extensive climate analysis that has been done for the region and they have very accurate analysis tools available for accurate design.
16	5/10/2011	Doug Crook explained the process of the wastewater collection, treatment, and greywater distribution. The wastewater is collected, the solids are separated, then it is filtered through the wetland and distributed to the greywater usage points (toilets for flushing, irrigation, hose spigots for exterior cleaning of boats, PV panels, dock cleanup, etc.
17	5/10/2011	Joshua went through an extensive precedent study showing where many of the design influences came from.
18	5/10/2011	Joe Greco went through each of the three design schemes. He noted that the scheme numbering is 2-4 because schemes 1, 5, and 6 were omitted during earlier design reviews.
19	5/10/2011	The Colonnade Scheme (Scheme 2): Important elements were the Maintenance and Boat Dock relationship and the public entry in the front along the South edge of the campus.
20	5/10/2011	The Framed Views Scheme (Scheme3): Important elements were that the labs were closer to the water, the campus was a little more spread out, and the housing was a little more private than the other schemes.
21	5/10/2011	The Courtyard Scheme (Scheme 4): Important elements were the courtyards that were framed by the buildings. The separate courtyards created gather spaces for different functions and fostered a more community feel than the other schemes.
22	5/10/2011	Site access through Judith Fancy was a concern for a guest attendee. Joel explained that the MREC will be accessed from Benny Benjamin to the NPS access road (formerly a haul road) that is planned to be reconstructed.
23	5/10/2011	Bob W. asked about lagoon dredging. Zandy replied stating that a NOAA bathymetry study is planned to commence in the Salt River Bay area and will inform the decision on whether or not dredging is necessary and where it might be necessary.
24	5/10/2011	Zandy explained that the NPS has plant restoration efforts in the planning stages that will be done around the MREC site. There are coastal restoration efforts being planned by the NPS and the National Guard.
25	5/10/2011	Guest attendees brought up recreational parking concerns. People want access to the beach past the MREC campus. The NPS and design team will take this into consideration in the final design. The old hotel concrete pad was offered as a suggestion.
26	5/10/2011	Zandy mentioned that it would be a good idea to have tie-downs in the MREC parking area to be able to bring the boats out of the water and tie them down in hurricane events.
27	5/10/2011	Parking capacity concerns: for the infrequent large even, it may be possible to shuttle people from the UVI campus. Also, people can be shuttled from the Contact Center parking area.
28	5/10/2011	Meredith (local resident) voiced her concern about the disruption of the bio-luminescants in the lagoon from construction and boat traffic. Other locations for the boat dock facilities such as the Crescent Beach to the West but was found to be less feasible than the lagoon based on mangroves and silt taking back the beach area. It is yet to be determined if they can be saved – no one knows for sure.
29	5/10/2011	Jose presented a preliminary concept design of a restoration plan he developed. The primary aspects included soil erosion control, laminar flow design and runoff control measures.
30	5/10/2011	Meeting concluded for the day.
31	5/11/2011	Joshua began with agenda overview.
32	5/11/2011	Joshua, Dennis and Michael gave an overview of the Choosing by Advantages (CBA) scoring process.
33	5/11/2011	Joshua led the discussion on how to choose the topics to be scored, assisted by Dennis.
34	5/11/2011	Important elements to consider that were discussed as a first pass were: • Cisterns & Infrastructure efficiencies • No screens = less wind resistance • Boat dock location • Floodplain proximity • Infirmary/Nurse's station/ambulance access ○ Joshua explained that all designs will have fire truck access to all buildings which will be more stringent access standards than ambulance. • MREC Site Disturbed Areas Calculations. While the entire site has been disturbed during a past development attempt, the are overall site disturbance calculations of the total 70+ acres total. ○ Scheme 2: 6.5 Acres ○ Scheme 3: 5.9 Acres ○ Scheme 4: 6.5 Acres • Housing Gross Square Footage (GSF) Calculations (see program space list.
35	5/11/2011	The JICMS made a general comment that they like Scheme 3 location of the labs due to expense/efficiency and the close proximity of labs to the water.
36	5/11/2011	In discussing the entry point/entry sequence of the MREC the JICMS said they were not concerned where it was located but the NPS was very concerned where it was located.
37	5/11/2011	Joel reiterated the primary function of the MREC in order of importance: First education, then K-12 education, then guided tours. Transient tourists are not to be the focus of the design.
38	5/11/2011	Ben provided a live walkthrough of each Scheme before starting the formal CBA scoring process.
39	5/11/2011	LAS, NPS and JICMS worked together to come up with a CBA matrix
40	5/11/2011	Dennis led the attendees through the scoring process, assisted by Joshua and documented each score in the CBA matrix (see attached).

41	5/11/2011	The paramount advantages were discussed among the attendees and chosen based on their importance to the success of the project. Each scheme was then scored based on their advantage. A2. Labs: Solar Orientation to Minimize Solar Heat Gain and Optimize Daylighting. • The scheme with the best orientation relative to the sun path will have the advantage because it will naturally be cooler while still allowing the optimum light into the space for lighting that will minimize electrical lighting. ○ Scheme 2 and Scheme 4 scored equally for the best orientation. A3. Housing: Access to Natural Ventilation. • Since the housing will rely on natural ventilation for cooling, the scheme with the best access to natural ventilation will have the most advantage. ○ Scheme 2 has larger undergraduate housing and therefore reduced cross ventilation. ○ Scheme 3 units have a better opportunity for cross ventilation than Scheme 2. ○ Scheme 4 has the best opportunity for cross ventilation based on building design and orientation on the site. C2. Housing: Foster Community through Shared Spaces. • The scheme with the greatest advantage would be the one that offered shared spaces that encouraged a sense of community for the people that used the housing. ○ Schemes 2 and 4 both offered courtyards in the housing are but Scheme 2 additionally offered a centralized location of the dining pavilion for good gathering opportunities and sense of community. ○ Scheme 2 has the greatest advantage. D1. Site: Clarity of Entry Sequence. • The clarity of entry sequence means that when a person arrives on-site it is very clear where they must go or enter the building and it is clear where they should not go. ○ Scheme 2 has a very clear entry sequence. It is easy to find the front door once you arrive in this scheme. The separation of the entry and post-entry circulation is preferred. ○ Scheme 4 has a nice arrival sequence with a pedestrian bridge over a wetland – good educational opportunity. ○ Scheme 3 has a confusing entry sequence. ○ Scheme 2 has the greatest advantage. E1. Labs: Lab/Dock/Maintenance Triangle Work Flow. • The researchers expressed importance that the laboratory, dock and maintenance facilities be as close to each other as possible. The reason is that each holds important components to the daily work flow. Researchers will be moving accessing elements from each of these locations daily. ○ Scheme 4 scored the lowest with no advantage because the work flow distances are the greatest. ○ Scheme 2 has some advantage but some of the facility locations needed to be adjusted. ○ Scheme 3 has the greatest advantage because the workflow triangle has the shortest distances. The lab relationship to the maintenance building and dock is the most critical.
42	5/11/2011	Scheme 2 scored the highest in the CBA matrix. However, the housing layout from Scheme 4 was favored. The preferred alternative became a combined Scheme 2A that included the overall site layout of Scheme 2 combined with the housing from Scheme 4.
43	5/11/2011	After the preferred scheme was decided, then the construction estimates were considered. Since each cost estimates of the two higher scoring schemes were close, it was decided that cost would not change the decision of the preferred scheme.
44	5/11/2011	Meeting adjourned.

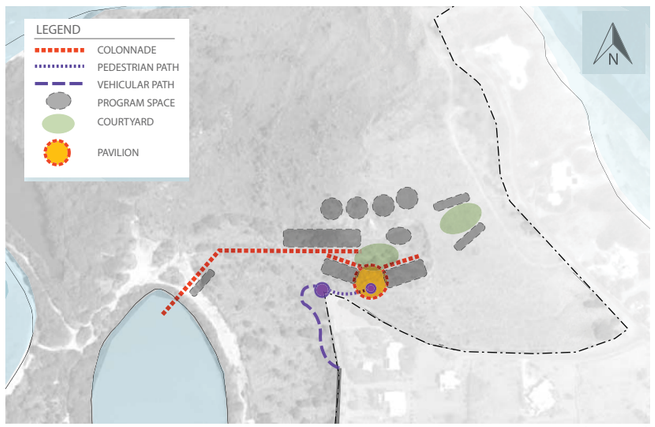
REMARKS

ATTACHMENTS

PREPARED BY Ben Ridderbos, Lord, Aeck & Sargent, Inc. **DATE PREPARED** May 27, 2011

THESE NOTES SUMMARIZE OUR UNDERSTANDING OF THIS MEETING. PROJECT ACTIONS WILL BE BASED ON THESE NOTES. PLEASE CONTACT THE WRITER IMMEDIATELY IF YOU DO NOT CONCUR.

collonade



site parti

master planning concept options

.2 alternate 1: colonnade

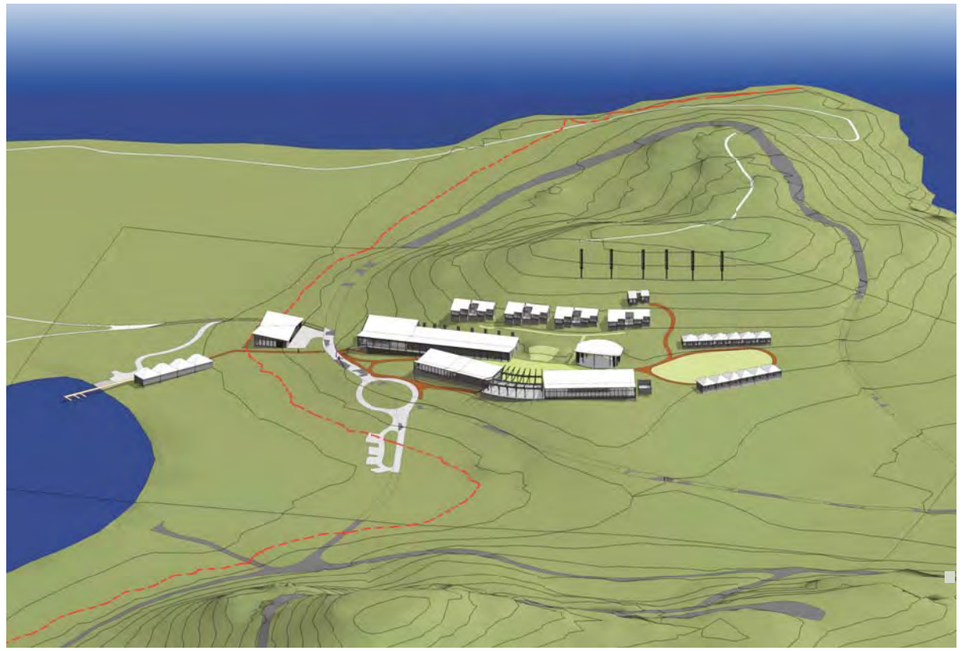
The organizing concept of this alternate is to create a series of linked colonnades or passageways that tie the visitor and the resident experiences together as they move throughout the site as well as to provide shelter from the sun and rain as part of these paths. The colonnade evokes the rich architectural history of St Croix and the Virgin Islands; it mirrors the experience one has in Christiansted while allowing the development of the buildings to ultimately be of their own time. The colonnade concept also offers a direct strategy for connecting the buildings on the new campus and creating active points of interest along the way to spurn spontaneous interaction between disparate groups occupying the site including casual visitors, researchers and local k-12 students visitors.

Upon drop off or parking at the center, one follows a path to the east up to an open air entry pavilion that serves as the lobby and a central gathering space for the project. This space is open to the outside, but has a rhythm of columns and beams overhead to define the space and provide shelter from the sun. Upon arrival at the entry pavilion, the site is revealed to you as the panoramic views from Buck Island and Christiansted in the east to Salt River in the west present themselves. Visitors and students from here have direct access to the Outreach and Education components of the project. To the north the pavilion opens onto the central courtyard where both sides are flanked with colonnades. The southern colonnade offers alternate entry to the Outreach and Education program elements. On the north edge of the courtyard, the spine of the center develops as a colonnade connects the courtyard, moving past the lab building connecting it directly to the maintenance building and further down the hill to the water side elements and the dock. This colonnade creates a central location for movement between many of the project's key program elements helping to build a community and allow visitors to easily navigate.

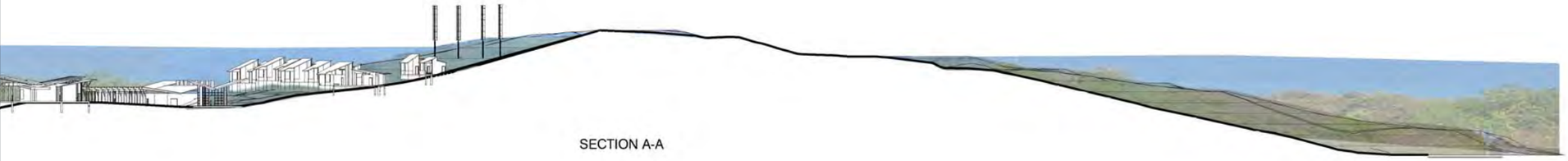
The residences in this scheme for the undergraduates are housed in two linear buildings creating a residential courtyard between them. Graduate and staff residences are located apart from the undergraduates for acoustic and other privacy reasons; they are higher on the hill. To bring these groups together, the dining pavilion is located centrally to all the housing and serves to help define the east edge of the central public courtyard. The lab colonnade terminates at this focal point for the site's residents and ties the whole site together.

site sections

site plan

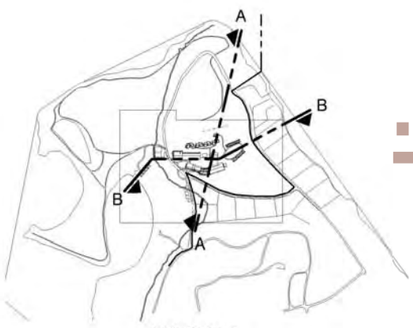


massing



SECTION A-A

SECTION B-B



SCHEME 2

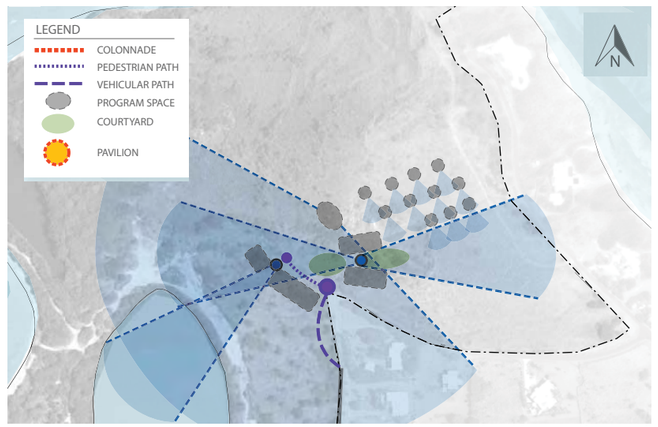
framed view

.2 alternate 2: framed views

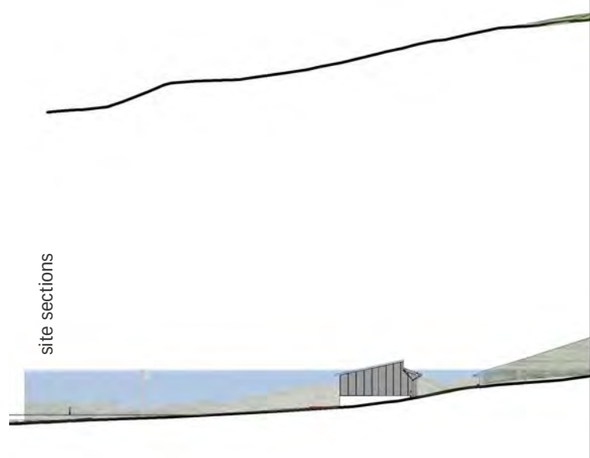
Alternate 2 is conceived to offer a sequence of framed views as one experiences the site which is rich with vistas in nearly all directions. To reinforce this idea, the building have been set in the site to offer views to their occupants, but more importantly, visitors and residents alike may move through the site where the buildings act as frames focusing one's experience on a particular view in a given direction.

Upon drop off at the site, one enters a forecourt that frames a view to the east of Buck Island framed between the Education and the Outreach components of the project. As visitors and residents move toward the lab buildings, they are again compressed between two buildings to reveal a view of Salt River Bay and the western side of the Park. Functionally speaking, placing the lab in this location also offers the closest proximity to the dock, easing the operations of the facility by keeping the dock, lab and maintenance buildings as close as the site allows.

The residences are arranged in a staggered pattern on the hill to allow each to have a view to the south and east. The dining pavilion is located high and to west above the labs. It thus becomes a central gathering space for all of the residents, as well as allowing it 270 degree panoramas as the apex of the framed view concept where the whole site is revealed and the frame is removed.

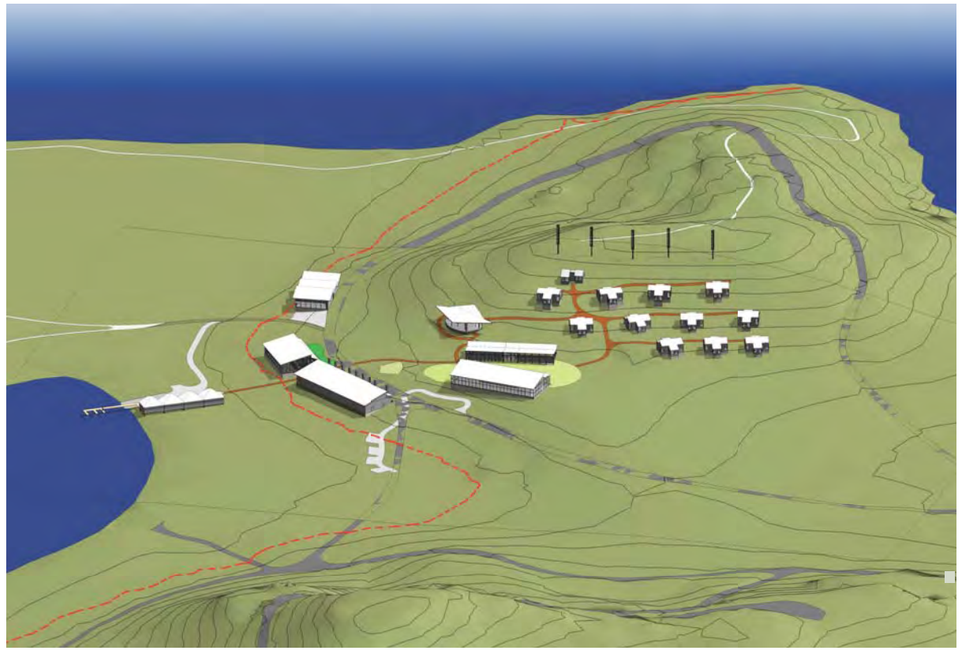


site parti



site sections

site plan



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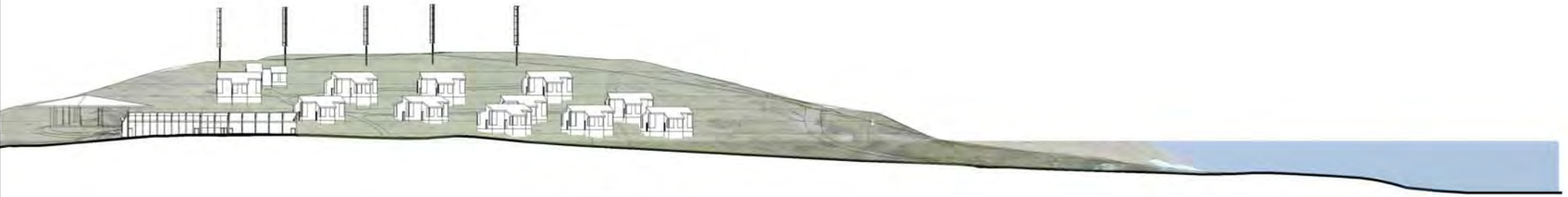
SECTION A-A



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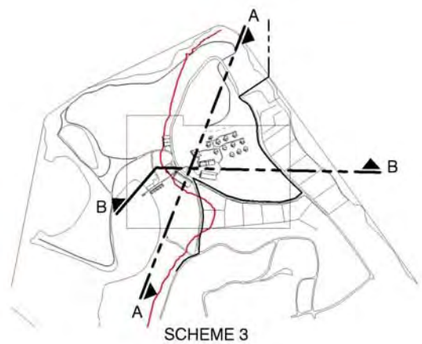


SCHEME 3

connected courtyards

.3 alternate 3: connected courtyards

The collegiate courtyard or quad is the conceptual and literal anchor for this alternate. The project lays out to create a series of 3 courtyards each with their own function and each becoming a part of a sequence of experiences as one moves through the project.

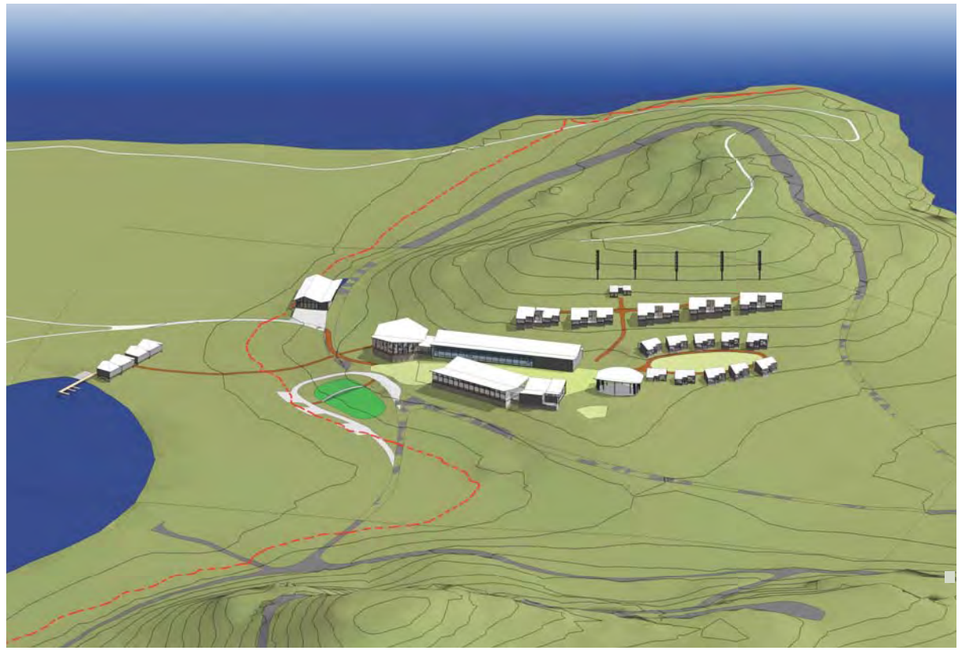
Upon arrival at the site, the vehicular circulation moves around a constructed wetland that is the precursor to the forthcoming courtyards. This one is experienced using a bridge over the wetland offering educational opportunity as well as an informal but organized start to the entry sequence into the MREC. The next courtyard is an entry and gathering space with the lab and outreach buildings creating is edges. Beyond this space is the central courtyard. This space is the central focus of the scheme with all occupants of the project present with the education, outreach, lab and dining pavilion all defining this courtyard.

The final courtyard is closer to an inner sanctum for the project, it is created by the undergraduate housing units as they are arranged to define the space but to leave the east view and windward direction open. Graduate and staff residences are located apart from the undergraduates for acoustic and other privacy reasons; they are higher on the hill. To bring these groups together, the dining pavilion is located centrally to all the housing and serves to help define the east edge of the central public courtyard.

site parti

site sections

site plan



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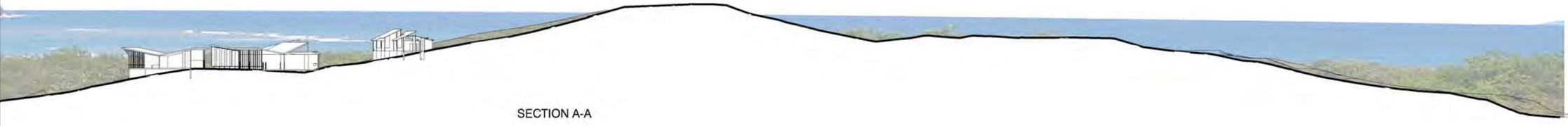

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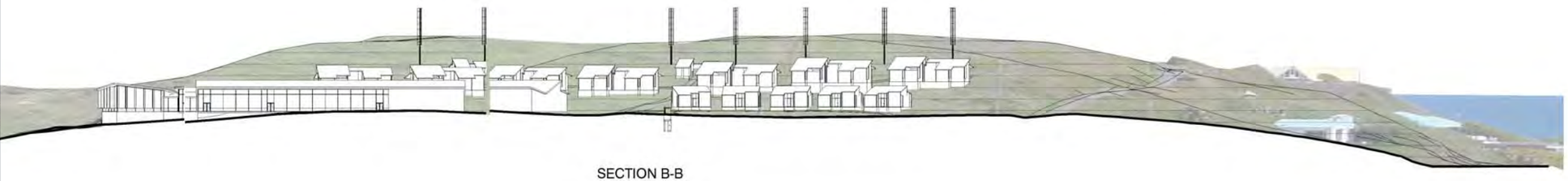

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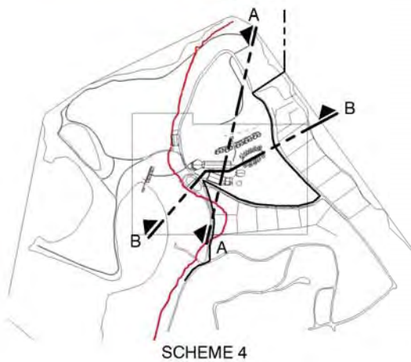


SCHEME 4

MREC site from across the bay, c1950

landscape restoration plan

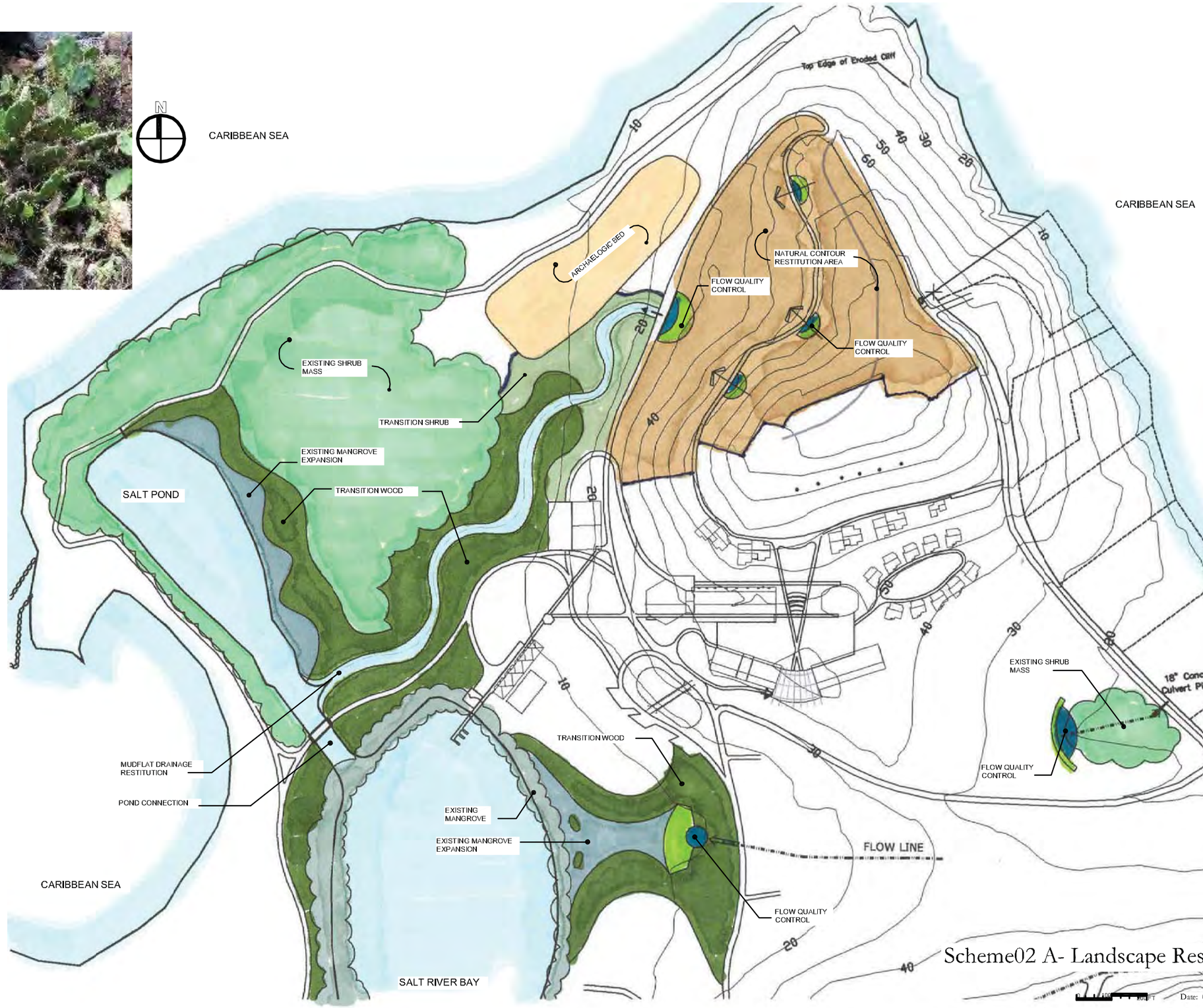
The Landscape demonstrates that the MREC can become an integral part of the natural reserve without interfering with its wildlife habitat and recreation potential.

The conceptual ideas we present dwell upon the interrelations of the marine, terrestrial and cultural environments we encounter on the site. These relationships are simplified in the typical description of the hydrologic cycle. They can be largely enhanced by the sensitivity we insert into the understanding and management of efforts to restore the hydrologic cycle of the two opposite flows typical to coastal areas where the land meets the sea, inland runoff flow and tidal flow.

To synthesize existing conditions we evaluated existing topography, hydrology and soil characteristics. Additional insight was provided by knowledge of ongoing concerns such as the plan to eradicate invasive species, restitute natural contours and the salt pond floodplain (mudflat) drainage.

The predominant landform is the hill which rises to 110 feet. The northeast and northwest slopes are a severe erosion hazard and have been designated as a natural contour restoration area. The natural slope can be identified by the soil type and a topographic plan. To achieve the natural non erosion slope we recommend bioengineering soil techniques such as the Filtrexx Compost Soxx. This is a system which doesn't requires heavy machinery, provides erosion control and native species re vegetation.

Basin A drains through an existing culvert at the southeast corner that eventually drains into the Caribbean Sea. It receives external offsite runoff contributions. A portion of Basin B will drain into a box culvert that is part of the proposed access road improvements. It also receives external offsite runoff contributions and drains into the Salt River Bay estuary. The remaining runoff of Basin B drains into the Salt River Bay estuary and the salt pond floodplain and will be subjected to the drainage runoff quantity and quality controls that will become an integral part of the MREC project. Basin C drains through a severe erosion hazard area of the hill because natural slope conditions have been significantly modified. It is the basin with the highest sediment runoff potential. Basin D drains almost directly into the Caribbean Sea.



Scheme02 A- Landscape Restoration

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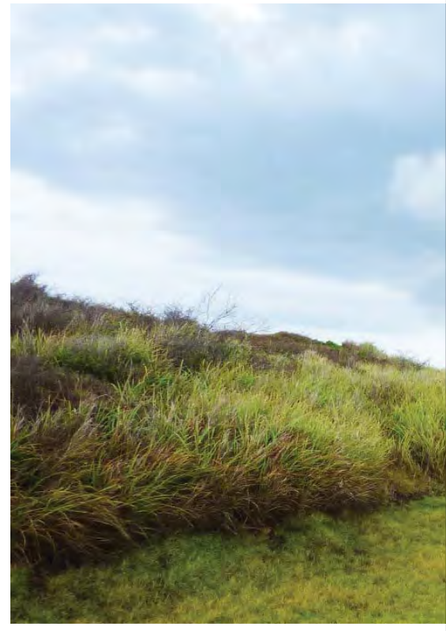

views of existing site

The trails at the west of the hill provide an opportunity to incorporate runoff flow quality controls that filter sediment, avoid large concentrated flows and promote sheet or laminar flow, reduce velocity and restore natural time of concentration.

The flow quality control at the base of the hill also diverts runoff away from the archaeological site which facilitates future archaeological excavations. It also promotes sheet (laminar) flow and prevents the migration of excess runoff sediment to the mudflat floodplain. Natural capacity of sediment transport should be maintained because this is an area of great marine wetland habitat potential and sediments also transport elements that contribute to the ecological food chain wildlife support .

The mudflat drainage restitution is exemplified by an intermittent meandering stream. This stream has a dual function to restore drainage to the salt pond by controlling the frequency and detention time of floods and efficiently draining areas south to facilitate recreational activities and circulation consonant to the NPS site restoration objectives.

The meandering stream to restore mudflat drainage is the conceptual idea for the inland runoff flow. To enhance the opposite tidal flow influence of the salt pond we suggest modifying the eroded banks that are not productive to stimulate tidal flow and mangrove expansion.

Another possibility is to provide a connection between the salt pond and the Salt Ricer Bay. This may restore a hydrologic cycle and the tidal flushing capacities that could be beneficial to the marine wetland habitat. A hydrodynamic model and other studies will be needed to determine the benefits of this hydrological modification.

Basins A and B drain to existing or proposed box culverts which have been designed to manage quantity and not quality of runoff. We suggest inserting Flow Quality Controls previous to any of these two outfalls. The proposed box culvert of Basin B that discharges runoff from the proposed access road improvements provides another opportunity to further refine the quality of water draining into the Salt River Bay estuary, expand the tidal zone influence and redefine the already altered edges of this estuary.

soil survey (soil conservation service)

Soil Series	Abb.	Soil Properties and Qualities
Cramer-Victory	CvC	clay. loam 2 to 12% slopes, very stony well drained severe erosion hazard 10 to 20 inches depth to bedrock
Pits, quarries	Pt	areas from which rock, gravel or sand have been removed for construction
Redhook	RdB	extremely stony sand 0 to 5% slope excessively drained, rarely flooded severe erosion hazard more than 60 inches depth to bedrock moderately saline
Salt flats, ponded	SaA	very poorly drained, strongly saline
Solitude	SoA	gravelly fine sandy loam 0 to 2% slopes, frequently flooded poorly drained more than 60 inches depth to bedrock Slightly to strongly saline
Southgate-Rock outcrop	SrF	gravelly loam and weathered igneous rock 40 to 60% slopes well drained severe erosion hazard 10 to 20 inches depth to bedrock
Usthortens	Us	areas that have been altered from their natural state by human activities
Victory-Southgate	VsC	loam, very stony 2 to 12% slopes well drained severe erosion hazard 20 to 40 inches depth to bedrock
Victory-Southgate	VsD	loam, very stony 12 to 20% slopes well drained severe erosion hazard 20 to 40 inches depth to bedrock
Victory-Southgate	VsE	loam, very stony

The site has a large variety of soil types (10) which in itself illustrates its rich environmental value. These soil types are differentiated according to the various landforms in the site and their topographic slope and relationship to the water.

The Southgate-Rock outcrop is the cliff that meets the sea surf in the north, northeast borders of the site.
The three Victory-Southgate soil types conform the hill that rises from 10 to 110 foot with slopes that range from 12 to 40%. All are extremely stony and an erosion hazard. The soil survey also indicates that a quarry was located in this hill.

The Solitude series is the floodplain which drains into the salt pond. It is an area with a high marine wetland wildlife habitat potential.

The Redhook series is the beach at the west edge of the site. The Usthortens series occupies an extensive part of the site and the whole edge with Salt River Bay, which testifies to some of the man made impact on the site. This is a very sensitive edge of the estuary which already has been altered from its natural state.

The Cramer-Victory series is located in the valley at the southernmost edge of the foot the hill. This soil series seems to be mostly located offsite.

hydrology

The dominant landform in the site is the hill which has a ridge line that essentially divides the site into four basins that are identified as Basin-A, Basin-B, Basin-C and Basin-D in the Landscape Restoration Basins Delimitation Plan. Basins A and B are located within the proposed MREC site.

Basin A drains through an existing culvert at the southeast corner that eventually drains into the Caribbean Sea. It receives external offsite runoff contributions. A portion of Basin B will drain into a box culvert that is part of the proposed access road improvements. It also receives external offsite runoff contributions and drains into the Salt River Bay estuary. The remaining runoff of Basin B drains into the Salt River Bay estuary and the salt pond floodplain and will be subjected to the drainage runoff quantity and quality controls that will become an integral part of the MREC project. Basin C drains through a severe erosion hazard area of the hill because natural slope conditions have been significantly modified. It is the basin with the highest sediment runoff potential. Basin D drains almost directly into the Caribbean Sea.