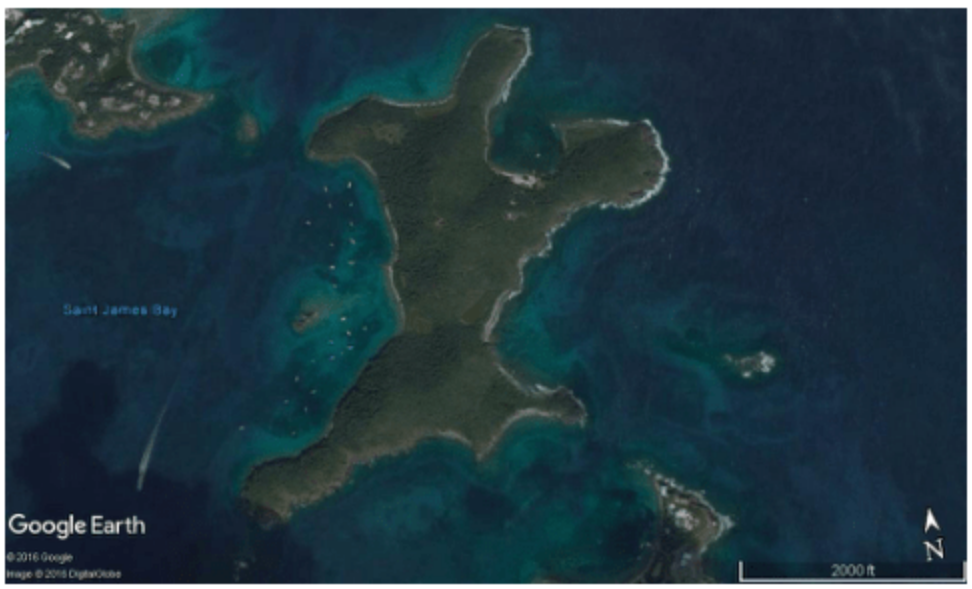
ENVIRONMENTAL ASSESSMENT
FOR THE CONSTRUCTION OF TWO DOCKS AND A BARGE LANDING
ON GREAT ST. JAMES ISLAND
U.S. VIRGIN ISLANDS



PREPARED FOR

GREAT ST. JIM, LLC.

PREPARED BY

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1.0 NAME AND ADDRESS OF APPLICANT

Great St. Jim, LLC
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2.0 LOCATION OF PROJECT

Great St. James Island is located to the southeast of the island of St. Thomas. The geographic coordinates of the island are 18° 18.583' N and 64° 49.752' W. The Temporary Barge Landing is located at 18° 18.902' N and 64° 49.802'W, the western Christmas Cove Dock is located at 18° 18.804' N and 64° 49.876' W, and the southern barge landing/dock is located at 18° 18.355' North L and 64° 49.659' W. The Location and Agency Review Map and Vicinity Map follow.

Figure 2.01 Agency Review Map, the entire island of Great St. James is within CZM first tier jurisdiction. The dock locations on the island are indicated.

Figure 2.02 Vicinity Map showing Great St. James Island in relationship to the surrounding area.

3.00 ABSTRACT

Great St. Jim, LLC is seeking to construct two docks, one of which is a combination dock/ barge landing, and a temporary barge landing to provide access to Great St. James Island.

There is currently a small pile-supported dock located within Shallow Bay on the north side of the island. The bay is very shallow and vessels accessing the dock have damaged the shallow seagrass beds within the bay. At one time, there had been a concrete bulkhead at the shoreline with a small floating dock. The previous owner submitted an application for the existing dock which was approved by DPNR's Division of Coastal

Zone Management, but was not approved by the U.S. Army Corps of Engineers due to objections by National Marine Fisheries because of the shallowness of the bay. The dock was constructed by the previous owner despite not receiving the federal permit and notices were issued by the USACE requesting the removal of the unpermitted structure. The dock however was never removed. The applicant, understands the issues with the existing dock and is proposing to remove the dock as soon as another dock is constructed and usable.

A detailed study was done around the entire island to determine suitable locations for dock location. All ESA listed corals were located and docks and barge landings were designed to avoid these corals.

A temporary barge landing is being proposed on the northwestern facing beach. This site is to the west of the salt pond and the associated wetlands. This a shoreline ramp which is 25 feet (ft) wide and 40ft in length extends to the Mean Water Line. The landing is free of both coral and seagrass colonization. The landing is excellent for short term transfer of material or equipment. The site is well protected from normal wave action but is periodically impacted by wave action from ferries which travel through current cut between Great St. James and St. Thomas. The wakes from these vessels make it an unattractive site for mooring a barge for any length of time at the site. This landing can be quickly constructed and utilized while the combination dock and barge landing on the southeastern side of the island is constructed.

The western dock is proposed on the northern end of Christmas Cove. Historically there was a dock in this location and there are still old concrete piles lying in the shallows of this site. The proposed dock will be 10ft in width and 195ft in length extending 187ft from mean low water (MLW) and 193ft from mean high water (MHW). The dock extends beyond the nearshore hardbottom to a depth of 15ft out in the uncolonized sand to allow for safe dockage for deeper vessels.

The southern dock is located off the point closest to Little St. James. The dock is "L" shaped and is 20ft wide (to allow for barge landing) and 150ft in length extending 141ft from MLW and 148ft from MHW, the "L" then turns east and extends 100ft by 20ft. A wave attenuating/reef creating system is proposed beneath the dock which will allow for more protected docking inside the dock when seas from the south are rough. The dock has 9ft of water depth of the southern end and 7ft to 8ft on the inside of the "L". The dock has been designed so that barges can approach and land on the end of the dock while vessels can dock along the "L".

4.00 STATEMENT OF OBJECTIVES SOUGHT BY THE PROPOSED PROJECT

Great St. Jim, LLC is proposing to construct a temporary barge landing and an access dock on the western side of the island to be used for worker and guest access to the island

and a combination barge landing/dock on the southeast side of the island on the point closest to Little St. James. The existing dock in Shallow Bay will be removed as soon as one of the docks is functional.

5.0 SUMMARY OF PROPOSED ACTIVITY

Great St. Jim, LLC is seeking to construct two docks, one of which is a combination dock/barge landing, and a temporary barge landing to provide access to Great St. James Island. A detailed study was done around the entire island to determine suitable locations for the dock locations and the sites with the least environmental impact were chosen.

A temporary barge landing is being proposed on the northwestern facing beach. This site is to the west of the salt pond and the associated wetlands. This a shoreline ramp which is 25 feet (ft) wide and 40ft in length extends to the Mean Water Line. Two bollards will be placed to either side of the ramp and two moorings will be installed 75ft offshore on either side of the ramp in just over 7ft of water depth. The mooring will be installed using helix anchors and will use floating lines will be used to avoid seafloor disturbance when the moorings are not in use. The landing is free of both coral and seagrass colonization. The landing is excellent for short term pick up and drop off of material or equipment. The site is well protected from normal wave action but is periodically impacted by wave action from ferries which travel through current cut between Great St. James and St. Thomas. The wakes from these vessels make it an unattractive site for mooring a barge for any length of time at the site. This landing can be quickly constructed and utilized while the combination dock and barge landing on the southeastern side of the island is constructed.

The western dock is proposed on the northern end of Christmas Cove. Historically there was a dock in this location and there are still old concrete piles lying in the shallows of this site. The proposed dock will be 10ft in width and 195ft in length extending 187ft from mean low water (MLW) and 193ft from mean high water (MHW). The dock will connect to an access slab 12ft long and 2' thick. All the ESA listed coral species within the area were located and the dock footprint avoids all ESA listed species. The dock extends beyond the nearshore hardbottom to a depth of 15ft out in the uncolonized sand to allow for safe dockage for deeper vessels.

The southern dock is located off the point closest to Little St. James. Again, all of the ESA corals were located and the dock was designed to avoid these corals. The dock is "L" shaped and is 20ft wide (to allow for barge landing) and 150ft in length extending 141ft from MLW and 148ft from MHW, the "L" then turns east and extends 100ft by 20ft. A wave attenuating/reef creating system is proposed beneath the dock which will allow for more protected docking inside the dock when seas from the south are rough. The dock has 9ft of water depth of the southern end and 7ft to 8ft on the inside of the

"L". The dock has been designed so that barges can approach and land on the end of the dock while vessels can dock along the "L".

The existing dock in the shallow northern bay will be removed as soon as one of the other two docks is functional. The dock will have the decking removed, and then the stringers and pile caps will be disassembled. This will all be done by workers from the shore. Once only the piles remain, a shallow draft barge will come into the bay and pull the piles out. If for some reason the piles cannot be pulled they will be cut off by commercial divers at the mudline.

5.01a Purpose of Project

The purpose of this application is to provide access to the island of Great St. James. Great St. Jim, LLC is proposing to construct a temporary barge landing to be used during the construction of the other docks, an access dock on the western side of the island to be used for worker and guest access to the island, and a combination barge landing/dock on the southeast side of the island on the point closest to Little St. James. The existing dock in Shallow Bay will be removed as soon as one of the docks is functional.

5.01b Presence and Location of any Critical Areas and Possible Trouble Spots

The island of Great St. James is within the Vessup Bay/ East End Red Hook Area of Particular Concern (APC) (Figure 5.01.1). The Vessup Bay/Red Hook APC is located on the eastern end of St. Thomas and includes Nazareth, Muller, Vessup, Red Hook, Great Bay, Cowpet Bay, Cabrita, Beck and Water Point, Great St. James, Little St, J, and Dog Island.

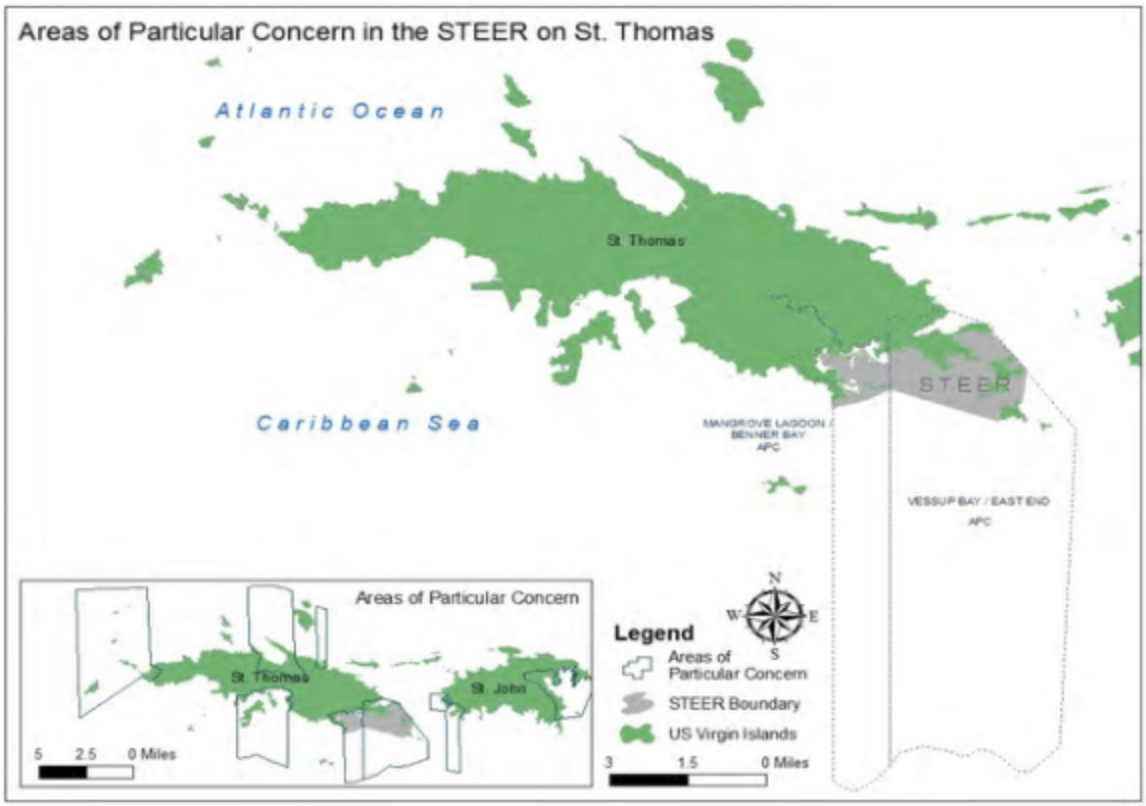


Figure 5.01.1 Areas of Particular Conern (STEER (2011) St. Thomas East End Reserve Management Plan. St. Thomas, USVI.

The island also lies within the St. Thomas East End Reverse (STEER). STEER was developed to help protect coastal resources including seagrass beds and coral reef communities. The island of Great St. James is in area C of the reserve and is referred to as St. James (Figure 5.01.2).

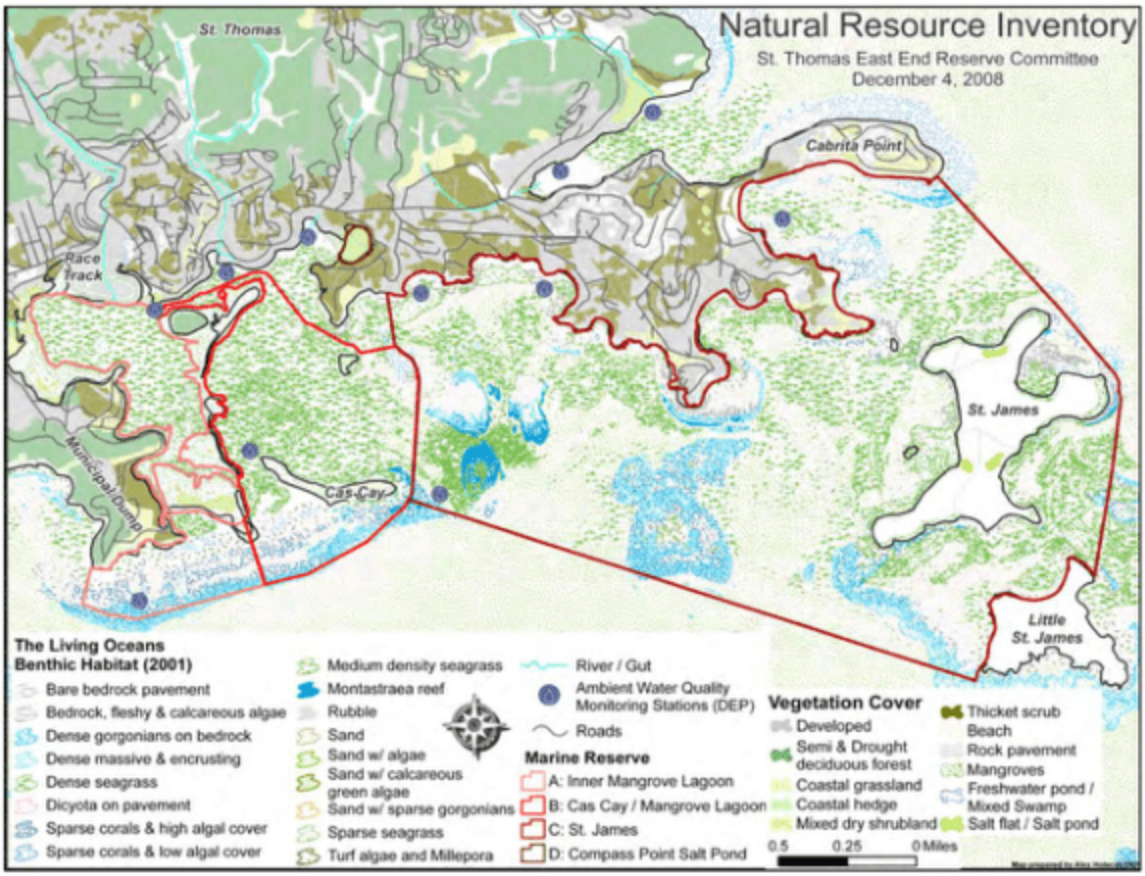


Figure 5.01.2 STEER boundaries. (STEER (2011) St. Thomas East End Reserve Management Plan. St. Thomas, USVI.

The regulations for the St. James are as follows:

St. James Marine Reserve and Wildlife Sanctuary	**Subchapter 96, Section 96-3**	*Prohibited Activities within the St. James MRWS:* • It is unlawful to remove any marine or other wildlife without a permit or specific authorization from the Commissioner
	Subchapter 96, Section 96-4	*Permitted Activities within the St. James MRWS:* Acts permitted, provided a permit is first obtained from the Commissioner: • Scientific collecting in support of and for use in a research project with an approved protocol • The use of castnet with a minimum square mesh size of ¼ inch to capture baitfish (fry) within 50 feet of the shoreline, except for Cow and Calf rocks • Fishing with hook and line

The marine habitats around Great St. James have abundant coral and seagrass resources. There are numerous ESA listed corals species near the proposed dock locations. *Acropora palmata, Acropora. cervicornis*, *Orbicella annularis, Orbicella franksi* and *Orbicella faveolata* as well as *Dendrogyra cylindrus* are found off all the beach from which the proposed docks and barge landings are planned. At the northern temporary barge landing site, these corals are located primarily to the west in an area of coral boulders and coral rubble. However, there are several small *A. palmata* and several *O. annularis* located on the shoreline cobble which extends out to a depth of 6.5ft. The presence of these species as well as several non-ESA listed *Porites astreoides* has dictated the location of the ramp. The proposed temporary barge landing position avoids all coral and seagrass resources.

Location of the western dock has a cobble beach between two areas of emergent bedrock and boulders. *A. palmata* occur on the emergent bedrock to the north. Offshore the seafloor quickly gives way to exposed pavement. There is a long linear depression right offshore and an old piling lies within this area. The fractured pavement then extends to approximately 11.5ft of depth over the next 100ft heading offshore. The area has some widely-scattered boulders and patchy coral colonization. There are scattered ESA corals including *Orbicella* and *Dendrogyra*. During the first survey, there was a very large *A. palmata* colony immediately seaward of where the old piling lay near shore. However, upon the next visit by the island it was noted that an old boat was tied nearshore apparently attached to the old piling. During a dive, several weeks later it was noted that the boat was gone and the large *A. cervicornis* had been badly broken. The location of all the ESA species has dictated the location of the dock. Approximately 75 corals will require relocation to minimize impact but no listed corals will need relocation.

The southern dock also extends from a cobble beach which gives way to rock pavement and has emergent bedrock and boulders on either side of the beach. There are *Acropora* colonies to the east and farther to the south on the bedrock and boulders. There are *Orbicella* and *Dendrogyra* within the embayment and their locations have dictated the location of the dock. The dock avoids all ESA listed corals but will require the relocation of approximately 75 corals.

This southern dock will include a combination wave attenuator and reef building system. A mitigation plan has been prepared and is found in Appendix B.

Because of the rock occurring in the area, some of the pilings may require socketing and if this is required special water quality measures will be taken. If at all possible a vibra-hammer will be used to drive the piles. A water quality monitoring program has been proposed and the plan is found in Appendix C.

The area is known habitat to protect sea turtles and marine mammals and as such NOAA's Sea Turtle and Smalltooth Sawfish Construction Conditions will be followed as well as NOAA's Vessel Strike Avoidance Measures and Reporting for Mariners.

The property contains 6 salt ponds. The wetland around the salt ponds have been delineated and the delineations were approved by the U.S. ACOE during a previous application for development of the island. This delineation is more than 5 years old, but no wetland disturbance will occur as a result of this project.

The island is known to be habitat to the St. Thomas Tree Boa that is a listed rare and endangered species. The boa as well as another species of snake have been seen during the field studies. There will be special corridors and preservation areas set aside on the island for these species. The access ways to the western and southern docks already exist, but the branch that will need to be developed to the temporary barge landing will be cleared by hand to limit impacts to the tree boas. A tree boa mitigation plan is found in Appendix D.

5.01c Method of Construction

The temporary barge ramp will be the first feature constructed. The landing slab will be framed and poured from shore and the bollards will be installed near the shoreline. The cobble will be excavated with a small machine and silt fencing will be placed seaward off all excavation prior to any work. Divers utilizing a small boat will install the offshore moorings.

The western and southern docks will both be constructed from a barge. A vibratory hammer will be used to drive all the piles if the hardness of the rock allows. If the rock proves to be too hard, the piles will be socketed, placed, and grouted in. All corals will be transplanted out of the footprint and area of impact prior to the start of construction and all turbidity control will be installed prior to any in-water work that day. If socketing is

required, seafloor length curtains will be used and monitored and not removed until water quality within the curtains has fallen to acceptable limits. All corals within the curtain limits will be removed to prevent damage by settling sediments. Once the pilings have been placed, re-enforcing steel will be placed and concrete poured. Turbidity controls will be installed and water quality monitoring will occur during all concrete pouring. Once the piles are completed the pile caps and decking will be placed.

Access slabs will be constructed from shore and silt fencing will be placed seaward of all excavations.

The existing dock will be removed as soon as one of the access docks is functional. The decking and pile caps will be removed from shore. The pilings will be pulled by a small barge and if the pilings proved to hard to pull they will be cut off at mudline.

5.01d Provisions to Limit Site Disturbance

The dock locations have been located to minimize impact on the marine environment by avoiding all ESA listed corals and seagrass beds. Corals which cannot be avoided will be relocated out of the footprint and potential area of impact and turbidity control and water quality monitoring will be implemented. The branch of the road to the temporary barge landing will be first cleared by hand to minimize impact to the VI Tree Boa. A Tree Boa protection plan is found in Appendix D.

5.00e Sedimentation Control Methods to be Implemented.

Silt fencing will be placed seaward of all upland excavation and construction. Turbidity barriers will be installed around all areas of in-work, including pile driving and concrete pouring overwater. If pile socketing is required two rows of turbidity barriers will be installed and these curtains will be seafloor length. These curtains will be maintained until the interior water quality has fallen to acceptable levels.

5.00f Schedule for Construction Activities and Implementation of Sediment Control Measures

Silt fencing will be installed prior to any upland excavation and maintained throughout construction. All construction will be occurring in cobble areas without vegetation, so fencing will be maintained until such time no exposed soil is within the area.

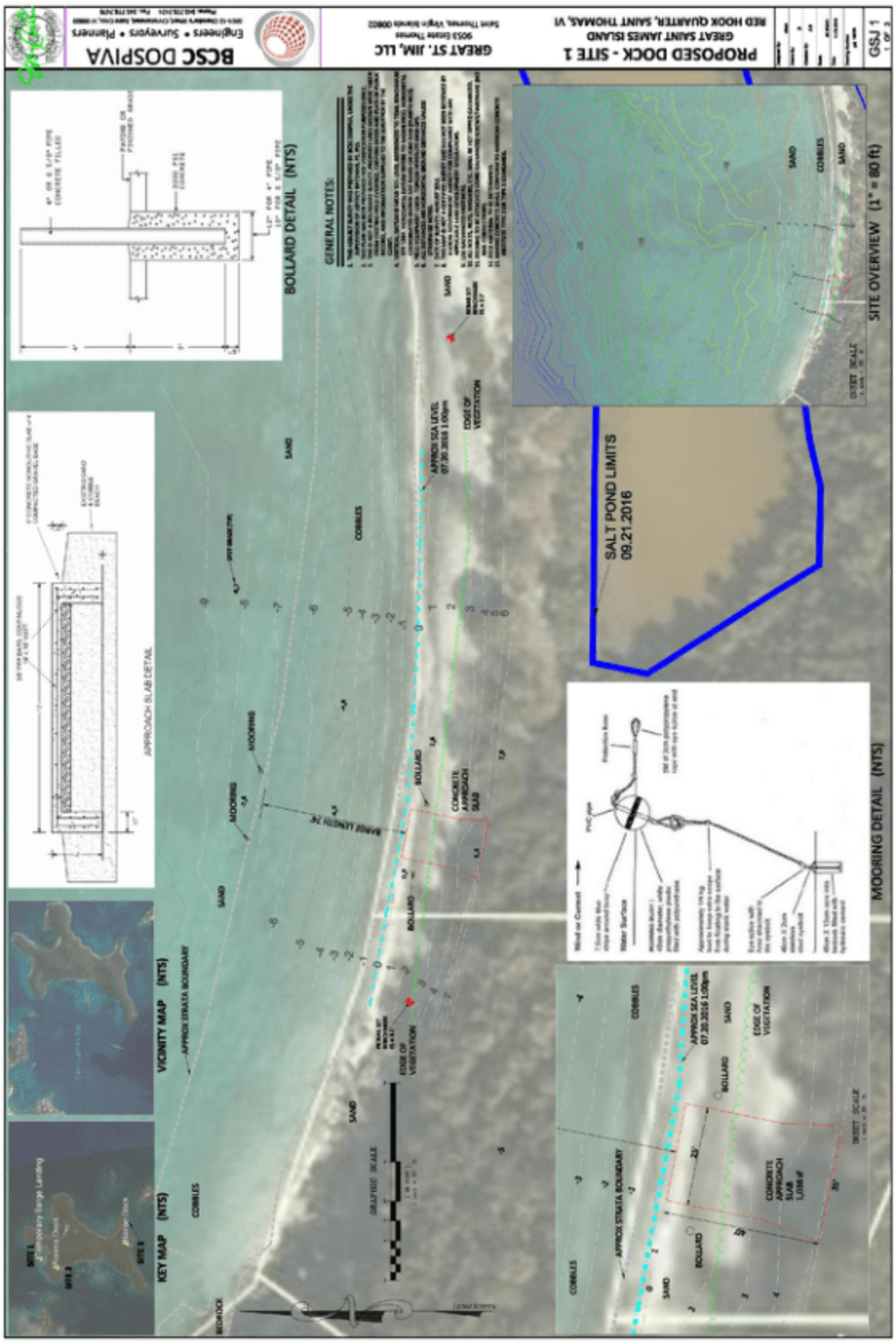
Silt fencing will be installed during the new access road clearing and maintained until such time the roadway is stabilized.

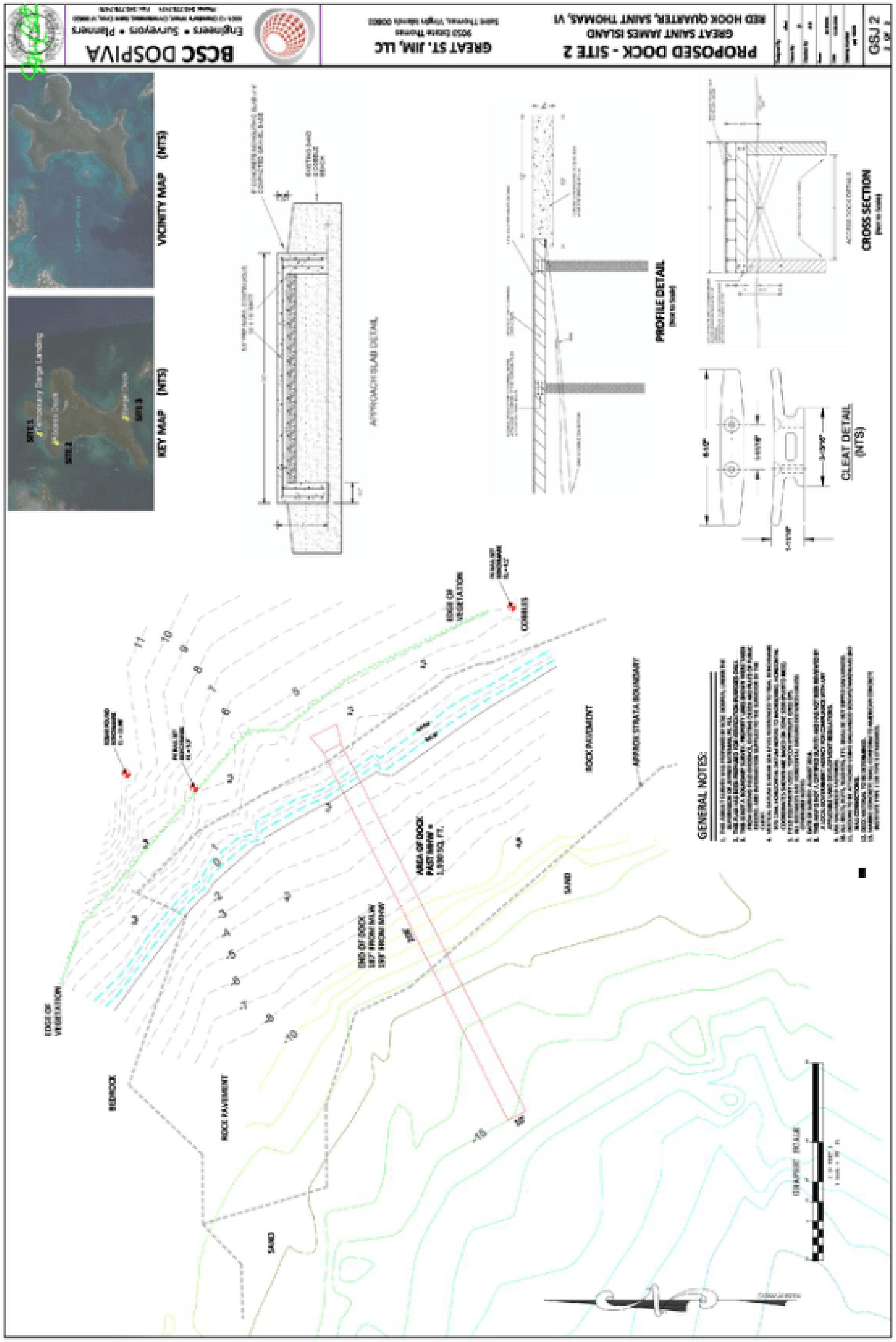
Turbidity barriers will be installed before any in-water work and maintained until interior water quality is within acceptable levels. Double turbidity barriers will be required if pile socketing is required.

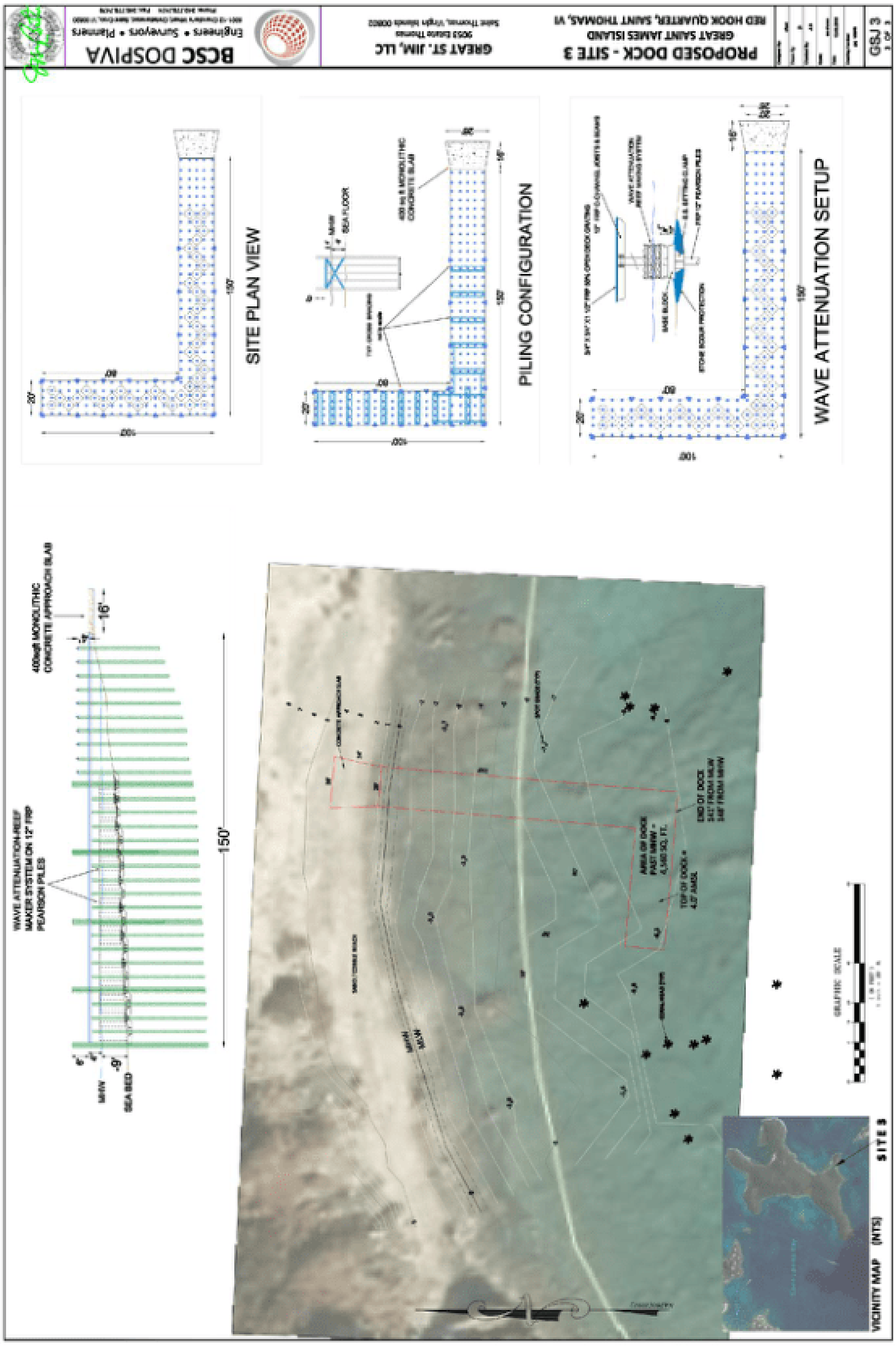
5.00g Maintenance of Sediment and Siltation Control Measures

All silt fencing and turbidity barriers will be inspected and maintained through the construction period. Silt fencing will be inspected daily even when no construction is in progress (over weekends/holidays). Turbidity barriers will be monitored throughout the day and will be repaired and adjusted as necessary as part of the water quality monitoring plan. Curtains will be maintained throughout the day and removed or secured as necessary when no in-water work is ongoing.

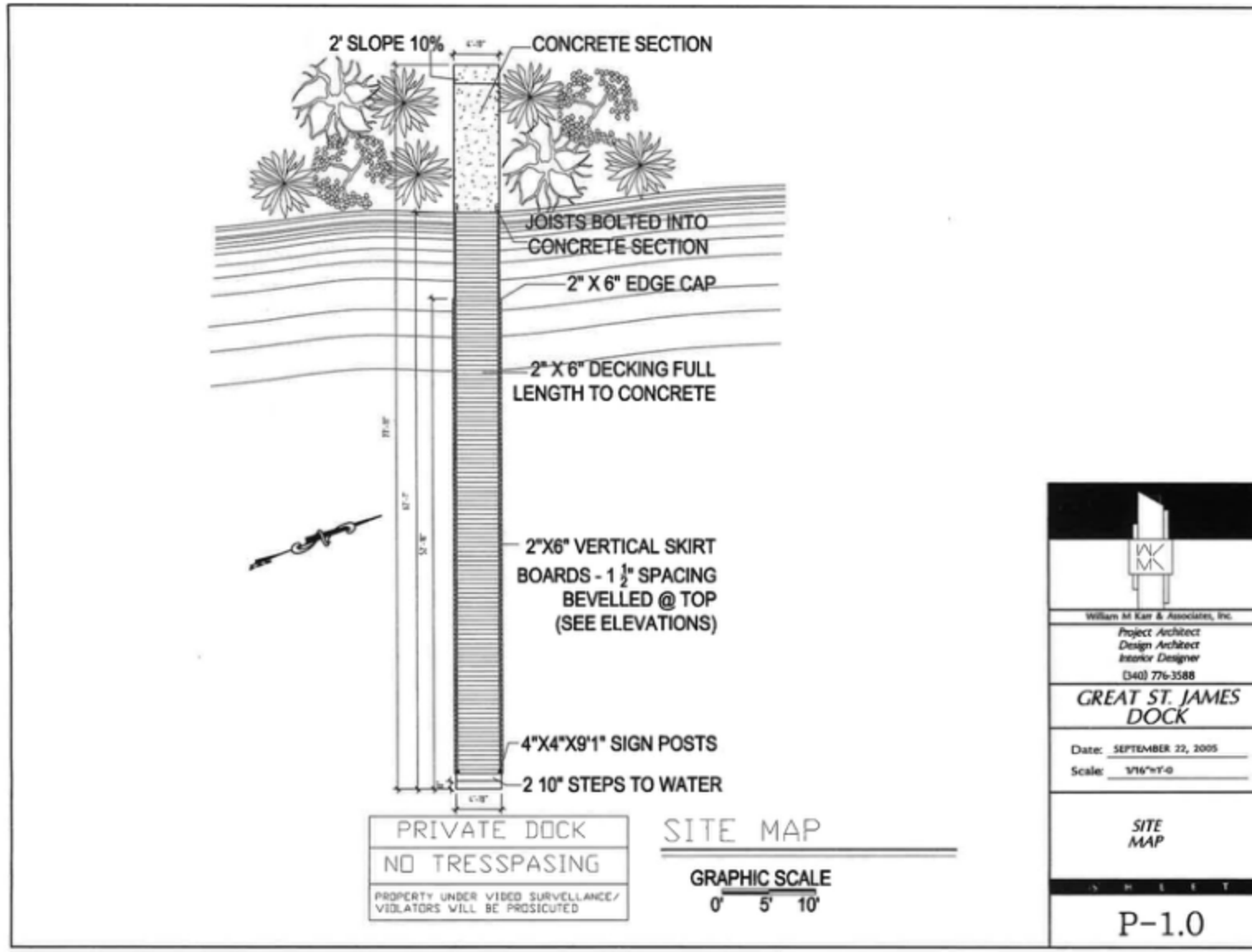
5.02 EXHIBITS AND DRAWINGS

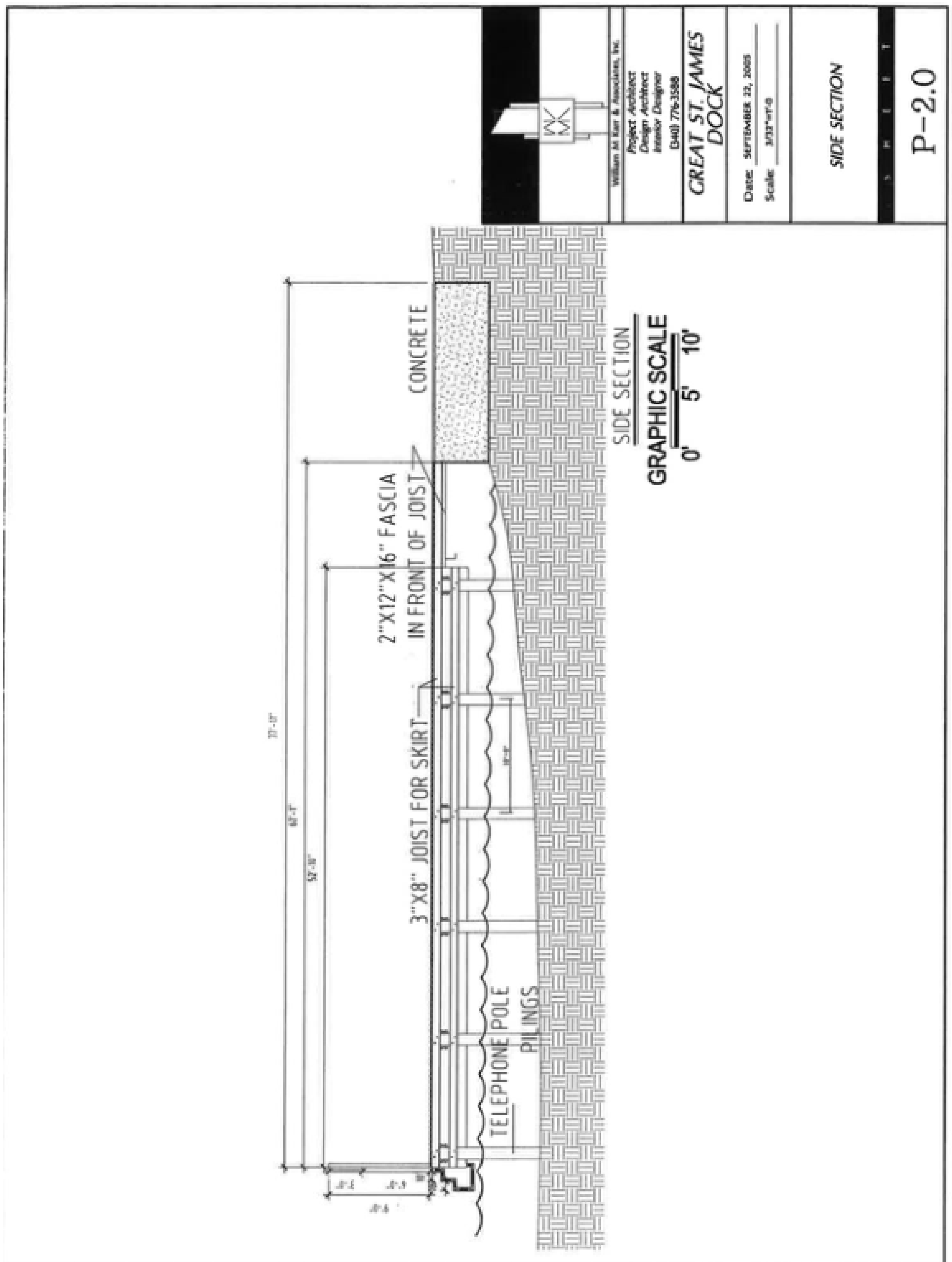



BCSC DOSPIVA
Engineers • Surveyors • Planners
GREAT ST. JIM, LLC
PROPOSED DOCK - SITE 2
GREAT SAINT JAMES ISLAND
RED HOOK QUARTER, SAINT THOMAS, VI
GSJ 2
VICINITY MAP (NTS)
KEY MAP (NTS)
SITE 1
Temporary Barge Landing
SITE 2
Access Dock
SITE 3
Barge Dock
APPROACH SLAB DETAIL
PROFILE DETAIL
CROSS SECTION
CLEAT DETAIL
(NTS)
EDGE OF VEGETATION
COBBLES
BEDROCK
ROCK PAVEMENT
SAND
APPROX STRATA BOUNDARY
END OF DOCK
AREA OF DOCK
GENERAL NOTES:
GRAPHIC SCALE



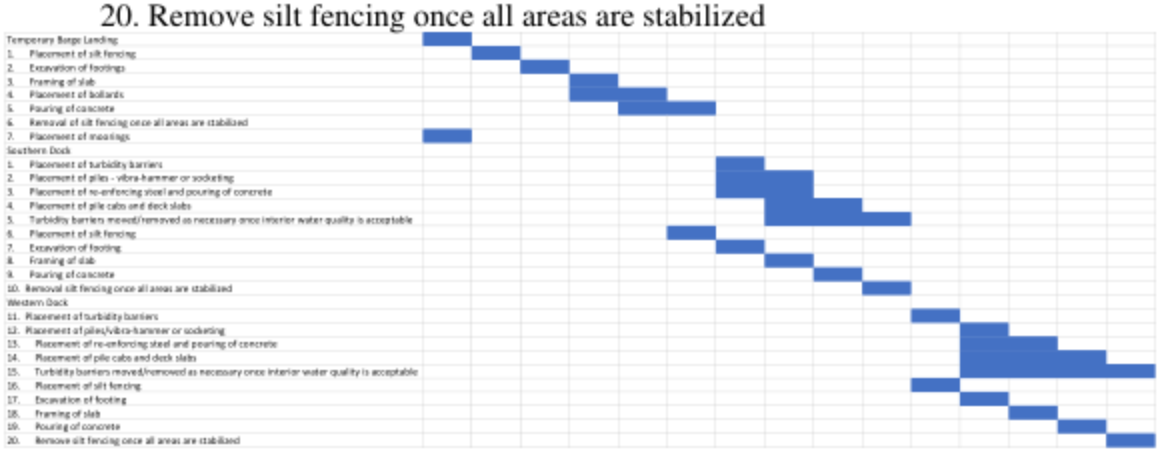
BCSC DOSPIVA
Engineers • Surveyors • Planners
GREAT ST. JIM, LLC
9053 Estate Thomas
Saint Thomas, Virgin Islands 00802
PROPOSED DOCK - SITE 3
GREAT SAINT JAMES ISLAND
RED HOOK QUARTER, SAINT THOMAS, VI
GSJ 3
SITE PLAN VIEW
PILING CONFIGURATION
WAVE ATTENUATION SETUP
WAVE ATTENUATION-REEF MAKER SYSTEM ON 12" FRP PEARSON PILES
400sqft MONOLITHIC CONCRETE APPROACH SLAB
MHW
SEA BED
-9'
16'
150'
100'
80'
20'
400 sq ft MONOLITHIC CONCRETE SLAB
SEA FLOOR
CONCRETE APPROACH SLAB
MHW
MLW
AREA OF DOCK PAST MHW = 4,560 SQ. FT.
TOP OF DOCK = 4.0' AMSL
END OF DOCK 141' FROM MLW 148' FROM MHW
GRAPHIC SCALE
VICINITY MAP (NTS)
SITE 3




CONCRETE
2"X12"X16" FASCIA
IN FRONT OF JOIST
3"X8" JOIST FOR SKIRT
TELEPHONE POLE
PILINGS
SIDE SECTION
GRAPHIC SCALE
0' 5' 10'
William M Karr & Associates, Inc.
Project Architect
Design Architect
Interior Designer
(340) 776-3588
GREAT ST. JAMES
DOCK
Date: SEPTEMBER 22, 2005
Scale: 3/32"=1'-0
SIDE SECTION
SHEET
P-2.0

5.03 Project Work Plan/Schedule

- Temporary Barge Landing
  1. Placement of silt fencing
  2. Excavation of footings
  3. Framing of slab
  4. Placement of bollards
  5. Pouring of concrete
  6. Removal of silt fencing once all areas are stabilized
  7. Placement of moorings
- Southern Dock
  1. Placement of turbidity barriers
  2. Placement of piles - vibra-hammer or socketing
  3. Placement of re-enforcing steel and pouring of concrete
  4. Placement of pile cabs and deck slabs
  5. Turbidity barriers moved/removed as necessary once interior water quality is acceptable
  6. Placement of silt fencing
  7. Excavation of footing
  8. Framing of slab
  9. Pouring of concrete
  10. Removal silt fencing once all areas are stabilized
- Western Dock
  11. Placement of turbidity barriers
  12. Placement of piles/vibra-hammer or socketing
  13. Placement of re-enforcing steel and pouring of concrete
  14. Placement of pile cabs and deck slabs
  15. Turbidity barriers moved/removed as necessary once interior water quality is acceptable
  16. Placement of silt fencing
  17. Excavation of footing
  18. Framing of slab
  19. Pouring of concrete
  20. Remove silt fencing once all areas are stabilized



6.00 ENVIRONMENTAL SETTING AND PROBABLE PROJECT IMPACTS
6.01 Climate and Weather

Prevailing Winds

The Virgin Islands lie in the "Easterlies" or "Trade Winds" which traverse the southern part of the "Bermuda High" pressure area, thus the predominant winds are usually from the east-northeast and east (IRF, 1977). These trade winds vary seasonally (Figure 6.01.1) and are broadly divided into 4 seasonal modes: 1) December to February; 2) March to May; 3) June to August; and 4) September to November. Below are the characteristics of these modes as taken from Marine Environments of the Virgin Islands Technical Supplement No. 1 (IRF, 1977).

December - February

During the winter the trade winds reach a maximum and blow with great regularity from the east-northeast. Wind speeds range from eleven to twenty-one knots about sixty percent of the time in January. This is a period when the Bermuda High is intensified with only nominal compensation pressure changes in the Equatorial Trough. The trade winds during this period are interrupted by "Northerners" or "Christmas Winds" which blow more than twenty knots from a northerly direction in gusts from one to three days. Such outbreaks average about thirty each year. They are created by strengthening of high-pressure cells over the North American continent, which, in turn, allow weak cold fronts to move southeastward over the entire Caribbean region. Intermittent rains, clouds and low visibility accompany these storms.

March - May

During the spring, the trade winds are reduced in speed and blow mainly from the east. Winds exceed twenty knots only thirteen percent of the time in April. The change in speed and direction is the result of a decrease of the Equatorial Trough.

June - August

Trade winds reach a secondary maximum during this period and blow predominantly from the east to east-southeast. Speeds exceed twenty knots twenty-three percent of the time during July. The trend for increasing winds results from the strengthening of the Bermuda High and a concurrent lowering of the pressure in the Equatorial Trough. Trade winds during this period are interrupted by occasional hurricanes.

September - November

During the fall, winds blow mainly from the east or southeast and speeds reach an annual minimum. Only seven percent of the winds exceed twenty knots in October. The low wind speeds result from a decrease in the Equatorial Trough. During this period,

especially during late August through mid-October, the normal trade wind regime is often broken down by easterly waves, tropical storms, and hurricanes.

Storm and Hurricanes

There are numerous disturbances during the year, especially squalls and thunderstorms. These occur most frequently during the summer, lasting only a few hours, and causing no pronounced change in the trade winds.

A tropical cyclone whose winds exceed 74 miles per hour is termed a hurricane in the northern hemisphere, and significantly affects the area. These hurricanes occur most frequently between August and mid-October (Figure 5) with their peak activity occurring in September. The annual probability of a cyclone is one in sixteen years (Bowden, 1974).

Climate

No rainfall data is available for Great St. James. However, based on the vegetation on the island the island which is dry adapted, it is probable that the island gets between 36-45 inches of rainfall a year. Rainfall usually occurs in brief, intense showers of less than a few tenths of an inch and major rainfall events are associated with weather systems (USGS 1998). The Virgin Islands have no sharply defined wet season. The wettest period generally is from September to November, and the driest period is from January to June (USGS 1998). The Cruz Bay which is the closest monitored station receives between 39 inches of rainfall annually. The average rainfall received between 1972 and 2012 is found in the table below.

CRUZ BAY, VIRGIN ISLANDS (671980)
Period of Record Monthly Climate Summary
Period of Record : 1/ 1/1972 to 3/31/2012

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	83.8	84.0	84.1	84.9	86.4	88.0	88.9	89.2	89.0	88.2	86.7	84.6	86.5
Average Min. Temperature (F)	69.6	69.5	69.7	71.7	74.0	75.8	75.9	75.9	75.1	74.2	72.7	70.6	72.9
Average Total Precipitation (in.)	2.65	1.89	1.89	3.49	4.18	2.50	3.41	4.65	6.02	4.81	6.28	3.25	45.02
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 71.2% Min. Temp.: 71.8% Precipitation: 88.2% Snowfall: 93.3% Snow Depth: 93.2%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Table 6.01.1 Climate data from the Southeast Regional Climate Center, University of North Carolina at Chapel Hill.

The difference between the mean temperatures of the coolest and warmest month is only 5 to 7 degrees F. The highest temperatures August or September and the lowest are in January or February. The highest average daytime temperature in the warmest months is about 88 degrees F, and in the coolest months is in the low 80's. Nighttime lows are usually in the mid 70's during the warmer months and in the high 60's during the cooler months (USGS 1998). In general, air temperature in the Virgin Islands ranges between 77 degrees and 85 degrees.

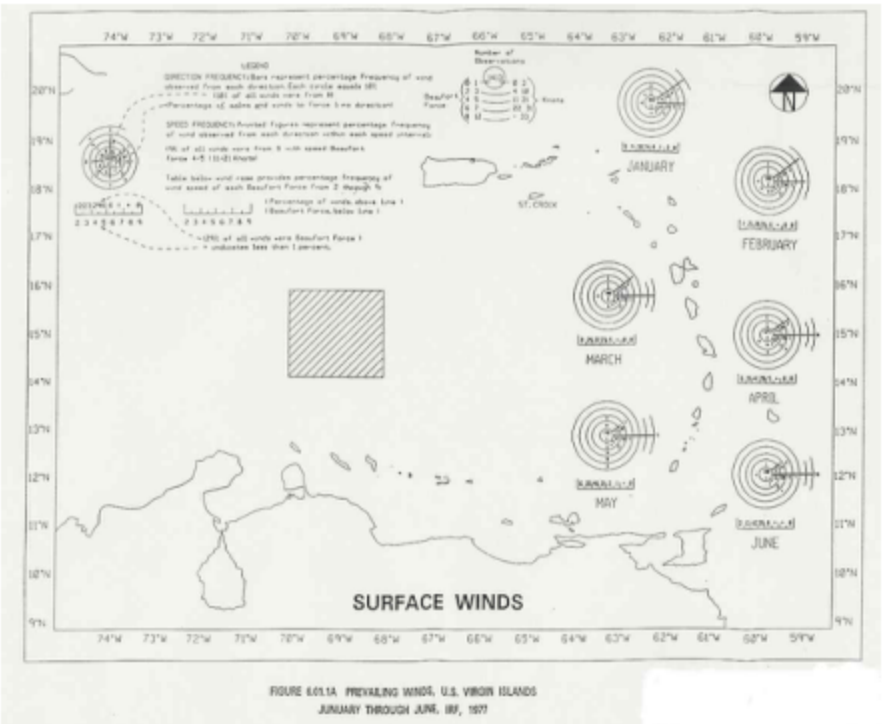


Figure 6.01.1. Prevailing Winds in the U.S. Virgin Islands, January through June

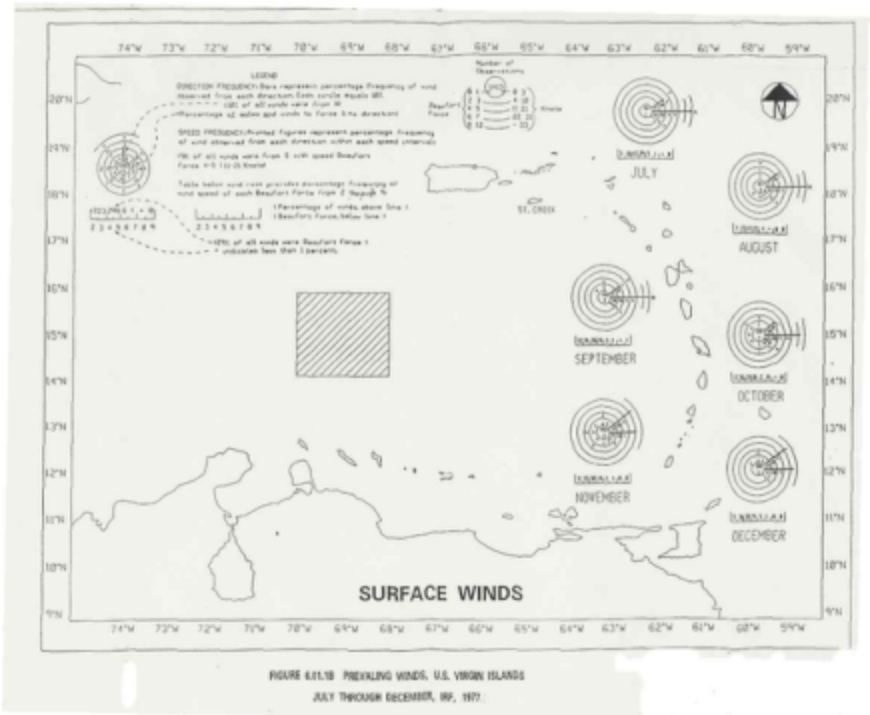


Figure 6.01.2. Prevailing Winds, U.S. Virgin Islands July through December.

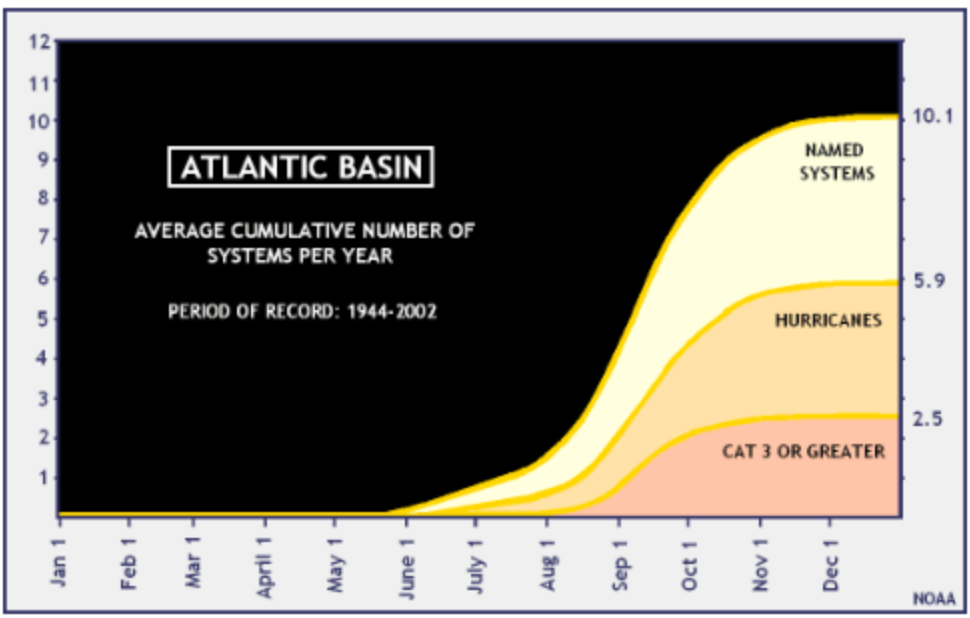


Figure 6.01.3. Tropical Hurricane Frequencies in the Virgin Islands (National Weather Service).

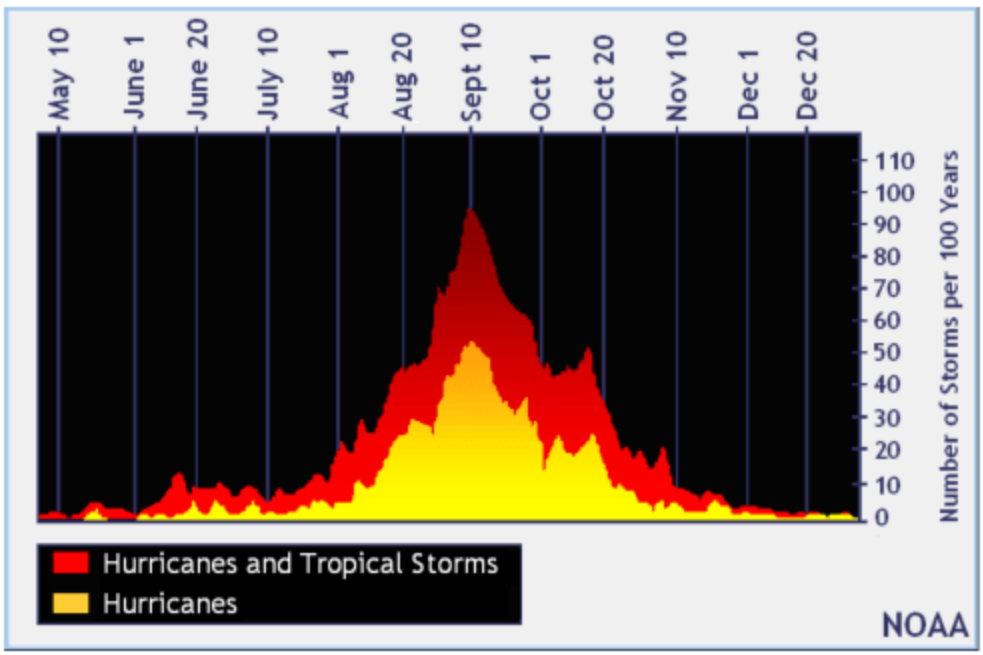


Figure 6.01.4. Tropical Storm and Hurricane Occurrences in the Atlantic (National Weather Service)

6.02 **Landforms, Geology, Soils, and Historic Use**

GEOLOGY OF ST. THOMAS, ST JOHN AND SURROUNDING CAYS

The Virgin Islands are near the northeastern corner of the present Caribbean Plate, a relatively small trapezoidal-shaped plate that is moving eastward relative to the North and South American continents carried on the American plate. The arc of the Lesser Antilles is an active volcanic arc above a subduction zone in which the Atlantic oceanic crust of the American Plate is carried downward under the Caribbean Plate. The closest volcano to the Virgin Islands that is still active is Saba, about 160 km. to the east.
St. John is 7 miles long and 3 miles wide for a total of 12,000 acres or 19 square miles. The oldest rocks of St. John are submarine lavas (keratophyre and spilite), beds of volcanic debris and chert. Associated intrusive rocks of the Water Island Formation is overlain by andesitic volcanic and volcanoclastic rocks of the Louisenhoj Formation which underlies the island of St. Thomas to the east and much of the northwestern portion of St. John. Donnelly (1966) suggested that the Louisenhoj Formation was deposited unconformably on the Water Island Formation after a period of emergence, tilting and erosion, on the slopes and environs of a subaerial volcanic island located roughly between St. Thomas and St. John, an area now occupied by Pillsbury Sound. The youngest layered deposits on St. Thomas are volcaniclastic rocks of the Tutu Formation. Fossils contained in the Tutu Formation suggest that those deposits are of the Early Cretaceous (Albain) Age (Donnelly et. al. 1971). It appears that all of the volcaniclastic rocks of St. Thomas and St. John were deposited in a relatively short period of time spanning 10 to 15 million years approximately 100 million years ago (D. Rankin 1988).

GEOLOGY OF GREAT ST. JAMES

The island which lies off the eastern tip of St. Thomas is irregularly shaped, and has two fault lines running across the island. The island is comprised of 162 acres and rises to an elevation of 186 feet above sea level. The island is a part of the Water Island Formation that was lain down in the Lower Cretaceous. The northern tip is tonalite, gabbro and granite from the tertiary period, the north-western tip as well as the southeastern tip of the island is basalt, and the southwestern tip is undivided, mostly keratophyra. The central portion of the island and the northeastern point is part of the Louisenhoj Formation. The shorelines are a combination of sandy beach, cobble beach and shear rocky cliffs. There are 6 salt ponds on the island.

SOILS OF THE PROJECT SITE

The Custom Soil Survey of the Unites State Virgin Islands has classified 6 soil types on the islands of Great St. James. **Cinnamon Bay gravelly loam (CgC)**, 5 to 12 percent slopes, occasionally flooded is usually found on alluvial fans and terraces adjacent to volcanic uplands. It has a surface layer which is 0 to 5 inches deep that is a very dark grayish brown gravelly loam, the subsurface is 5 to 10 inches deep and is a dark brown gravelly loam. **Redhook extremely stony sand (RdB)**, 0 to 5 percent slopes, rubbly, rarely flooded is usually found on coast beaches that are composed of calcareous sand. It has a surface layer 0 to 7 inches deep of dark brown extremely stony sand, underlain with 7 to 10 inches of brown very stony and 10 to 16 inches of very pale brown very gravelly sand below which is 16 to 60 inches of white very gravelly sand. **Salt flats ponded (SaA)** consist of area of unvegetated saline flats, saline marshes and salt ponds. The soils are very deep and poorly drained, strongly saline and frequently ponded for very long periods. **Southgate-Rock outcrop complex (SrE)**, 20 to 40 percent slopes is found on the summits and side slopes of volcanic hills and mountains. It has a surface layer of 0 to 5 inches of brown gravelly loam and a subsoil of 5 to 10 inches of brown very gravelly loam underlain by 10 to 17 inches of weathered igneous bedrock and 17 to 60 inches of unweathered igneous bedrock. **Southgate-Rock outcrop complex (SrF)**, 40 to 60 percent slopes is found on the summits and side slopes of volcanic hills and mountains. It has a surface layer of 0 to 5 inches of brown gravelly loam and a subsoil of 5 to 10 inches of brown very gravelly loam underlain by 10 to 17 inches of weathered igneous bedrock and 17 to 60 inches of unweathered igneous bedrock. **Solitude gravelly fine sandy loan (SoA)**, is found in areas that are adjacent to saline marshes, flats and salt ponds and are a mixture of terrestrial and marine sediments.

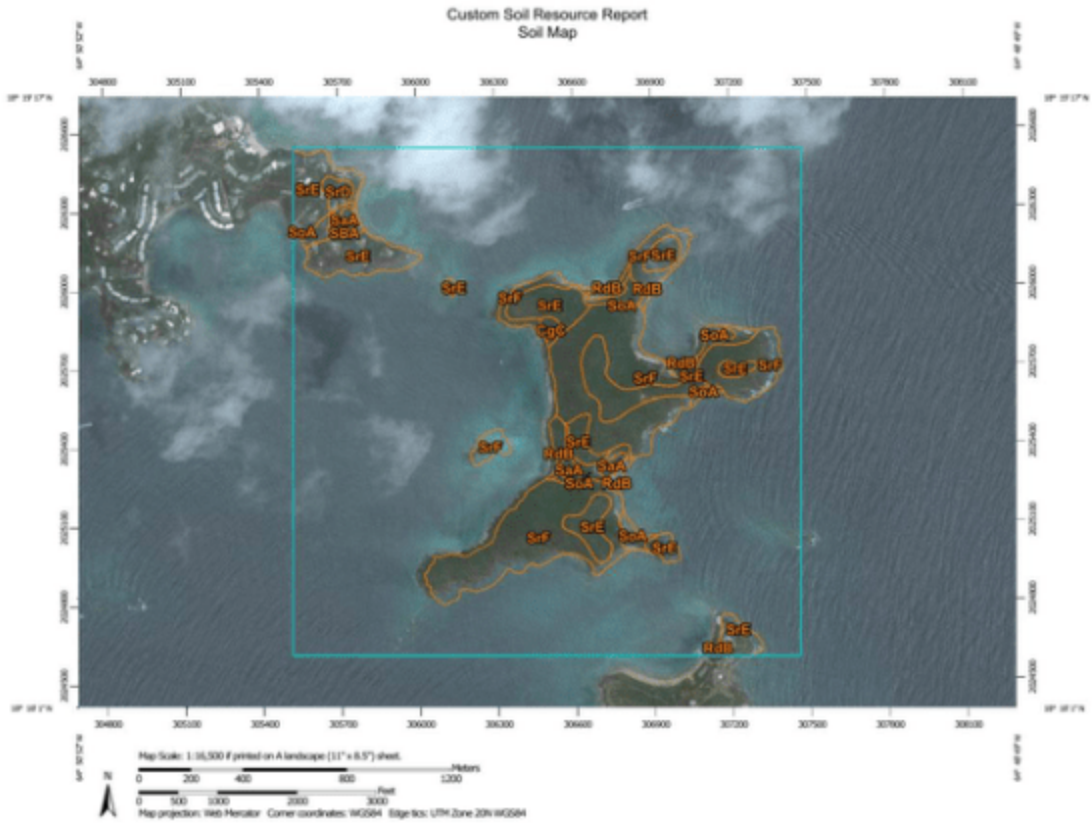


Figure 6.02.1 Custom Soils map of the project area (USGS Custom Soil Survey (https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

HISTORIC USE

The archeological survey found no evidence of prehistoric habitation. There are no structures shown on the island before 1760 on any of the historic maps. The island is reported to have been under cultivation since the 1760. Around 1770, a cotton plantation was established and cotton was cultivated until approximately 1815. Great St. James was continuous occupied between 1760 and 1911. Today there is a house and complex located off the northern bay which is often referred to as Shallow Bay

ADVERSE SITE CONDITIONS

The island is protected by its location between St. Thomas and St. John and the surrounding cays. The northern temporary barge landing is protected by the other cays to the north, and St. Thomas and St. John to the west and east. Waves do attenuate in Pillsbury Sound and the area can be effected by large seas and swells. However, there are no offshore structures other than the buoys and barges using the site should be moored no more than a couple of hours.

Under normal sea conditions the Christmas Cove Dock and the Southeastern Dock/Barge Landing are well protected by their locations in relation to the prevailing seas which are

usually from the east, southeast or northeast. During storms and during some periods of the winter, seas can approach from the southwest. The Christmas Cove dock could be effected by waves approaching between 220˚ to 250˚ and the Southwest dock would be effected by waves coming from 210˚ to 240˚. Waves occur from this direction primarily during storm events. When seas become extremely rough or storms approach vessels would be taken to more protected anchorages.

All three sites lie with area VE elevation 8ft where FEMA has determined that the 100-year flood elevation with velocity will be 8ft as shown on FIRM maps 45 and 30 below.

Figure 6.02.2. FEMA FIRM Map Panel 45 of 94.

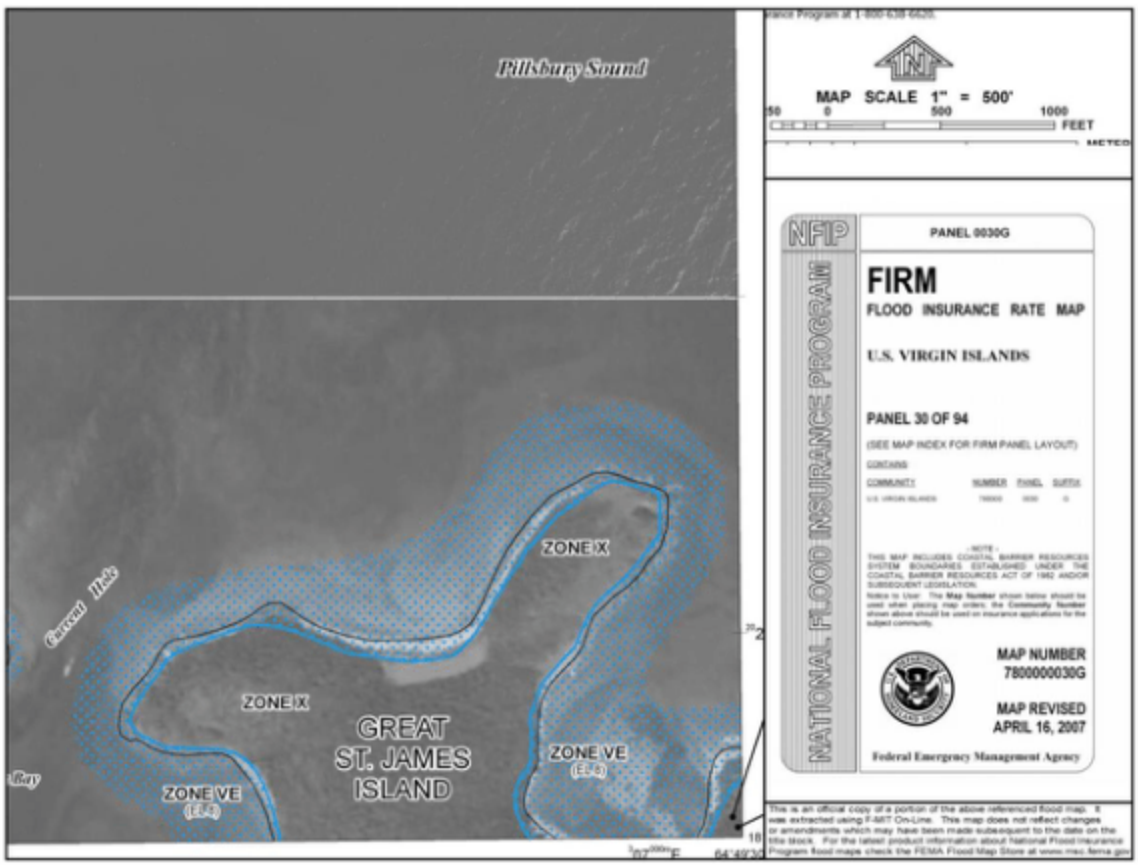


Figure 6.02.3 FEMA FIRM Map Panel 30 of 94.

The U.S. Virgin Islands lie in one of the most earthquake prone areas of the world, and are susceptible to ground shaking, earthquake-induced ground failures, surface fault ruptures and tsunamis (tidal waves) (Hays, 1984). The activity is mostly associated with large-scale tectonic activity or faulting, originating in the Anegada Trough to the northeast of the islands. The trough and its related scarp apparently were thrown up by block faulting during the late Pliocene or early Pleistocene. It is oriented generally northeast to southwest, separating St. Croix from Puerto Rico and the other Virgin Islands. Based on shallow focus earthquakes, the Anegada Fault Trough is estimated to be more than 400 miles in length. There are indications that strike slip movement is occurring, with St. Croix shifting northeast relative to Puerto Rico (Puerto Rico Water Authority 1970). The year 2017 marks the 150th anniversary of the last major earthquake in the islands. This quake, which occurred on November 18, 1867 had an identified intensity of VIII on the Modified Mercalli Scale. Earthquakes of this magnitude have generally been associated with epicentral ground accelerations of between 0.05 and 0.35 gravities. Since the 1868 quake, there has been continuous low intensity activity, all below 6.0 Richter. Thousands of tiny earthquakes are encountered every year on the island.

IMPACT OF SITE GEOLOGY ON THE DOCK

The site geology will have little impact on the construction and placement of the temporary barge landing. Both other docks will be impacted by the site geology which will dictate how the pilings can be installed. It is probable that the pile in the pavement areas will have to be socketed. Once beyond the pavement a vibratory hammer can be utilized.

IMPACT OF THE EXISTING DOCKS ON GEOLOGICAL RESOURCES

No dredging or filling is proposed, therefore there will be negligible impact on the geology of the area.

6.03 Drainage, Flooding, and Erosion Control

6.03a Impacts of Terrestrial and Shoreline Erosion

The project includes the construction of 3 landing or access pads on cobble beaches between rocky headlands. These pads are all limited in size the largest being just over 1000sqft. Due to the small size of these introduced impervious surfaces none should result in any notable change in terrestrial runoff. Both docks are pile supported and in areas of rocky or cobble beaches. Neither dock site has sand deposition on the beach and the cobbles found on both beach are moved by wave action rather than littoral transport. The construction of the docks should not result in any shoreline erosion.

6.03b Relationship of the Project to the Coastal Flood Plain

All three sites lie with area VE elevation 8ft. where FEMA has determined that the 100-year flood elevation with velocity will be 8ft as shown on FIRM maps 45 and 30 provided in Section 6.02.

6.03c Presence and Location of any Critical Areas and Possible Trouble Spots

The island of Great St. James is within the Vessup Bay/ East End Red Hook Area of Particular Concern (APC) (Figure 5.01.1). The Vessup Bay/Red Hook APC is located on the eastern end of St. Thomas and includes Nazareth, Muller, Vessup, Red Hook, Great Bay, Cowpet Bay, Cabrita, Beck and Water Point, Great St. James, Little St, J, and Dog Island.

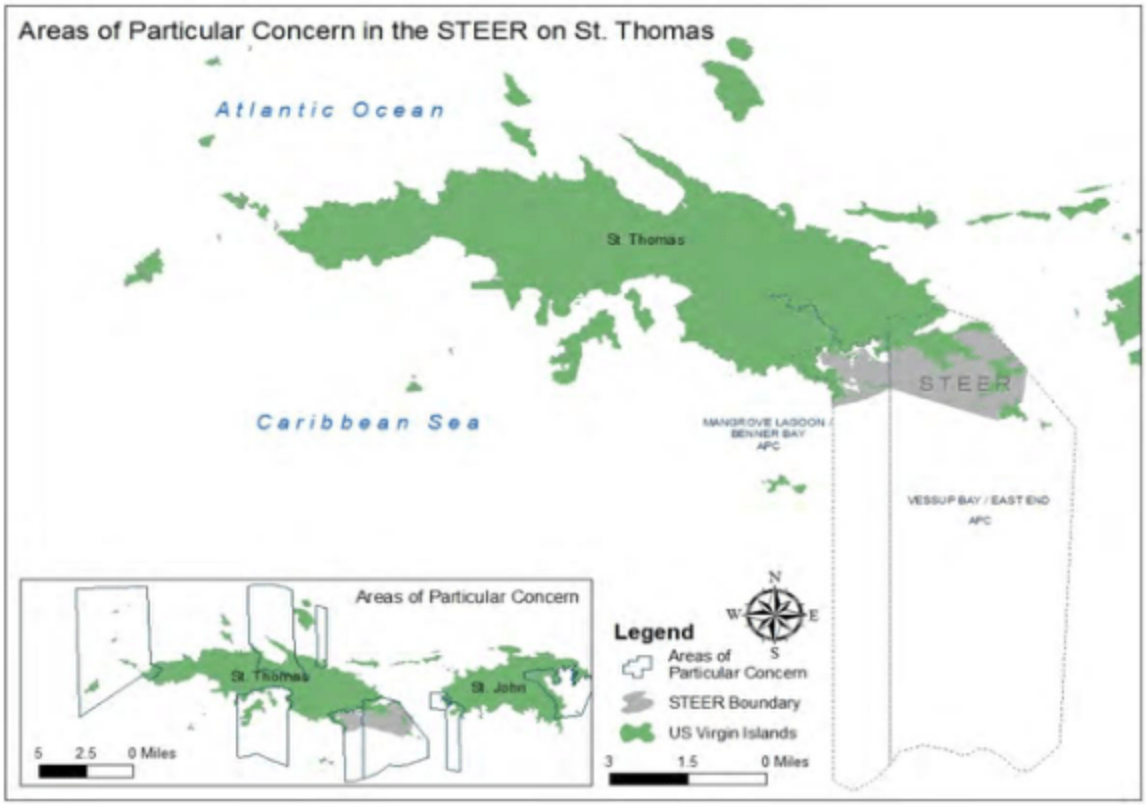


Figure 5.01.1 Areas of Particular Conern (STEER (2011) St. Thomas East End Reserve Management Plan. St. Thomas, USVI.

The island also lies within the St. Thomas East End Reverse (STEER). STEER was developed to help protect coastal resources including seagrass beds and coral reef communities. The island of Great St. James is in area C of the reserve and is referred to as St. James (Figure 5.01.2).

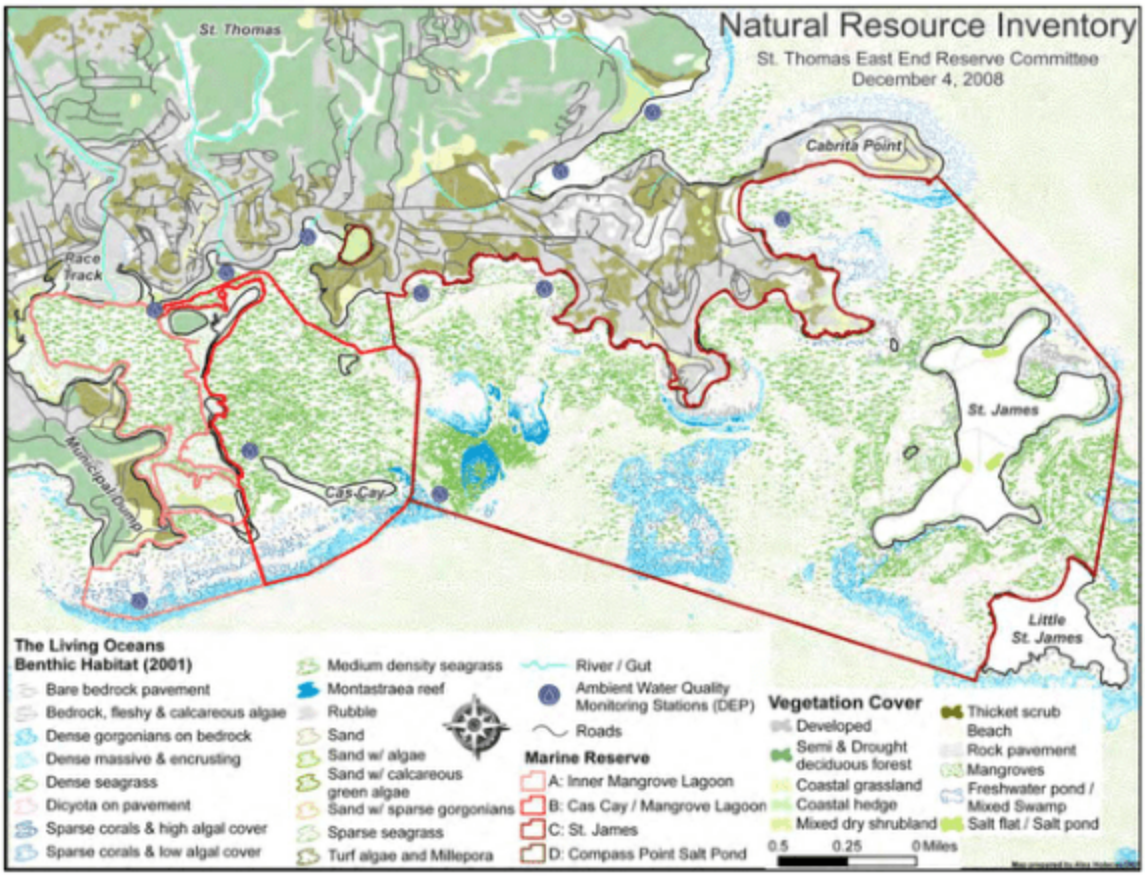


Figure 5.01.2 STEER boundaries. (STEER (2011) St. Thomas East End Reserve Management Plan. St. Thomas, USVI.

The regulations for the St. James are as follows:

St. James Marine Reserve and Wildlife Sanctuary	**Subchapter 96, Section 96-3**	*Prohibited Activities within the St. James MRWS:* • It is unlawful to remove any marine or other wildlife without a permit or specific authorization from the Commissioner
	Subchapter 96, Section 96-4	*Permitted Activities within the St. James MRWS:* Acts permitted, provided a permit is first obtained from the Commissioner: • Scientific collecting in support of and for use in a research project with an approved protocol • The use of castnet with a minimum square mesh size of ¼ inch to capture baitfish (fry) within 50 feet of the shoreline, except for Cow and Calf rocks • Fishing with hook and line

The marine habitats around Great St. James have abundant coral and seagrass resources. There are numerous ESA listed corals species near the proposed dock locations. *Acropora palmata, Acropora. cervicornis*, *Orbicella annularis, Orbicella franksi* and *Orbicella faveolata* as well as *Dendrogyra cylindrus* are found off all the beach from which the proposed docks and barge landings are planned. At the northern temporary barge landing site, these corals are located primarily to the west in an area of coral boulders and coral rubble. However, there are several small *A. palmata* and several *O. annularis* located on the shoreline cobble which extends out to a depth of 6.5ft. The presence of these species as well as several non-ESA listed *Porites astreoides* has dictated the location of the ramp. The proposed temporary barge landing position avoids all coral and seagrass resources.

Location of the western dock has a cobble beach between two areas of emergent bedrock and boulders. *A. palmata* occur on the emergent bedrock to the north. Offshore the seafloor quickly gives way to exposed pavement. There is a long linear depression right offshore and an old piling lies within this area. The fractured pavement then extends to approximately 11.5ft of depth over the next 100ft heading offshore. The area has some widely-scattered boulders and patchy coral colonization. There are scattered ESA corals including *Orbicella* and *Dendrogyra*. During the first survey, there was a very large *A. palmata* colony immediately seaward of where the old piling lay near shore. However, upon the next visit by the island it was noted that an old boat was tied nearshore apparently attached to the old piling. During a dive, several weeks later it was noted that the boat was gone and the large *A. cervicornis* had been badly broken. The location of all the ESA species has dictated the location of the dock. Approximately 75 corals will require relocation to minimize impact but no listed corals will need relocation.

The southern dock also extends from a cobble beach which gives way to rock pavement and has emergent bedrock and boulders on either side of the beach. There are *Acropora* colonies to the east and farther to the south on the bedrock and boulders. There are *Orbicella* and *Dendrogyra* within the embayment and their locations have dictated the location of the dock. The dock avoids all ESA listed corals but will require the relocation of approximately 75 corals.

This southern dock will include a combination wave attenuator and reef building system. A mitigation plan has been prepared and is found in Appendix B.

Because of the rock occurring in the area, some of the pilings may require socketing and if this is required special water quality measures will be taken. If at all possible a vibra-hammer will be used to drive the piles. A water quality monitoring program has been proposed and the plan is found in Appendix C.

The area is known habitat to protect sea turtles and marine mammals and as such NOAA's Sea Turtle and Smalltooth Sawfish Construction Conditions will be followed as well as NOAA's Vessel Strike Avoidance Measures and Reporting for Mariners.

The property contains 6 salt ponds. The wetland around the salt ponds have been delineated and the delineations were approved by the U.S. ACOE during a previous application for development of the island. This delineation is more than 5 years old, but no wetland disturbance will occur as a result of this project.

The island is known to be habitat to the St. Thomas Tree Boa that is a listed rare and endangered species. The boa as well as another species of snake have been seen during the field studies. There will be special corridors and preservation areas set aside on the island for these species. The access ways to the western and southern docks already exist, but the branch that will need to be developed to the temporary barge landing will be cleared by hand to limit impacts to the tree boas. A tree boa mitigation plan is found in Appendix D.

6.04 Fresh Water Resources

There are no freshwater resources on the island of Great St. James. There is no potable water use planned for either dock or the temporary barge landing.

6.05 Oceanography

6.05a Sea Bed Alteration

Great St. Jim, LLC is seeking to construct two docks, one of which is a combination dock/barge landing and a temporary barge landing to provide access to Great St. James Island. A detailed study was conducted around the entire island to determine suitable locations for the dock locations and sites with the least environmental impact were chosen.

A temporary barge landing is being proposed on the northwestern facing embayment. The barge landing can be quickly constructed and utilized while the combination dock/barge landing on the southeastern side of the island is constructed. This site is to the west of the sand pond and its associated wetlands. The landing includes a shoreline ramp which is 25ft wide and 40ft in length extends to the Mean Water Line (MWL). Two bollards will be placed to either side of the ramp and two moorings will be installed 75ft offshore on either side of the ramp in just over 7ft of water depth. This will allow barges to moor rather than to use their props to stay in place and will minimize bottom disturbance. The moorings will be installed using helix anchors and will use floating lines as to not disturb the seafloor when not in use. The landing area is free of coral colonization and just offshore there is very sparse seagrass colonization.

The western dock is proposed on the northern end of Christmas Cove. Historically there was a dock in this location and there are still old concrete piles lying in the shallows of this site. The proposed dock will be 10ft in width and 195ft in length extending 187ft from MLW and 193ft from mean high water (MHW). The dock will connect to an access slab which is 12ft x12ft and the slab will be 2ft thick. All the ESA listed coral species within the area were located with GPS and the dock footprint avoids the ESA listed species. The dock extends beyond the nearshore hardbottom out to a depth of 15ft into an area of uncolonized sand to allow for safe dockage for deeper vessels and minimum impact by vessels to the seafloor. The dock will require sixty-six 12in diameter piles.

The southern dock is located off the point closest to Little St. James. The ESA corals were located by GPS and survey and the dock was designed to avoid these coral species. The dock is "L" shaped and is 20ft wide (to allow for barge landing) and 150ft in length extending 141' from MLW and 148' from MHW, the "L" turns east and is 20ft wide and 100ft in length. A combination wave attenuating/reef creating system is proposed beneath the dock which will allow for more protected docking inside the "L" when seas from the south are rough. The dock has 9ft of water depth off the southern end and 7ft to 8ft on the inside of the "L". The dock has been designed so that barges can approach and land on the south end of the dock while vessels can dock along the "L". There will be 152 12in diameter dock piles and forty-three 12in diameter wave attenuator piles. The attenuator/reef building piles provide substrate designed additional surface to allow colonization by coral and sponge species.

6.05B TIDES AND CURRENTS

The Virgin Islands coastal areas are not subject to significant tidal ranges or tidal currents. Due to the small size of the island, the sea flows around the island causing an average tidal height of only a few inches and maximum change of only a little over a foot. Only very narrow intertidal zones are found because of this lack of tidal amplitude and the steepness of the island rising out of the sea. The tides around Great St. James are primarily semi-diurnal in nature, with two cycles of high and two of low water every 24 hours. The second cycle is often indistinguishable. The mean tides range from 0.8f. to 1.0

ft and the spring tidal ranges reach up to 1.3ft (IRF 1977). There are no notable locally driven tidal currents due to the lack of confinement within the area. NOAA has a tide gauge in Charlotte Amalie which is a southern exposure which has been recording water levels since 1975. The high tide recorded on September 18, 1989 (Hurricane Hugo) was +3.35ft, and in 1995 during Hurricane Marilyn the Charlotte Amalie tide station recorded the highest tide height 3.98ft above Mean Lower Low Water (MLLW). The lowest tide recorded was on February 6, 1985 and was -1.44ft. The tidal ranges of the Charlotte Amalie station are as follows:

Mean Higher High Water	1.09ft
Mean High Water	0.94ft
Mean Tide Level	0.54ft
Mean Sea Level	0.52ft
Mean Low Water	0.13ft
Mean Lower Low Water	0.0ft

There is also a Tide Station in Lameshure Bay, St. John (Station ID: 9751381), the station is located at latitude 18° 19.0' N and longitude 64° 43.4' W and has a mean tidal range of 0.72 ft and a diurnal range of 0.82 ft.

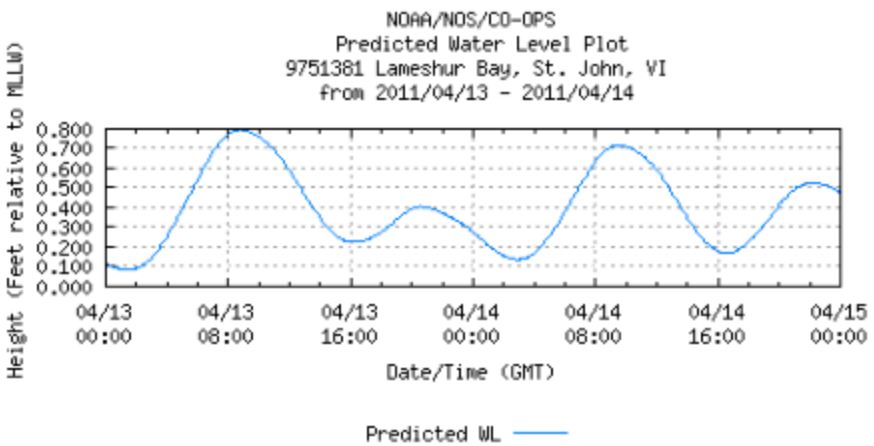


Figure 6.05.1. Tidal data from the Lameshure Tidal Station (NOAA Buoys)

The surface currents throughout the Caribbean are driven by the North Equatorial Current that runs through the islands west-northwest and then joins the Gulf. These currents change very little from season to season with the currents coming more from the south during the summer months. Because of the shallowness of the Caribbean basin of less than 1000m, mainly surface water from the Atlantic flows through the islands. The westerly drift of the Caribbean Current sweeps into Pillsbury Sound from the Southeast, seeking a way North through the barrier set up by the Cays to discharge along the North Shore of St. Thomas and out into the Atlantic. The current flows past Great St. James in a northwesterly direction. Due to the formation of the island and the normal water movement into Pillsbury Sound from the south, there is frequently a strong southerly

current running between Great St. James and Little St. James and through Current Cut.

6.05C WAVES

The deep-water waves off Great St. James are primarily driven by the northeast trade winds that blow most of the year (Figure 6.05.1). Waves average from 1 to 3ft from the east, 42% of the time throughout the year (IRF, 1977). For 0.6% of the time easterly waves reach 12ft in height. The southeasterly swell with waves one to twelve feet high become significant in late summer and fall when the trade winds blow from the east or when tropical storms and hurricanes pass the islands at a distance to the south. During the winter months, long length, long period northern swells develop to a height of 1 to 5 feet. The USACE Hindcast Studies for buoys 61022 and 61025, the two buoys whose waves patterns directly affect the island, show that a majority of the waves which occurred approach from easterly directions.

6.05D MARINE WATER QUALITY

The dock locations all have excellent water quality. During baseline studies for the dock construction on Little St. James, baseline samples taken between Little St. James and Great St. James found turbidities to range from 0.27 NTU to 1.17 NTU under normal sea conditions. Samples taken those previous studies are shown below.

DATE	TURBIDITY NORTH	TURBIDITY EAST	TURBIDITY SOUTH	TURBIDITY WEST
10/06/03	0.67	0.56	0.73	0.54
10/17/03	0.44	0.74	0.67	0.37
10/24/03	0.65	0.71	0.87	0.47
2/6/04	0.54	0.36	0.74	0.85
2/14/04	0.64	0.86	0.78	0.34
2/17/04	0.85	0.76	0.56	0.65
12/28/04	0.45	0.78	0.67	0.54
1/12/05	0.76	0.87	0.34	0.56
2/15/05	0.56	0.67	0.58	0.75
4/30/05	0.32	0.45	0.71	0.60
10/12/05	0.56	0.72	0.39	0.61
10/15/05	0.63	0.58	0.79	0.83

Turbidty measurements (NTU) during studies for this project as as follows

Date/Location	Temporary Barge Landing	West Dock	Southeast Dock
3/20/2016	0.91	0.88	0.75
4/15/2016	0.57	0.71	0.71
6/1/2016	0.49	0.91	0.87
6/27/2016	0.80	0.54	0.66
7/11/2016	0.76	0.76	0.61
8/2/2016	0.93	0.79	0.87
8/23/2016	0.62	0.82	0.68
9/3/2016	0.63	0.75	0.74

The offshore waters are classified as Class B and the best usage of the water is listed as the propagation of desirable species of marine life and for primary contact recreation (swimming, water skiing, etc.). The quality criteria include, dissolved oxygen not less than 5.5mg/l from other than natural conditions. The pH must not vary by more than 0.1 pH unit from ambient; at no time, shall the pH be less than 7.0 or greater than 8.3. Bacteria (fecal coliform) cannot exceed 70 per ml, and turbidity should not exceed a maximum nephelometric turbidity unit of three (3) NTU.

IMPACT OF PROPOSED PROJECT

The temporary barge landing and docks will replace the use of the landing and dock in Shallow Bay. Both frequently result in the suspension of sediment from the seafloor. The upland construction associated with the docks and landing are minor and with proper siltation control should not result in any impact to marine water quality. The placement of pilings will probably require socketing and could impact water quality. A double set of seafloor length turbidity barriers will be required and all corals will be relocated out the barrier footprints. Barriers must be maintained until such time the interior water quality is acceptable. If properly implemented and monitored the socketing should have only a very short-term limited impact on water quality. A Water Quality Monitoring Plan is proposed and is found in Appendix C. Once constructed, the docks and landing will have negligible impact on water quality. The docking areas are all deep enough that there should not be an issue with propwash.

The use the docks by vessels will increase the potential for releases of hydrocarbons into the marine environment through spills and exhaust. No fueling or maintenance will be allowed on the docks. To mitigate potential spills, fuel spill supplies will be kept near the base of the docks so that they can be deployed in the event a release occurs. No pumping of bilges or live-a-boards will be allowed on the dock.

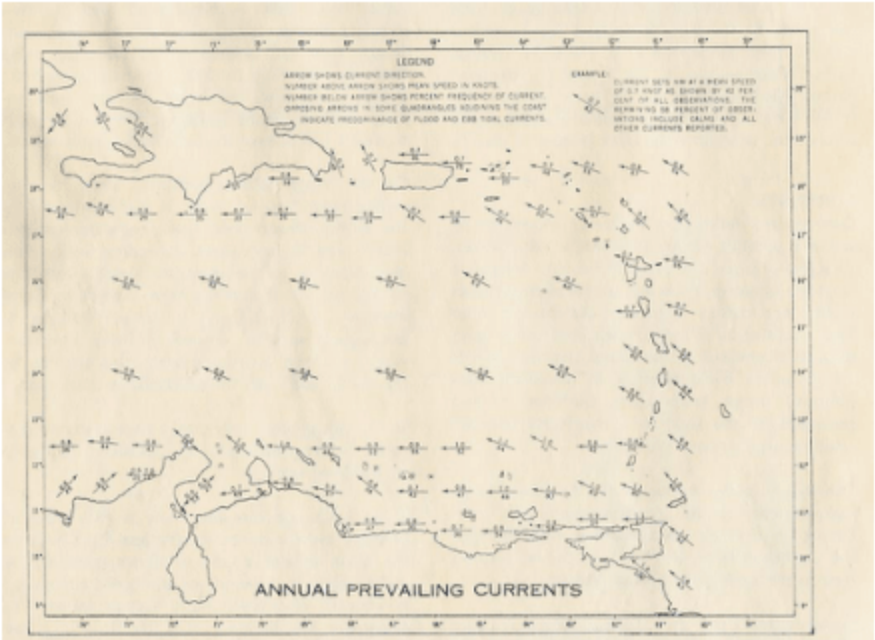
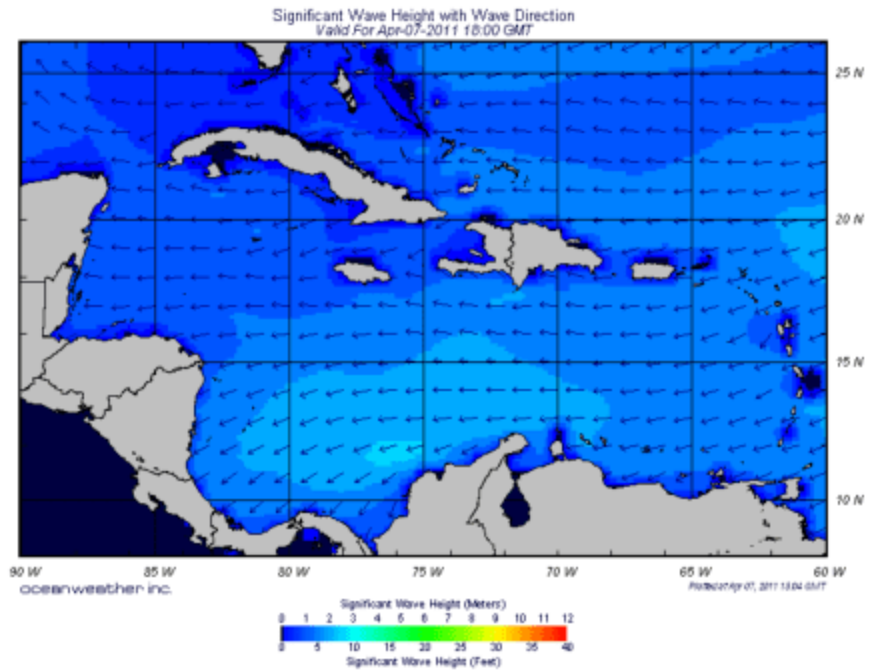


Figure 3. Annual prevailing currents in the Caribbean. From U.S. Naval Oceanographic Office, *Sailing Directions*, 1963.

Figure 6.05.1. Prevailing currents in the Caribbean, IRF 1975.



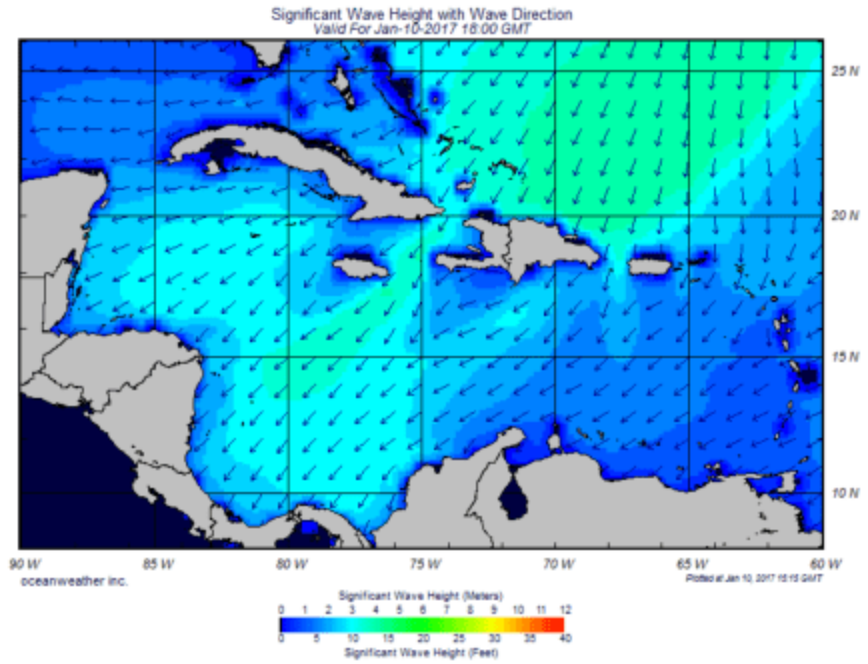


Figure 6.05.2. Currents in the Caribbean April 2011 and January 2017. ([redacted])

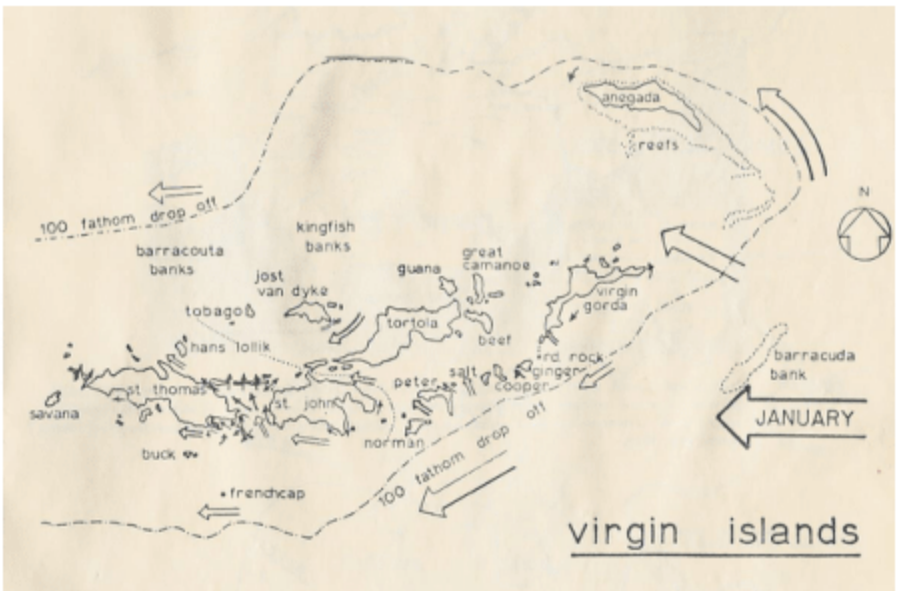


Figure 6.05.3 Prevailing currents off St. John, IRF 1975.

Figure 6.05.4. Wave Roses from the USACE Wave Information Studies for buoy 61022.

6.06 MARINE RESOURSES

Benthic Habitat Description
General

Sandy beaches, cobble beaches and steep rocky shorelines surround great St. James Island. All three of the proposed dock and barge landing sites will extend from cobble beaches. The northern shore where the temporary barge landing is proposed has cobble which extends down to a depth of approximately 7ft and has sparse seagrass colonization within the barge approach. There are scattered corals in the bay to the east and dense seagrasses offshore beyond the landing site. The cobble within the landing site is only colonized by fire coral. The emergent bed rock to both the east and west sides of the bay are colonized by corals species including ESA corals.

The northern portion of Christmas Cove where the Access Dock is located has emergent bedrock to either side of the small embayment which are colonized by coral and sponge species. Rock pavement and scattered boulders extends offshore to a depth of 11.5ft where it gives way to a sandy bottom. Corals and sponges colonize the rock pavement and scattered boulders. There is seagrass off shore but it begins beyond the terminus of the proposed dock.

The southern facing dock is off a cobble beach between to rocky shorelines. There is rock pavement extending off shore and then broken rock pavement further out. Corals and sponges colonized the rock pavement.

ESA listed coral species are found at all three locations and the Nassau Grouper (Epinephelus striatus) was seen off both the Christmas Cove and southern dock site.

Methods

The NOS St. John and St. Thomas Habitat Map Tile 16 (Figure 6.06.1) of the Great St. James area shows the colonized rock pavement and bedrock as well as the offshore seagrass beds. The seagrass beds are not as continuous near the shoreline as shown, and the offshore area at both Christmas Cove and the southern dock site are colonized pavement rather than bedrock right off the cobble beaches and on the northern facing beach the pavement doesn't extend completely across the bay as shown. Surveys were done on Scuba and *Acropora palmata* and *Acropora cervicornis, Dendrogyra cylindrus, Orbicella annularis, Orbicella faveolata, Orbicella franksi,* and *Mycetophyllia ferox* were mapped so that they could be avoided. Habitat boundaries were marked with GPS and/or by the surveyor for accuracy. Percent abundance was determined along transect lines and utilizing a meter square.

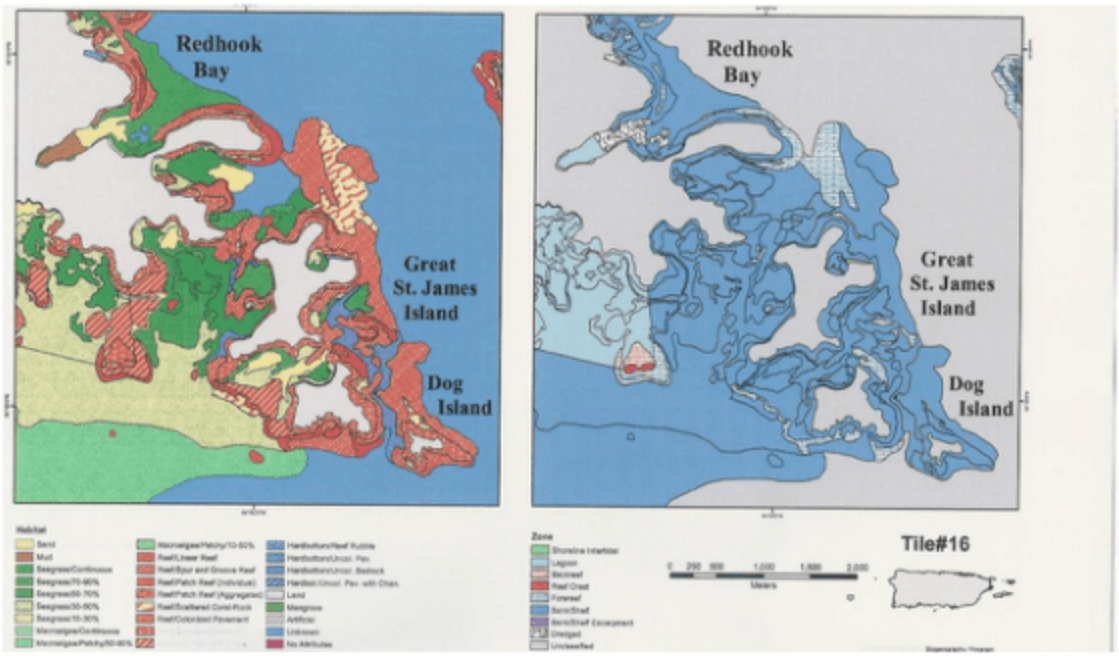


Figure 6.06.1 NOAA Benthic Habitat Map

Benthic Resources

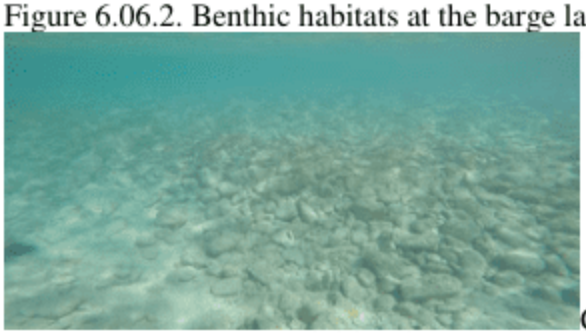
Great St. James is located off Water Point on the eastern end of St. Thomas. This oddly shaped island has a variety of shoreline types and six salt pond/wetland habitats. There is a well-protected shallow northern bay where an existing dock is located. Shallow Bay is colonized by seagrass which includes *Thalassia testudinum, Syringodium filiforme* and *Halodule wrightii*. Recently the sea vine *Halophila stipulacea* has colonized areas which have been disturbed. The densest seagrass beds once lay near shore and to the east of the dock. Over the last several years these beds have been highly disturbed. The peninsula to the east of this point is surrounded by rocky headlands and is a very exposed environment. The rocky cliffs extend below the sea surface and due to the intense wave action, the shallowest areas are not colonized. By a depth of 8ft-10ft the rocky substrate becomes colonized by a wide variety of corals and sponges. The slope is steep offshore and the water reaches a depth of 40ft to 50ft relatively close to shore. The rocky slope gives way to a cobble then sand bottom and there are sparse to moderately dense seagrass beds that extend seaward. The rocky shoreline continues around to the south, with coral colonized nearshore hardbottom and seagrass colonized sand and cobble further offshore. There are two cobble beaches further to the south divided by a small rocky headland, there is some colonized beach rock nearshore and shallow seagrass beds off shore. The shoreline facing St. James Cut and the southern end of the island is rocky. This area has limited coral colonization in the inner tidal zone giving way to an abundant diverse coral community on the submerged rocky slopes. The rock is relatively steep with numerous grottos, and caves, and gives way to a cobble/sand bottom at around 20ft to 25ft. There are moderate to dense seagrass beds off shore. The Stragglers lay off the southern most point of the cay, and like the southern shoreline of the island there is minimal colonization in the inner tidal areas of the emergent rocks with coral colonization and

diversity increasing with depth. The western shoreline is well protected and is a combination of rock and sandy beach. The water deepens much more gradually on this side of the island. In the areas with rock along the shoreline are colonized by corals and sponges. The less colonized inner tidal area is much less defined here due to the more protected nature of the site. Within Christmas Cove there is a rock groin like structure that extends into the bay near the center of the embayment. Offshore to the north of the groin there is a small beach rock shelf and then a strip of uncolonized sand before sparse to moderately dense seagrass beds begin. The site is currently used by boats anchoring adjacent to the beach.

To the south of the groin there is a beach rock shelf with moderate coral colonization which falls off to depth of over 6ft only 40ft from shore and there is a board area of uncolonized sand out to a depth of 10ft before reaching the moderately dense seagrass beds and open sandy plains. The shoreline becomes rocky again to the north along Current Cut and the area is more subject to wave and current action. There is coral colonization along the rocky shoreline and on the rock pavement that extends off shore. The north-facing bay to the east of Current Cut is a mixture of cobble and rocky shoreline with a small sandy beach in front of the salt pond. Where rock is present there is coral colonization and in the open sandy areas there is moderate to dense seagrass colonization.

The temporary barge landing is located at the western end of the north-west bay. The landing. The beach is cobble and the cobbles extend out to a depth of 7ft at the landing site. The landing site contains some scattered *Millepora complanata*, but no hard-coral species. There are scattered corals to the east in the cobble including a few *Orbicella annularis* and *Acropora palmata*. *Porites astreoides* is the most abundant coral in the cobble to the east. The location for the barge ramp was chosen due to the presence of corals and coral colonized boulders throughout the bay to the east. To the east in the bay there are numerous *Orbicella annularis*, *O. faveolata* and *Dendrogyra cylindrus* as well as other coral species. Offshore there are dense seagrass beds consisting of *Thalassia testudinum* and *Syringodium filiforme*, however these are greater than the 75ft off shore which the barge will extend while moored. There very sparse *Syringodium* colonization within the barge approach, representing less than 5% bottom coverage.

Figure 6.06.2. Benthic habitats at the barge landing.

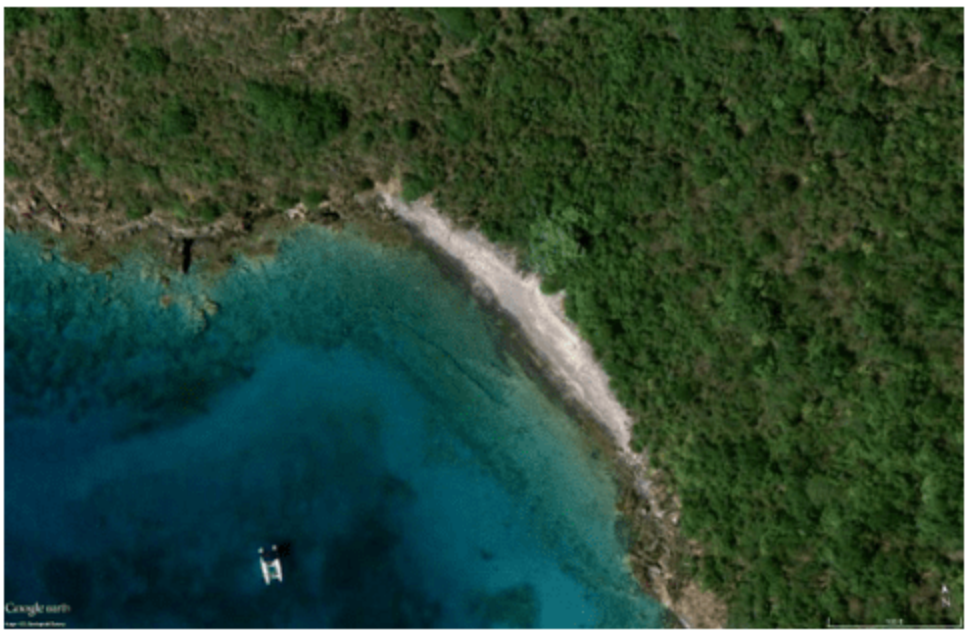

Cobble in footprint of barge mooring site


Seagrass offshore well beyond the cobble

 Sparse seagrass in the immediate barge approach

The access dock in Christmas Cove is near the location of an old historic dock. The beach is a mixture of sand and cobble. There is rock pavement extending offshore and there is an area of cobbles in the center of this area which is uncolonized out to a depth of 5ft. The rock pavement has various depressions and breaks and within one of these depression is a pile from the old concrete dock. Beyond the depression, the water deepens quickly out to a depth of 12ft. The rock pavement is colonized by *Diploria strigosa, D. labyrinthiformis, Orbicella annularis, O. franksi, Porites astreoides, P. porites, Dendrogyra cylindrus, Gorgonia sp*. and *Millepora sp*. and the sponges *Aplysina fulva, Amphimedon compressa* and *Ircinia* sp. Coral colonization increases on either end of the small embayment and with depth. Beyond the nearshore hard bottom, approximately 120ft off shore the bottom becomes sandy. There is a minimally colonized area before the bottom begins to become colonized by *Syringodium filiforme* which slowly grades into a mixed bed of *Thalassia testitudium* and *Syringodium*. The exotic seavine *Halophila stipulacea* is also present. This seavine was not present in 2006.

There was a very large intact *Acropora cervicornis* in the center of the bay just off the old dock piling in the depression early in 2016. However, a boat moored on the old piling and on a subsequent dive the *Acropora* was found completely broken. Pieces of this *Acropora* remain. There are *Acropora palmata* in the shallows to the north of the proposed dock location both on the cobble and bedrock.



The bottom formation is clearly visible this photograph.

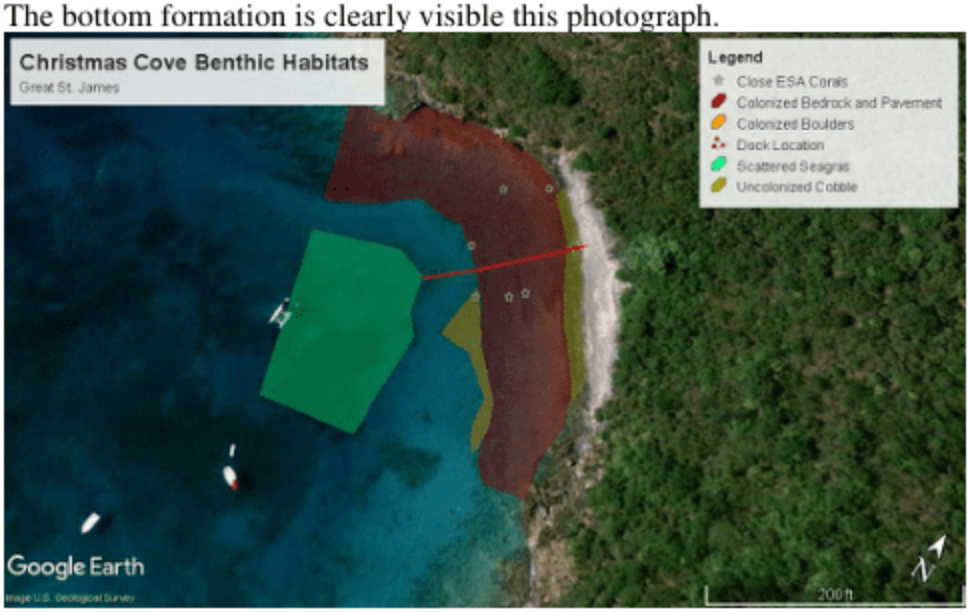
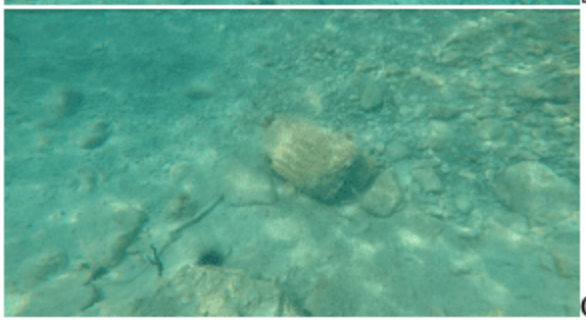


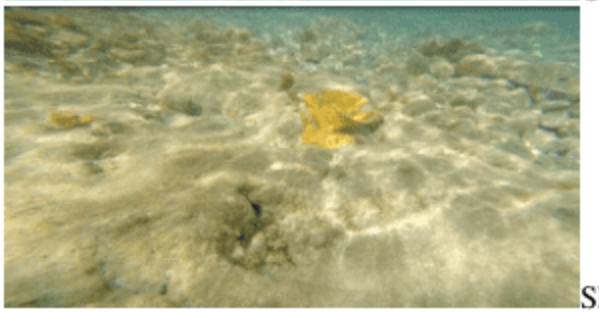
Figure 6.06.3 Benthic Habitats Christmas Cove

Cobble with minimal colonization

Sand beyond colonized pavement



Old piling



Shallow *Acropora*

Broken *A. cervicornis*

The Access Dock/Barge dock is located in the bay closest to Little St. James. Like the other two bays there is cobble on the shoreline which extends into the sea to 2ft to 4ft of water depth. Offshore there is pavement with boulders and odd rock formation. The area is colonized by scattered corals which are most abundant on the boulders. *Orbicella annularis, O. franksi, O. faveolata, Dendrogyra cylindrus, Porites astreoides, P. porites, Diploria strigosa, D. clivosa. D labyrinthiformis Gorgonia sp.* and *Millepora sp.* and sponges *Aplysina fulva, Amphimedon compressa and Ircinia* sp. are present. *Acropora palmata* is present on the headlands to the east and south.

There are scattered boulders and broken pieces of bedrock offshore, most of which are colonized by corals and sponge species.

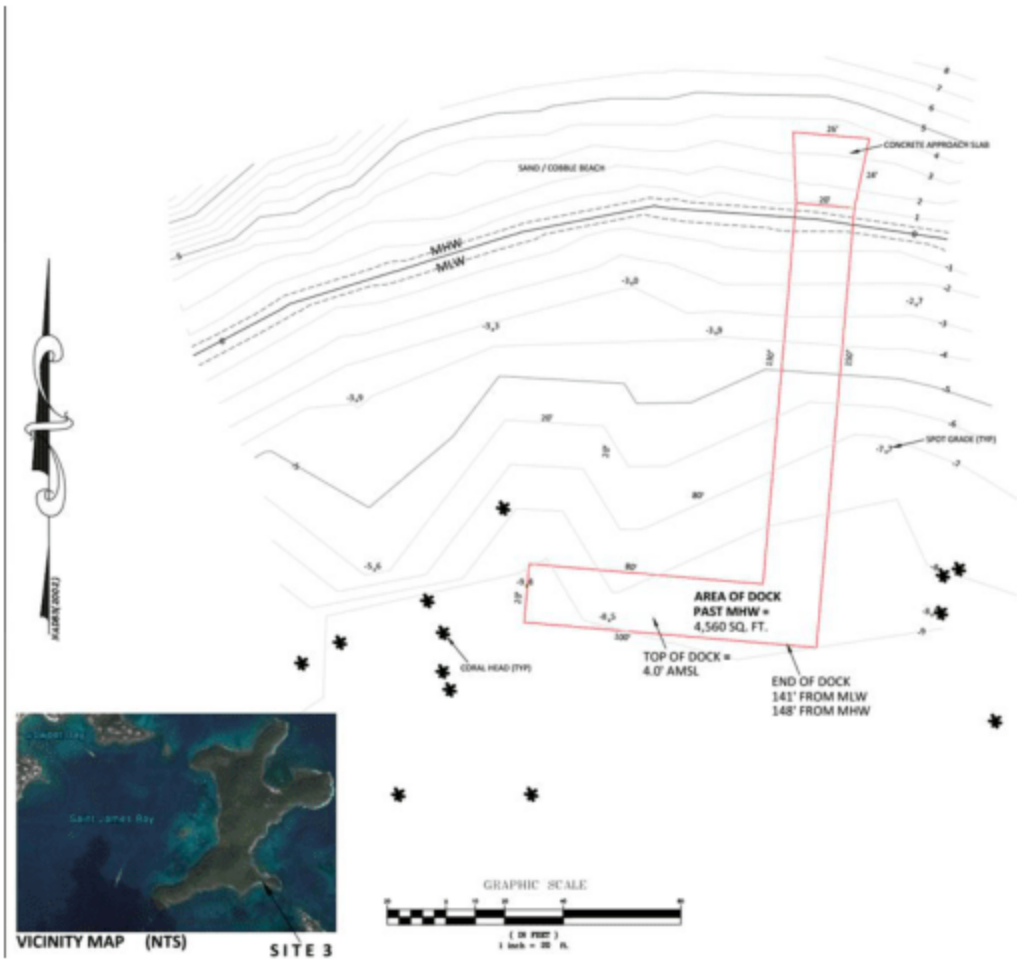
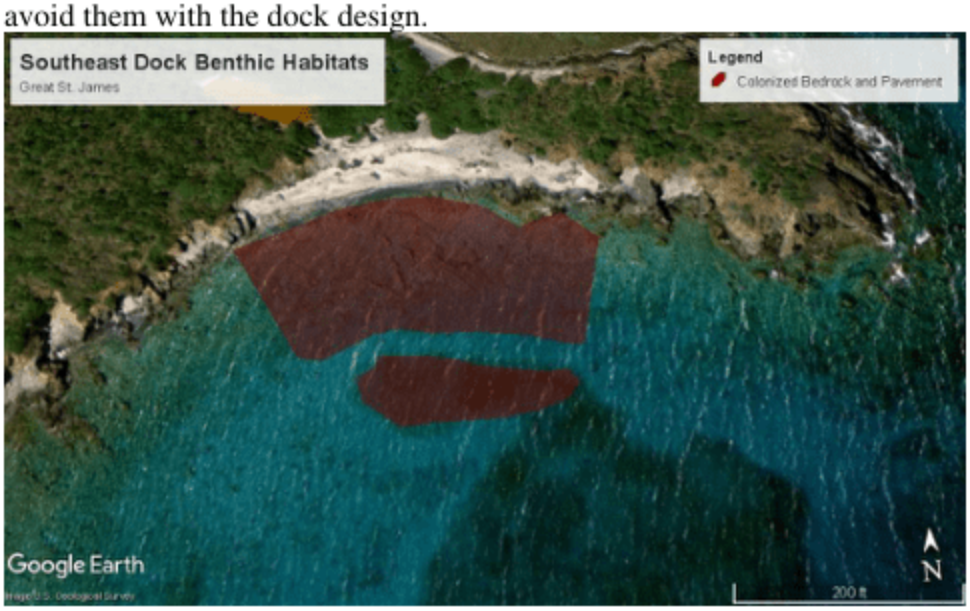


Figure 6.06.4. All of the ESA corals in the bay were mapped by the surveyor in order to avoid them with the dock design.



6.06.5 Benthic Habitats in the southeastern embayment

Impact of Construction

The temporary barge landing has minimal in-water disturbance. The landing pad is landward of MHW and only two moorings will be placed offshore. Moorings will be placed with helix anchors and will utilize floating lines to minimize impact to the seafloor. There is very sparse *Syringodium* coverage in the immediate approach and the installation of the anchors should have a negligible impact. The barge will come into the landing tie up to the bollards and pick up the moorings and cut off its engines to minimize impact. The end of the barge will be in 7ft of water at the edge of the cobble where the sand is uncolonized. By not using is engines to maintain position on shore the impact to the seafloor and water quality should be minimal. The barge will not be in place long enough to have a shading impact on the seafloor.

There are approximately 75 corals in the footprint of the Christmas Cove Dock and its immediate impact area. The corals will be relocated to the hardbottom areas to the north prior to any construction. A Coral Relocation and Transplant Plan is found in Appendix B. The Christmas Cove dock will require sixty-six 12in pilings. It is probable that a least ½ of those will require socketing. Double turbidity barriers will be deployed and water quality monitored will be conducted during all in water work. Turbidity barriers will not be opened or removed until interior water quality has settled to acceptable levels. All corals will be relocated out of the area enclosed by the curtains so that they will not be impacted by settling sediment. Turbidity barriers will be removed or secured when not in use to limit impact to the surrounding benthos. If turbidity control is properly maintained and monitored the impacts should be minimal. The dock has been designed to extend out into the uncolonized sand and terminate before reaching the dense *Thalassia* and *Syringodium* beds offshore. The seavine *Halophila stipulacea* may now be in the footprint of the dock. During the initial surveys, it was well beyond the dock footprint but has slowly been spreading into the uncolonized sand. The use of the dock will introduce the potential for hydrocarbon releases from motorized vessels and from their exhaust. This bay is already highly used by sail and motor vessels and the increased potential for releases should not be significantly over what is currently present.

The southeastern dock/barge ramp will also impact approximately 75 corals in its footprint and impact area. These corals will be transplanted onto the hard bottom areas to the south. The dock will require one hundred and fifty-two 12” piles and forty three 12” piles for the wave attenuators and reef building system. Many of the piles may require socketing and the same procedures will be followed as described for the Christmas Cove installation. If properly implemented impacts to water quality should be minimal. The depths are such that the dock’s use should not disturb the seafloor. The use of the dock will introduce the potential for hydrocarbon spills from vessels and from the exhaust.

The locations of the docks have been made so that they avoid impact to ESA listed coral species and provide the greatest depth possible while minimizing the size of the structures.

6.07 Terrestrial Resources

The application is for the development of a temporary barge landing and two docks. All three structures have access pads or landing pads which will be constructed on cobble beaches which are unvegetated. The access ways to both the Christmas Cove beach and southeastern dock already exist and will not require additional clearing. Approximately 175' of access way must be cleared in order to access the temporary barge landing.

Flora

The island is a harsh dry windswept environment that supports a large variety of thorny species. There are 6 wetlands, two of the wetlands are salt ponds surrounded by monocultures of black mangroves (*Avicenna germinans*) and two of the wetlands are salt ponds surrounded by buttonwood mangroves (*Conocarpus erectus*). One of the wetlands is more depressional and is surrounded by manchineel (*Hippomane manchineel*). A plant species list follows which provides the general location for each of the species encountered during detailed terrestrial surveys in 2005 and 2006. Additional terrestrial surveys were made in 2016, and while a notable amount of additional clearing had been done the species on the island remain the same. Many of the plants were found in more than one habitat. The plant communities can be divided into those on the most exposed areas of the coastline, the beach community, the wetland communities, the windward vegetation and the less exposed portions of the site. There is also a small landscaped area from around the existing buildings on the site.

The locally listed rare and endangered *Mammalaria nivosa* was noted on the exposed rocky cliffs within the exposed coastal vegetation. It was not as prevalent as Turks head cactus. *Malpighia woodburyanna,* another locally listed rare and endangered plant may be present but was not seen during the surveys.

SPECIES	BEACH	WETLAND	EXPOSED COASTAL	WINDWARD	LESS EXPOSED	LANDSCAPE
Acacia tortuosa	x	x	x	x	x	
Agave missionum	x					
Argusia gnaphalodes	x					
Avicennia germenans	x					
Borrichia arboresceus	x	x				
Bourreria succulenta	x	x				
Bucida bucera	x	x				
Bursera simaruba	x	x	x	x		
Caesalepinia bonduc	x					
Cakile lanceolata	x	x				
Canavalia rosea	x					
Canella winterana	s					
Capparis cynophallophora	x	x	x	x		
Capparis flexuosa	x	x	x	x		
Capparis indica	x	x	x			
Cassine xylocarpa	x	x	x	x	x	
Cenchrus incertus	x					
Chamaescye artiuclata	x	x				
Chrysobalanus icaco	x					
Citharexylum fruticosum	x	x				
Clerodendrum	x	x				

aculeatum						
Coccoloba uvifera	x	x	x			
Cocoloba krugii	x	x				
Cocoloba microstachya	x	x				
Cocos nucifera	x					
Comocladia dodonaea	x	x	x			
Conocarpus erectus	x	x				
Crinum zeylanicum	x					
Crossopetalum rhacoma	x	x				
Croton betulinus						
Croton discolor	x	x	x	x		
Cuscuta americana	x	x				
Dalbergia ecastaphyllum	x	x				
Distichlis spicata	x					
Erithalis fruticosa	x	x				
Erthrina corallodendrum	x					
Erythroxylum brevipes	x	x	x			
Eugenia cordata	x	x				
Eugenia ligustrina	x	x				
Eugenia sessiliflora	x					
Euphorbia artculata	x	x	x			
Euphorbia mesembrianthemifolia	x	x	x	x		
Guapira fragrans	x	x	x			
Heliotropium curassaruium	x					
Heteropteris purpurea						
Hippomane manchineel	x	x	x			
Ipomoea eggersii						
Ipomoea pes caprae	x					
Jacquinia arborea	x					
Jacquinia berterii	x	x				
Jatropha gossypifolia	x	x	x			
Krugiodendron ferreum	x					
Lantana camara	x	x	x	x		
Lantana invoucrata	x	x	x	x		
Leucaena leucocephala	x	x	x	x	x	
Malpighia linearis	x	x	x			
Malpighia woodburyana						
Mammilaria nivosa	x					
Melocactus intortus	x					
Morinda citrifoli	x	x				
Oplonia spinosa	x	x				
Opuntia dillenii	x	x	x			
Pictetia aculeata	x	x				
Pilosocereus royenii	x	x	x	x		
Pisonia subcordata	x	x	x	x		
Pithecellobium unguis cati						
Plumeria alba	x	x	x	x		
Prestonia aggulatinata	x	x				
Pyschotria nervosa	x	x				
Randia aculeata	x	x	x	x		
Rochefortia acanthophora	x					
Samyda dodecandra	x					
Scolosanthus versicolor	x	x				
Sesuvium portulacastrum	x	x				
Sida rhombifolia	x	x	x	x		

Solanum racemosum	x	x			
Sporobols virginicus	x				
Stigmaphyllon emarginatum	x	x			
Stigmaphyllon perilocifolium	x	x	x		
Stigmaphyllon periplocifolium	x	x	x		
Surinam maritima	x				
Tabebuia heterphylla	x	x	x	x	
Thespesia populnea	x	x	x		
Tillandsia utriculata	x	x	x		
Tragia volubilis	x	x	x	x	
Urechites lutea	x				

Fauna

The island has significant wildlife use. Deer, and goats were noted during the survey in the dense bush in 2004 but only deer were noted in 2005 and 2006. Numerous mice and rats were noted on every visit and did not seem afraid of humans. No rats were noted in 2016.

Reptiles were abundant and tree anoles (*Anolis cristatellus*), grass anoles (*Anolis pulchellus*), barred anoles (*Anolis stratulus*), dwarf geckos (*Thecadactylus* sp), and common ground lizards (*Sphaerodactylus macrolepis*) were seen. Worm lizards (*Amphisbaena fenestrata*) have been reported but were not encountered. Puerto Rican racers (*Alsophis portoricensis*) were seen on every site visit including in 2016 and appear in the highest density around the salt ponds. The St. Thomas tree boa (*Epicrates monensis granti*) is also present and two were seen during the surveys in May of 2006. One in the vegetation near the modern housing complex and one in the trees near Christmas Cove.

6.08 Wetlands

The U.S. Army Corps of Engineers defines wetlands as "those areas that are periodically inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, bogs, marshes and similar areas." (U.S. Army Corps of Engineers, 1986). In March 2004 Amy Claire Dempsey of Bioimpact, Inc., delineated the wetlands on the island of Great St. James in accordance to the 1987 Wetland Delineation Manual.

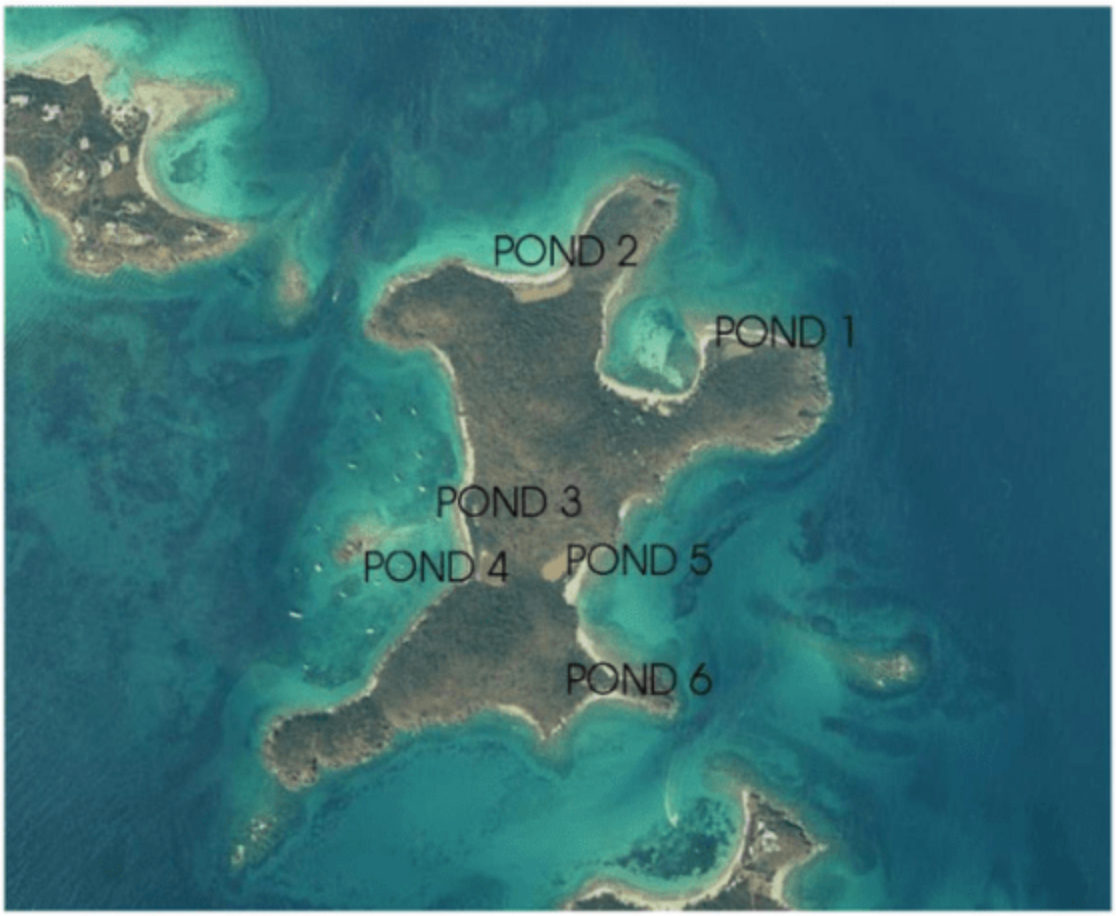


Figure 6.08.1 The six salt ponds on Great St. James

POND 1

Pond 1 is located on the northeastern point of the island. The pond is surrounded by cobbled beaches to the north and west and steep hillsides to the east. The southern side has the gentlest rise from the pond and has the greatest area of wetland outside the area that typically has standing water. Cobbles extend down into the pond on the two beach sides and the cobbles have green stains. The pond has a monoculture of black mangroves, *Aviennia germinans*.

POND 1

POND 1

POND 2

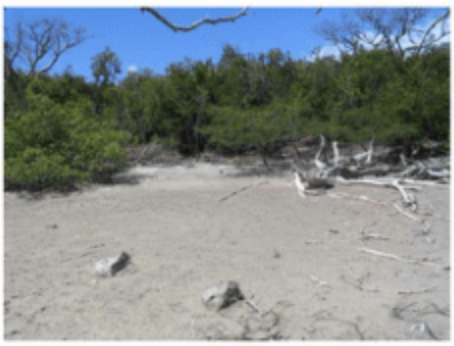
Pond 2 is located on the northwestern point of the island. The pond is surrounded by a cobble beach to the north and steep hill sides to the south, east and west. There is a rock wall build across the eastern corner of the pond. The pond is almost a monoculture of black mangrove, *Aviennia germinans*. Only a few white mangroves, *Laguncularia racemosa* were encountered along the shore side. This wetland is closest to the temporary barge landing. The access roadway is 100' from the edge of this wetland.

POND 2

POND 2

POND 3

Pond 3 is a depressional area off Christmas Cove on the western side of the island. It is located to the north of a larger salt pond. This wetland is primarily surrounded by manchineel (*Hippomane manchineel*). It appears that this pond only occasionally holds water. There is a lot of dead wood within this depression.



POND 3

POND 4

Pond 4 is located behind the cobble beach berm off Christmas Cove. The western side of the pond is bordered by a cobble beach and cobbles spill down into the pond. The northern, southern and eastern sides of the pond are bordered by steep hillsides. The wetland forms a narrow strip around the pond. The pond is a monoculture of buttonwood mangroves, *Conocarpus erectus*.

POND 4

POND 4

POND 5

Pond 5 is located on the eastern side of the island behind a cobble beach. Its eastern border is a mixture of sand and cobble spilling over from the beach, and the northern, southern and western border are steep hillsides. The northern end of the pond has been filled with coral rubble which was thrown over into the pond during stormd. The pond is surrounded by buttonwood mangroves, *Conocarpus erectus* and the ground cover *Sesuvium portulacastrum* is present along the eastern side.

POND 5


POND 5

POND 6

Pond 6 is located to the south of pond 5 on the other side of a knoll. It is fringed by the shoreline community on its eastern and northern sides. Steep hillsides surround the pond to the south and west. White mangroves (*Laguncularia racemosa*) are the dominant species surrounding the pond.


POND 6

The southeastern landing is closest to this pond. The access road already exist and its use will not impact the wetland.

6.09 RARE AND ENDANGERED SPECIES

All three rare or endangered sea turtle species; hawksbill turtles (*Eretmochelys imbricata*) green turtles (*Chelonia mydas*) and leatherback turtles (*Ermochelys coriacea*) occur in the area but neither of the docks or landing sites are turtle nesting beaches. NOAA's Sea Turtle and Smalltooth Sawfish Construction Conditions will be followed as well as NOAA's Vessel Strike Avoidance Measures and Reporting for Mariners in order to protect these species. Acoustic impacts are also a potential impact to sea turtle species therefore a vibratory hammer will be used during construction to minimize this impact and if necessary pile will be socketed rather than impact driven. The use of an impact hammer is not proposed.

The marine habitats around Great St. James have abundant coral and seagrass resources. There are numerous ESA listed corals species near the proposed dock locations.

Acropora palmata, A. cervicornis, Orbicella annularis, O. franksi and *O. faveolata* as well as *Dendrogyra cylindrus* are found off all the cobble beaches from which the proposed docks and barge landings are proposed. At the northern temporary barge landing site, these corals are located primarily to the east where there are coral boulders and coral rubble. There are few located on the shoreline cobble which extends out to a depth of 6.5ft to 7ft. There are several small *Acropora palmata* and several *Orbicella annularis* on the nearshore cobble and the presence of these species as well as several *Porites astreoides* dictated the location of the barge landing. The proposed temporary barge landing position avoids all coral and the landing approach is over sparse seagrass.

The western dock location is off a cobble beach between to areas of emergent bedrock and boulders. *Acropora palmata* occur on the emergent bedrock to the north as well as on the cobble. Offshore the seafloor quickly gives way to exposed pavement and there is a long linear depression right offshore. An old piling lies within this area. The fractured pavement then extends to a depth of approximately 11.5ft offshore over the next 130ft. The area has some widely-scattered boulders and patchy coral colonization. There are scattered ESA corals including *Orbicella* and *Dendrogyra*. During the first survey, there was a very large *Acropora cervicornis* immediately seaward of where the old piling lay near shore. However, upon the next visit by the island it was noted that an old boat was tied nearshore apparently attached to the old piling. During a dive several weeks later it was noted that the boat was gone and the large *A. cervicornis* had been badly broken. The location of the ESA species has dictated the location of the dock. Approximately 75 corals will require relocation to minimize impact, but no listed corals will need relocation.

The southern dock also extends from a cobble beach which gives was to rock pavement and also has emergent bedrock and boulders on either side of the beach. There are *Acropora* to the east and farther to the south on the bedrock and boulders. There are *Orbicella* and *Dendrogyra* within the embayment and their locations have dictated the location of the dock. The dock avoids all ESA listed corals but will require the relocation of approximately 75 corals.

The island is known to be habitat to the St. Thomas Tree Boa (*Epicrates monensis granti*) that is a federally listed rare and endangered species. The boa as well as another species of snake were seen during the field studies. There will be special corridors and preservation areas set aside on the island for these species. The access ways to the western and southern docks already exist, but access will need to be developed to the temporary barge landing. Vegetation along this access will be cleared by hand to limit impacts to the tree boas. A tree boa mitigation plan is found in Appendix D.

6.10 Air Quality

All of St. John and St. Thomas is designated Class II by the Environmental Protection Agency in compliance with National Ambient Air Quality Standards. In Class II air quality regions the following air pollutants are regulated; open burning, visible air

contaminants, particulate matter emissions, volatile petroleum products, sulfur compounds, and internal combustion engine exhaust (Virgin Islands Code Rules and Regulations).

There will be a slight increase in air emissions during the use of heavy equipment for pile socketing/vibra-hammering. Once the docks are complete air quality will be impacted by the periodic vessel visitations. The dock will have a negligible impact on air quality.

7.00 IMPACTS ON THE HUMAN ENVIRONMENT

7.01 Land and Water Use Plans

The property is zoned R-1, Residential Low density. The proposed structures are intended to provide access to the residence on the offshore cay.

7.02 Visual Impact

The structures are proposed for the privately held offshore cay. The docks are all low profile and will have turtle friendly solar lighting for visibility at night. Due to the locate of the cay the dock structures will only be visible from boats and from Little St. James.

7.03 Impact on Public Services

7.03a Water

There will be no water service to the docks or landing.

7.03b Sewage Treatment and Disposal

There will no sewage associated with the docks or landing.

7.03c Solid Waste Disposal

The construction of the docks will have minimal waste production. The wood and decking which will be removed from the dock which will be demolished will be recycled and reused on the island and the piles will be used in landscaping. The ramp for the temporary barge landing will not be removed unless required by the agencies. Ramp would not be used unless there were an emergency and the southern barge ramp was unusable. If the barge ramp is removed the concrete would be broken up and buried in the islands disposal site. It will have no impact on public waste disposal facilities.

7.03d Roads, Traffic and Parking

The docks and landing are associated with an offshore cay and therefore have no impact on public roads, traffic or parking. The roads on GSJ are private and are not public roadways. The construction of the barge ramp, the docks and their use will not affect public roads. The island roadways are hard packed dirt roadways and most traffic on the

roadways are smaller gators, and golf carts to transport employees. Upland development including the roadways and roadway stabilization is discussed in the Master Plan application.

7.03e Electricity

The docks and landing will use turtle friendly solar lighting.

7.03f Schools

The construction of the 2 docks and landing will have no impact on schools.

7.03g Fire and Police Protection

The development of the access docks and landing will improve fire department and police access to the cay in the case of an emergency.

7.03h Health

The construction of these features will not increase the use of the public health facilities. The construction of these docks and the landing will make it easier for emergency health transportation to and from the cay.

7.04 Social Impacts

The construction of the docks and barge landing are proposed for a private offshore cay with the intention to provide access to the owner and his staff. These activities on the privately held island will not affect the islands of St. Thomas or St. John.

The western dock has been located as far north in Christmas Cove as possible while minimizing benthic impacts. The bay is heavily used because it is an excellent mooring area and therefore it is also a suitable location for a dock. Vessels will only approach the dock at low speeds. Signage will be placed on the dock noting that it is an active private dock and to use caution if swimming or snorkeling near the dock. Most of the activity in Christmas Cove occurs to the south. The owner access to the island and the public use of the moorings should be able to co-exist.

7.05 Economic Impact

The private docks and landing are not revenue producing. The permitting of the structures will result in the payment of submerge land fees by the applicant.

7.06 Impacts on Historical and Archeological Resources

The proposed structures are in the shallow waters around Great St. James. Detailed surveys were done as part of the benthic assessment. An old dislodged pile was noted near the shoreline and one further offshore. These are being avoided due to coral colonization. A request for a clearance letter has been sent to SHPO. A MOU is in place for the upland portions of the island.

7.07 Recreational Use

People typically do not visit either the northern beach area or the southeastern dock site. The Christmas Cove is however periodically visited by boaters and visitors who picnic on the beach or walk on the shoreline. The docks will not interfere with public access to the shoreline and the public will continue to enjoy free egress within the 50' set back.

7.08 Waste Disposal

The dock will not create solid waste, any trash from vessels will be disposed of in receptacles on the island, and hauled off with the other trash. The temporary barge landing and access dock/barge land will facilitate the removal of trash form the island.

7.09 Accidental Spills

No fueling or repair will be allowed at the docks. The docks and landing will keep emergency spill kits nearby so that in the event of an inadvertent release from a vessel it can be quickly contained.

7.10 Potential Adverse Effects Which Cannot Be Avoided

The project will result in the alteration of an offshore cay and development on shorelines which have previously been undeveloped. There will be water quality impacts due to pile installation, but if the turbidity control and monitoring is implemented as proposed impacts should be minimized and short term. There are corals within the footprints and impact area of the construction and these will be transplanted prior to construction (Mitigation Plan Appendix B). The docks have been designed so that the vessels are in deeper areas and bottom disturbance should be minimized.

Christmas Cove is already heavily utilized by boat traffic so the additional vessel use should be negligible. Neither the northern barge landing or southern site are typically used by boaters and this will result in increased boat traffic to both.

8.00 Mitigation Plans

To abate and minimize environmental impacts the following mitigation and monitoring plans are proposed.

Coral Relocation and Mitigation Plan Appendix B
Water Quality Monitoring Plan Appendix C
Tree Boa Protection Plan Appendix D

9.00 Alternatives to Proposed Action

A siting study was done around the entire island. All potentially usable docking sites were investigated. Site accessibility was one of the most restrictive issues.

The existing dock which is in Shallow Bay is far too shallow and its use has result in damage to the once dense *Thalassia testudinum* beds within the bay. Although barges have been landed in the bay it has resulted in damage to the shallow seagrass beds. The bay is only 4ft deep 600ft off shore.

The dock in its current configuration is not approved by the USACE and the USACE has requested its removal. It was not permitted due to the shallowness of the bay and the potential impacts to the shallow seagrass beds. Shallow Bay is also not suitable for barge landing.

In order to provide boat access and barge access to the island a new structure or structures are necessary.

Many of the shorelines are inaccessible due to steepness. The most southern embayment could support a dock with similar impacts as the selected sites, access to this embayment was extremely difficult and would require significant cutting and filling which would result in increased environmental impact.

On Christmas Cove there are several areas where a dock could be extended from the shoreline with similar potential impacts as the proposed dock, however, the areas further to the south would have greater seagrass impact, could impact the salt pond and would have a significant impact on the public use of Christmas Cove since the dock would extend into the highly used mooring area. The area selected in Christmas Cove is at the far end of the cove and therefore will not result in boat traffic through the mooring field.

Figure 9.01 Options considered

10.00 Relationship Between Short Term and Long Term Uses of Man's Environment

The existing access to the island of Great St. James is not suitable for the owners intended residential use. The existing dock is in too shallow of a bay and is not federally permitted in its current configuration. The development of a more suitable dock and barge landing is in the best interest of the environment to abate impacts which are occurring due to the shallowness of the bay which is now being used. The development of adequate facilities for island access and the continuing requirements for the removal of trash and delivery of supplies is in the best long-term interest for man's environment.

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APPENDIX A