Save Coral Bay Inc.
9901 Emmaus
Coral Bay, St John USVI

Mr. Alberto Gonzalez, Project Manager, Regulatory Division
Antilles-Miami Permit Section
U.S. Army Corps of Engineers
9900 S.W. 107th Avenue, Suite 203
Miami, FL 33176

February 28, 2023

cc: Ms. Samantha Burns, Section Chief, Antilles-Miami Permit Section
Ms. Susan Kaynor, Chief, Jacksonville Permits Section, Regulatory Division
Mr. Shawn Zinser, Chief, Regulatory Division, Jacksonville District
Mr. Robb Fox, Esq., Manko-Gold-Katcher-Fox

re: **Review of Jan 2023 Documents Submitted to USACE by the Summers End Group LLC**
USACE Permit Application #SAJ-2004-12518

Dear Mr. Gonzalez,

I am writing to you on behalf of Save Coral Bay, Inc. ("SCB") and its thousands of supporters in the United States Virgin Islands and throughout the United States. Over the past nine years SCB has submitted many hundreds of pages of detailed comments on a proposed private marina project in Coral Bay, St John, USVI (Army Corps permit application #SAJ-2004-12518). Most recently we submitted a petition with the signatures of over 14,000 individuals opposed to this project, known as the "St John Marina" and proposed by the applicant "Summers End Group LLC" (or "SEG").

Following the submission of our most recent petition we learned that SEG had submitted additional documents to the US Army Corps of Engineers ("USACE") in support of their marina project. These documents were ostensibly responsive to a "Request for Additional Information" sent to SEG by USACE in September 2022.

On January 18, 2023, SCB filed a request under the federal Freedom of Information Act ("FOIA") for the SEG submission documents, and we received documents in response to that FOIA request on February 22, 2023. We have now reviewed those documents, in detail, and have written comments which we hope will assist USACE and other involved federal agencies in their handling of the SEG submission. Our comments are being submitted to you in a separate document, attached to this cover letter. We hope you will find them useful and that you will enter our comments into the administrative record for this permit application review.

In a nutshell, we have found extensive errors, omissions and non-responses in the most recent submission from SEG. For example:

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1. The data submitted for the Benthic Resource Survey did not come close to what had been promised in the Scope of Work and what is required by the Corps and NOAA to complete evaluation of the project.
2. The UMAM functional assessment was completed incorrectly rendering any conclusions stemming from it invalid and unsupportable.
3. SEG's estimates of impacts to protected resources are grossly inaccurate and do not agree with their prior estimates, federal agency estimates, or independent estimates.
4. The project continues to be contrary to the Public Interest for multiple reasons, including the failure by the applicant to avoid and minimize impacts to the greatest extent practicable.

There is little disagreement among people who know Coral Bay that an appropriately scaled and appropriately situated marina would create net benefit to the quality of the human and natural environment of Coral Bay. However, the insistence by the Summers End Group in proposing an over-sized marina for super yachts in an extremely exposed and environmentally sensitive region of Coral Harbor is simply not a tenable proposition. By any accepted methodology for assessing environmental impacts, the proposed "St John Marina" would result in extensive impacts to protected marine resources, and the mitigation measures suggested by the Applicant are entirely inadequate to mitigate any meaningful part of those impacts.

After nine years of failing to take a serious look at alternatives, and failing to address the requirements for avoidance, minimization and mitigation, it is our considered opinion that the Summers End Group is either unwilling or unable to comply with the requirements of federal environmental law. The errors and omissions in the most current submission are testament to the lack of serious compliance by this applicant.

Once again, Save Coral Bay respectfully requests, on behalf of many thousands of people who value the environment of Coral Bay and the surrounding National Park resources, that the United States Army Corps of Engineers deny permit application number SAJ-2004-12518 on multiple grounds, including the fact that it is contrary to the public interest.

We formally request that the comments attached hereto be included in the administrative record for the subject permit application.

Sincerely,

David Silverman, President, Save Coral Bay Inc., a 501(c)3 public charity

ATTACHMENT: Review of Applicant "Summers End Group" Jan 2023 Submission to USACE

Review of Applicant "Summers End Group" Jan 2023 Submission to USACE

US Army Corps of Engineers Permit Application Number SAJ-2004-12518

This document reviews material submitted by or on behalf of the Summers End Group LLC to the United States Army Corps of Engineers pursuant to a Department of the Army permit application for a private commercial marina located in Coral Bay, St John, US Virgin Islands. The materials reviewed were submitted by the applicant in response to requests by the Army Corps for additional information required for consultations under the Magnuson-Stevens Fisheries Management Act and the Endangered Species Act.

This analysis was performed by individuals associated with Save Coral Bay Inc., a non-profit public charity based in Coral Bay, St John, USVI.

David Silverman
2-28-2023

➔ Introduction

This document, together with its associated Appendices and Exhibits, present the conclusions of a detailed review of materials submitted to the United States Army Corps of Engineers by the permit applicant, the "Summers End Group LLC" relating to a proposed private marina in Coral Bay, St John, US Virgin Islands. It is our hope and expectation that these comments will assist the Corps and other involved agencies in their review of the materials submitted by the applicant.

The document review was conducted by the non-profit public charitable organization "Save Coral Bay Inc." and involved contributions from multiple individuals with expertise in the matters discussed. In particular, the local knowledge of conditions in Coral Harbor held by individuals who live here was invaluable in conducting the review.

➔ Guide to these Comments

The private marina project which is the subject of these comments is located in Coral Bay, St John, US Virgin Islands and has been under review by the United States Army Corps of Engineers ("USACE") since April 2014. During those almost nine years the applicant – the Summers End Group LLC, or "SEG" – has submitted three Army Corps permit applications (April 2014, September 2014 and May 2015), there have been two public notices and two public comment periods, there have been six requests by USACE for additional information, and there have been many thousands of pages of documents submitted to USACE by the applicant, by interested parties, and by the public.

It is clearly infeasible to address the totality of that administrative record, so these comments are limited specifically to the documents submitted by SEG to USACE in January 2023, ostensibly in response to USACE's most recent request for additional information dated September 21, 2022. These comments should not be seen as our comprehensive response to the SEG project proposal; they are limited to a review of the new documents submitted in January 2023 and should be seen as additive to comments previously submitted to the Corps by this reviewer and by others.

In an effort to make this review as useful as possible to USACE and other involved federal agencies it has been structured to address specific topics of concern to USACE and to the public. The main sections of the report are as follows:

1. **Overview of Submitted Documents**: A very brief description of each of the twenty-two (22) documents submitted by SEG to USACE in January 2023, identifying new material and previously submitted material.

2. **Review of Applicant's 2023 Benthic Resource Survey**: A detailed comparison between what was required pursuant to the approved benthic survey Scope of Work and what was produced by the Applicant.

3. **Review of Applicant's Compensatory Mitigation Plan and UMAM Assessment**: Analysis of the UMAM assessment provided by the Applicant and analysis of the proposed compensatory mitigation.

4. **Benthic Resource Impacts (SAV):** Review of Applicants calculations regarding the impacts to Submerged Aquatic Vegetation ("SAV") from marina construction and operation.

5. **Review of Avoidance and Minimization**: Review of the avoidance and minimization measures required under NEPA and offered by Applicant.

6. **Review of New Mooring Field Documents**: Review of the history and current documents pertaining to a 75-position public mooring field.

7. **Miscellaneous Additional Comments on New Materials Submitted:** Addressing public comments, and addressing marina structural integrity.

➔ OVERVIEW OF SUBMITTED DOCUMENTS

Save Coral Bay, Inc. filed a request under the Freedom of Information Act ("FOIA") for documents submitted by SEG (the Applicant) to USACE during January 2023. A total of twenty-two (22) documents were received by us on February 22, 2023 and an additional two partially redacted documents were received by us on February 24, 2023. This review focuses exclusively on the initial set of 22 documents.

Of the 22 documents initially received there were 11 documents containing new information submitted by SEG in response to the USACE requests. The remaining 11 documents were either materials previously submitted to USACE (and unchanged from the prior submissions) or, in three cases, unsigned and undated draft documents. The 22 initial documents are briefly summarized below (documents highlighted in green are new documents, those in grey are previously submitted and unchanged documents, and those in yellow are unsigned and undated drafts):

1. **2023 0106 Summers End RAI Response:** This document follows the structure of the September 2022 USACE request for additional information and provides responsive commentary to the USACE requests, as well as referencing the associated exhibits.

2. **2023 0106 Supplemental Benthic Info:** This document supplements the information provided in Exhibit 4 (2022-2023 Benthic Survey).

3. **Exhibit 1 - Water Quality Monitoring Plan - updated with Turtle Monitoring and Acoustic Monitoring:** This is a mostly new document providing additional details on proposed monitoring of water quality during construction.

4. **Exhibit 3 - Compensatory Mitigation Plan:** This document provides new proposed compensatory mitigation measures and references a UMAM assessment of impacts and mitigations.

5. **Exhibit 4 - 2022-2023 Benthic Survey:** This document contains the results of the benthic resource survey required by the Corps and the NOAA agencies. It was produced following agreement on a "Scope of Work" for the survey, attached as Exhibit 1.

6. **Exhibit 7 - VISHPO Concurrence Letter**: This document, dated September 28, 2021, was issued prior to the Phase I and Phase II archeological studies, and does not reflect the findings of those studies. It was previously submitted to USACE in March 2022.

7. **Exhibit 8 - Minimized Marina Layout**: This is a revised marina layout, reflecting the removal of two (2) finger piers and four (4) berths in the immediate vicinity of the historic shipwreck, and removal of eight (8) finger piers in the north marina. A total of

twenty-four (24) berths for smaller vessels (60' and smaller) have been removed and five (5) berths for larger vessels (80' and larger) have been removed. The new design reflects a 24% reduction in the number of slips available for smaller boats and a 12% reduction in the number of slips for super yachts.

8. **Exhibit 9 - 2020 Watershed Management Plan Proposed Mitigation:** This document, which was previously submitted to USACE in May 2020, does not appear to contain any new or updated information.

9. **Exhibit 10 - Memorandum Of Understanding Between The Summers End Group, LLC DPNR**: This undated and unsigned document purports to be an MOU between SEG and DPNR however it has no signatures and appears to be a draft document prepared by SEG and not accepted, as of this time, by DPNR.

10. **Exhibit 11 - Memorandum Of Understanding Between The Summers End Group, LLC Department of Public Works**: As with the previous MOU, this agreement is not dated or signed. It appears to be a draft document prepared by SEG and not accepted, as of this time, by the Department of Public Works.

11. **Exhibit 12 - St. John Marina Mooring Field Grant Agreement**: As with the prior two documents, this is an undated, unsigned draft agreement.

12. **Exhibit 13 - Pile Driving Summary:** Minor update reflecting the elimination of 93 pilings.

13. **Exhibit 14 - Public Interest - The Truth about Coral Bay:** This document appears to be a transcript of a video previously submitted to USACE in August 2017. The video includes statements in support of the marina from thirty (30) individual residents of St John.

14. **Exhibit 15 - Act No 8407:** This is a copy of the act of the Virgin Islands Legislature which ratified Coastal Zone Management permits for the Summers End Group, in spite of the fact that those permits had not undergone the review and approval of the CZM committee, as required by Virgin Islands law.

15. **Exhibit 16 - Minimization Images:** Collection of images depicting prior marina designs, not all of which were ever submitted for permitting or public review.

16. **Exhibit 17 - Break Even Analysis:** This 2-page letter provides a brief discussion of the financial impacts of the proposed slip count reduction.

17. **Exhibit 18 - Erosion and Sediment Control Plan**: This document consists of several engineering drawings previously submitted to USACE in August 2017.

18. **Exhibit 19 - US Fish and Wildlife Concurrence Letter**: This is a copy of a letter dated August 2018 from the USFWS which has previously been submitted to USACE.

19. **Exhibit 20 - The Truth About Coral Bay Documentary:** This document solely consists of a link to a video on YouTube, previously provided to USACE in 2017.

20. **Exhibit 21 - Geotechnical Report:** This document, dated October 7, 2019, was previously submitted to USACE.

21. **Exhibit 22 - Geotechnical Addendum Coral Bay Harbor Sub-bottom Profile:** Additional geotechnical (depth to bedrock) report for areas not previously surveyed.

22. **Exhibit 23 - UMAM Assessment Documents:** This document consists of partially completed UMAM templates for the impact and mitigation areas.

Comments on the two documents relating to archeological investigations (Exhibit 2 and Exhibit 3) will be submitted separately after review by local experts in the subject matter. Our focus in this review has been exclusively on the documents highlighted in GREEN above, not on previously submitted or draft materials.

➔ REVIEW OF BENTHIC RESOURCE SURVEY (EXHIBIT 4)

Pursuant to the request of USACE, Applicant has provided a "Benthic Resource Survey" covering approximately 114 acres of Coral Harbor. Our review of the provided survey data raises a number of significant questions and concerns about the adequacy of the report and any conclusions stemming from it.

BACKGROUND – AGREED SCOPE OF WORK

Prior to commencing the survey, Applicant produced a "Scope of Work" ("SOW") document describing the physical extent of the survey, the methods of work, the data to be collected and reported and other relevant parameters defining the benthic survey. Applicant states that this SOW was approved by NOAA and USACE. The SOW is attached as Exhibit 1 with text highlighted to indicate required tasks that were to be performed in the survey.

The SOW referenced the Florida DEP "Guidance on Surveys for Potential Impacts to Submerged Aquatic Vegetation" and stated that the survey would be conducted following the guidelines contained therein. In particular, the SOW made the following statements:

- A total of 114 acres encompassing the Potential Impact/Action Area will be surveyed, including all of Coral Harbor, specifically the proposed marina and mooring area, and the reefs, and seagrass beds surrounding Penn and Harbor Point at the mouth of the harbor.
- Transect will be spaced to visually cover 100% of the proposed survey area. The transect width is proposed as 5 meters.
- Divers will document the following: sediment/seafloor substrate, depth, salinity, water temperature, and current speed and direction. Water depth will be measured with dive depth meter (in meters), as well as the vessel depth finder which has been calibrated.
- Anthropogenic impacts such as the presence of debris, propeller scars or vessel blowouts within the Action Area will be mapped.
- Areas composed of cobbles and rubble will be identified as consolidated and unconsolidated. Sediment within (on) the hardbottom area will also be located and depth and type of sediment recorded. Detailed observations and counts will be made of the flora and fauna on the hardbottoms as quantitative assessments are undertaken.
- Seagrass assessment will be made utilizing the Florida Department of Environmental Protection (FDEP) seagrass survey protocols (Surveys for Submerged Aquatic Vegetation Compensatory Mitigation Projects) and Florida DEP's Guidance on Surveys for Potential Impacts to Submerged Aquatic Vegetation.
- Reference sites will be established for both coral and seagrasses in Hurricane Hole offshore of undeveloped areas to be used for comparison when addressing coral and seagrass health.
- The percent cover of SAV will be visually assessed utilizing the Braun-Blanquet Cover-Abundance Scores. The edge of each SAV patch (unit) shall be marked with the GPS.

- The seagrass will be quantitatively evaluated within randomized quadrats placed within SAV patches (units).
- A 1 m2 (1 m x 1 m) quadrat be used for this survey; At least 5 m2 should be sampled in small patches (those less than 0.1 acres). For larger patches, at least 1 m2 be sampled per 80 m2, (density of approximately 50 (1 m x 1 m) quadrats per acre. A description of the community structure, including the species composition and percent cover of SAV based on quadrat data, will be provided.
- Quantitative data will be determined using a quadrat that is divided into 100 assessment units.
- Cover-abundance (percent cover) of SAV will be determined by counting the number of cells with SAV and then calculating the percentage of cells within the quadrat with SAV.
- Excel spreadsheets will be provided with the following information:
    - Transect number, GPS location, length, direction and width.
    - ESA-listed coral colonies including; GPS location, species, colony size, percent of live versus recent partial mortality, and coral condition as describe above.
    - Data for any Nassau grouper, sea turtles, marine mammal observed during underwater surveys will include: site, transect number, and location, species, habitat and depth at which animals were observed, behavior (e.g., resting, feeding, mating, swimming through), and approximate size, if possible.
    - Non-ESA coral colonies including; GPS location, species, colony size, percent of live versus recent partial mortality, and coral condition as describe above.
    - Seagrass Quadrat Analysis, quadrat location, species present, density, height, health and observations on grazing or species use.

We have evaluated what was provided in Exhibit 4 (Benthic Resource Survey) and "Supplemental Benthic Info" and compared it with what the Applicant agreed to provide in the approved Scope of Work. This evaluation is documented in the remarks which follow.

WHAT WAS COMPLETED AND WHAT INFORMATION WAS PROVIDED

Although the survey may have covered the entire 114 acres required by the Corps and documented in the Scope of Work, the information that was provided in Exhibit 4 Benthic Resource Survey does not come close to what was promised in the accepted Scope of Work.

Specifically, the table below identifies the requirement as documented in the SOW, and what was actually provided in the survey documents.

Survey Requirement from Scope of Work	What was provided in Benthic Survey	Status
A total of 114 acres encompassing the Potential Impact/Action Area will be surveyed, including all of Coral Harbor, specifically the proposed marina and mooring area, and the reefs, and seagrass beds surrounding Penn and Harbor Point at the mouth of the harbor.	According to the published map of the survey area, the required geospatial coverage was surveyed. However the lack of supporting data on transect and quadrat location makes it impossible to validate the survey extent.	**UNKNOWN**
Transect will be spaced to visually cover 100% of the proposed survey area. The transect width is proposed as 5 meters.	No transect data was provided.	**INCOMPLETE**
Divers will document the following: sediment/seafloor substrate, depth, salinity, water temperature, and current speed and direction.	None of this data was provided. The sole data was Braun-Blanquet cover.	**MISSING**
Anthropogenic impacts such as the presence of debris, propeller scars or vessel blowouts within the Action Area will be mapped.	No data was provided on anthropogenic impacts. Either none were found (unlikely), or none were reported.	**MISSING**
Reference sites will be established for both coral and seagrasses in Hurricane Hole offshore of undeveloped areas to be used for comparison when addressing coral and seagrass health.	The report does not contain any reference site data.	**MISSING**
The percent cover of SAV will be visually assessed utilizing the Braun-Blanquet Cover-Abundance Scores. The edge of each SAV patch (unit) shall be marked with the GPS.	Cover-Abundance scores are provided however only 643 of the 1100 quadrats include Lat/Lon GPS coordinates. The remaining 467 quadrats are missing GPS data, rendering them unusable.	**INCOMPLETE**
The seagrass will be quantitatively evaluated within randomized quadrats placed within SAV patches (units).	There is no quantitative quadrat data provided, solely visual cover abundance scores.	**MISSING**
Quantitative data will be determined using a quadrat that is divided into 100 assessment units.	There is no quantitative quadrat data provided in the report.	**MISSING**
A 1 m2 quadrat be used for this survey; For larger patches, at least 1 m2 be sampled per 80 m2, (density of approximately 50 (1 m x 1 m) quadrats per acre.	The SOW requires 50 quadrats per acre, for a total of 5,700 quadrats over 114 acres. Only 1,100 quadrats were reported, and none of the quadrats were reported with quantitative data.	**HIGHLY INCOMPLETE**
Excel spreadsheets will be provided with all of the collected data.	No spreadsheets have been provided.	**MISSING**

As is readily seen in the summary table above, the Benthic Resource Survey provided by the Applicant does not come close to providing the depth and breadth of data promised in the approved Scope of Work document. In particular, the lack of ANY quantitative quadrat data (stem counts), the lack of GPS coordinates for approximately half of the cover-abundance scores, the lack of any of the ancillary data promised, render this report extremely superficial and inadequate for its proposed purposes.

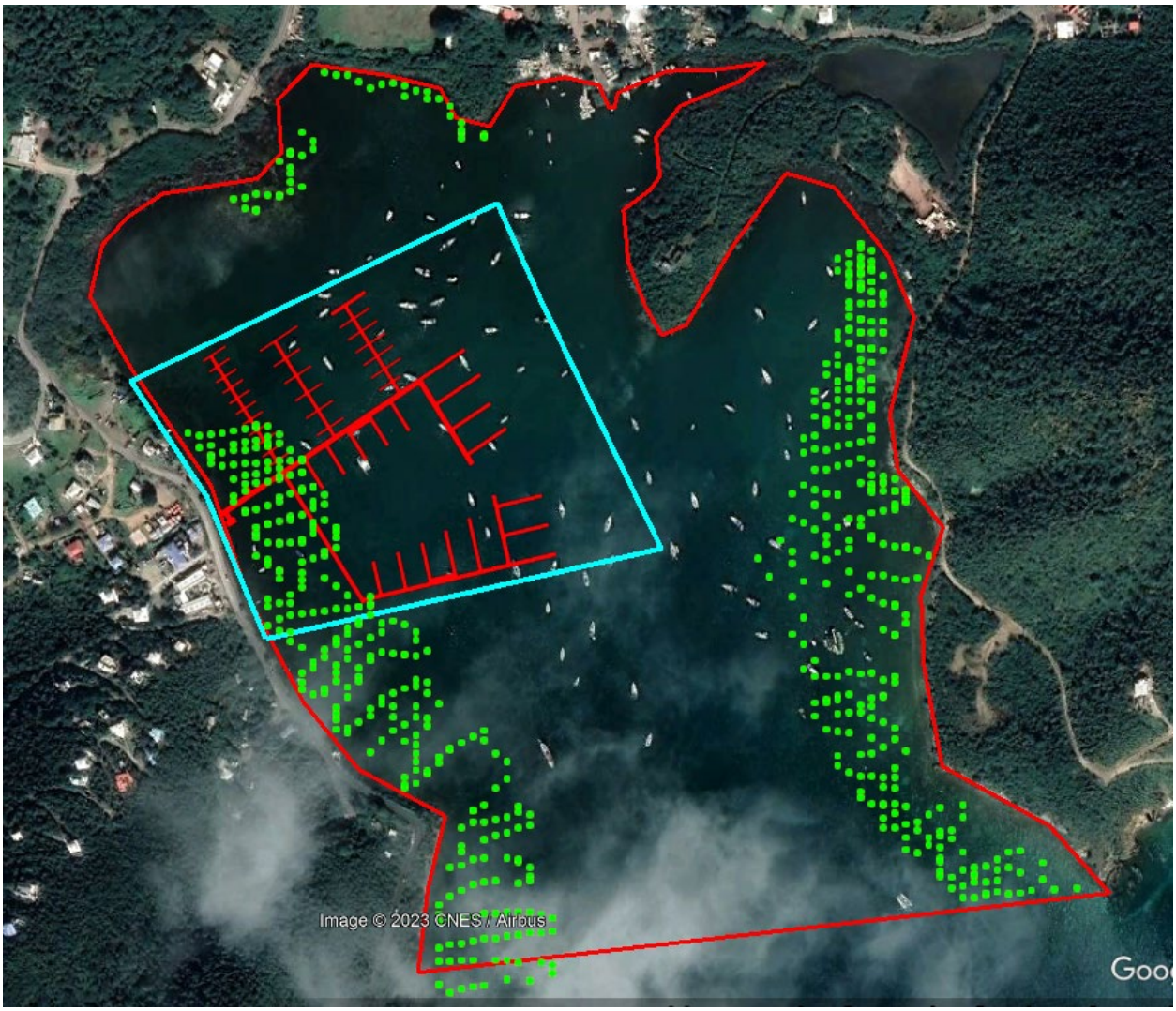
The report does little more than confirm what was already known: that the benthos of Coral Harbor is extensively vegetated with SAV, and that there are major coral communities in at least two locations. However as far as providing a baseline for impact and mitigation assessment, the report is of little value.

MAP OF APPLICANT'S 2022-2023 BENTHIC RESOURCE SURVEY

Although the Applicant did not provide a map indicating the location of transects and quadrats, the table provided in the Benthic Resource Survey did supply Lat/Lon coordinates for 643 out of 1,100 quadrats (the remaining quadrats did not include location data).

We have uploaded the supplied GPS data to Google Earth to visually illustrate the transect paths and the portion of the 114 acre survey area that was reported on in the survey. The illustration below includes the following features: (1) an underlying Google Earth satellite image of Coral Harbor, (2) the footprint of the marina docks, (3) the area of direct construction and operational impacts outlined in turquoise, (4) the 114 acre survey area outlined in solid red, and (5) the location of the 643 quadrats that were reported with GPS coordinates.

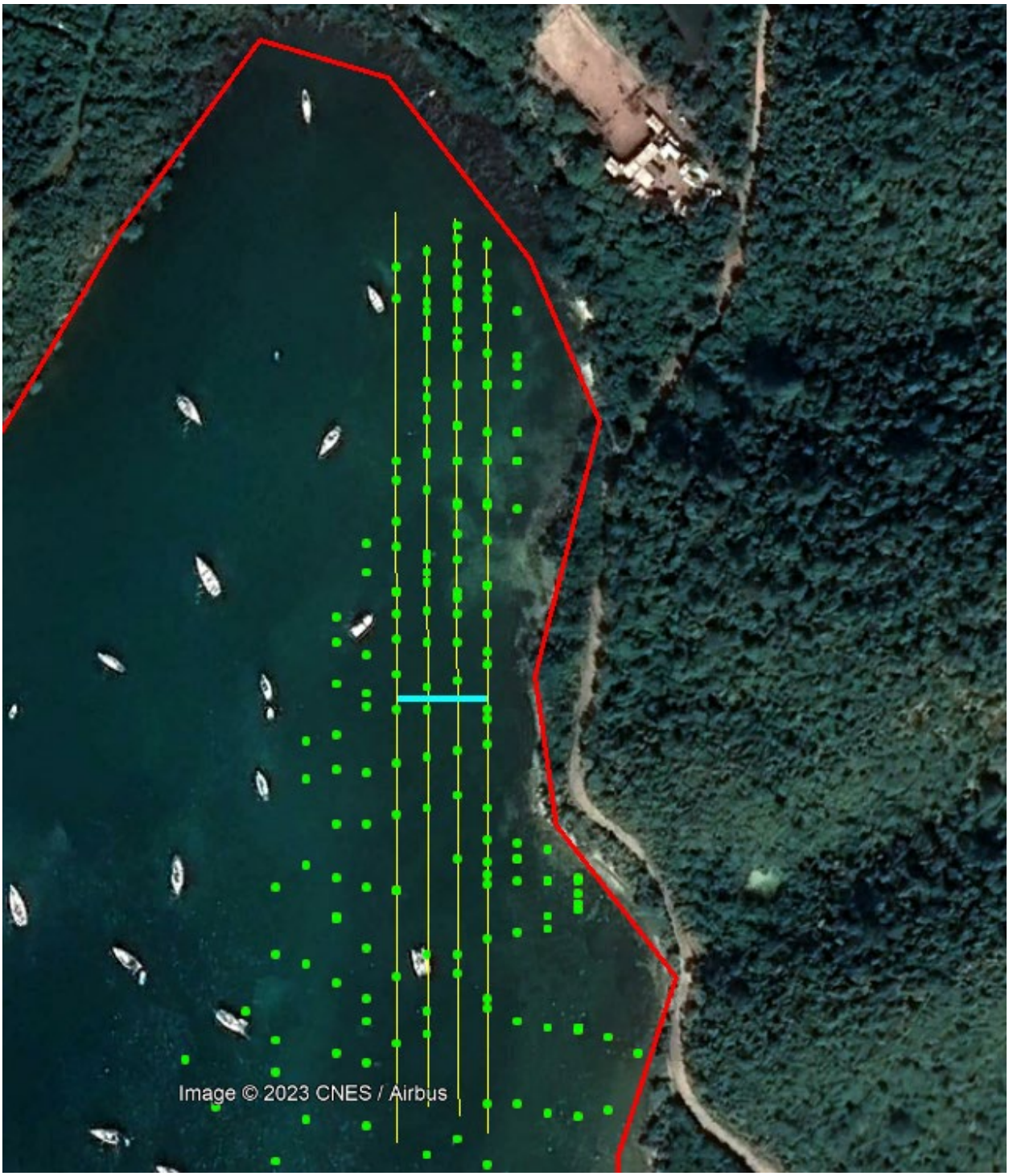
Each of the 643 quadrats which included geolocation data is indicated by a green dot on the image.



This image illustrates the extremely limited coverage of the survey area reported in the Applicant's 2022-2023 Benthic Resource Survey. Although the figure could include an additional 460 points, these points cannot be plotted due to lack of GPS coordinates, and it is unlikely that these points would extend the survey area substantially if they follow a similar pattern to the points that were geolocated.

The image also illustrates that the reported survey locations did not include the majority of the marina construction footprint. It did not include the habitat of the fringing mangroves at Usher Cay or at the northwest corner of the harbor. It did not include any of the deeper portions of Coral Harbor. It certainly did not comply with the required Scope of Work.

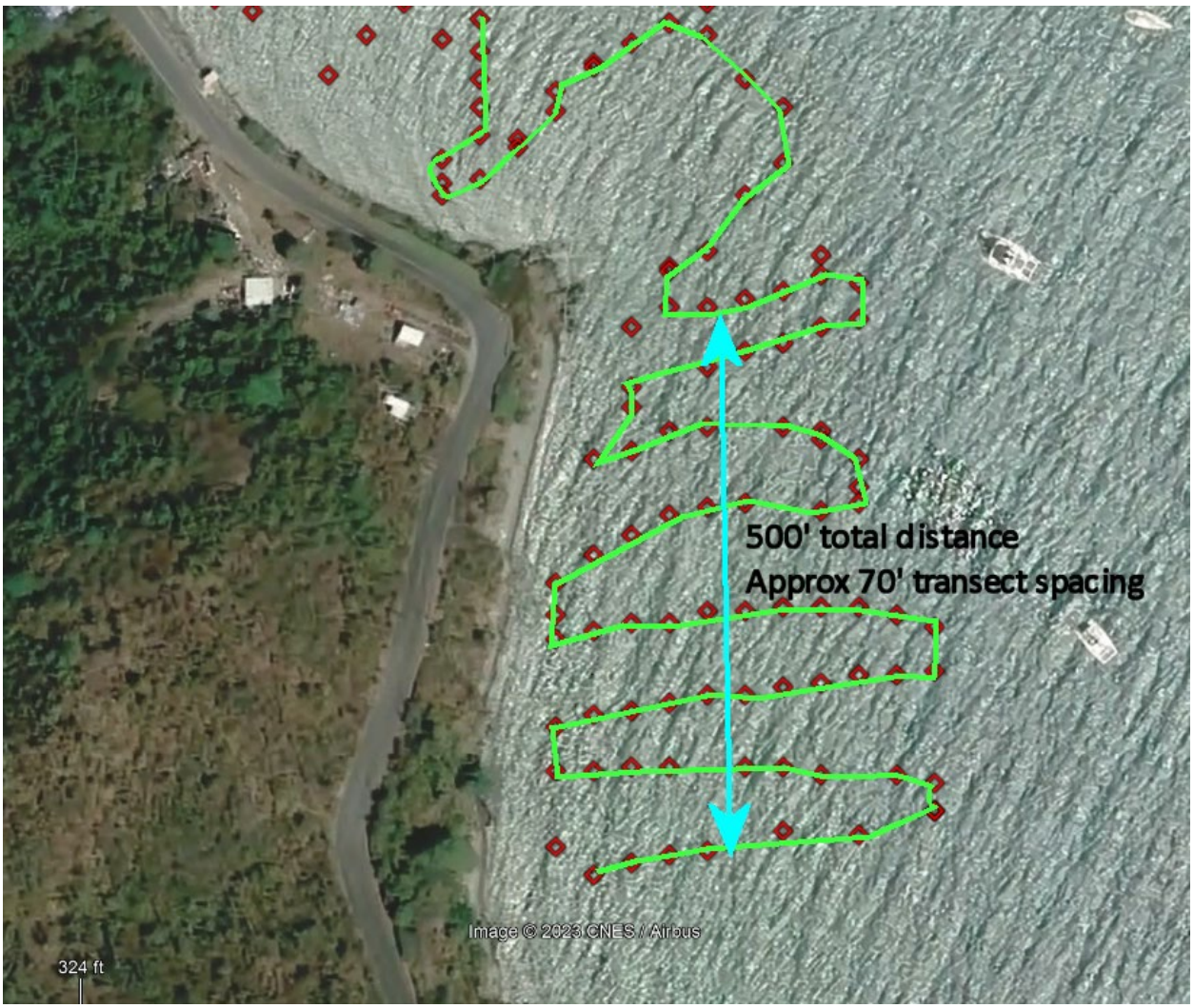
The image also illustrates that the required 5 meter transects were not conducted. If the northeast corner is expanded some transect paths become apparent, as illustrated below with thin yellow lines connecting linear transect points:



The turquoise bar across the four lines measures 30 meters, which indicates that these transects were spaced 10 meters apart, not the 5 meters required under the Scope of Work. The visibility in Coral Harbor rarely exceeds 3 meters, and virtually never exceeds 5 meters, so it is highly doubtful that these transects provided complete visual coverage of the benthos in this area, and certainly was not adequate to locate and identify small coral colonies or other features of interest.

Additional evidence of the inadequate transect spacing is observed at the southwest corner of the survey area, just south of Penn Point. This area is known to contain multiple protected resources, include ESA listed corals and hardbottom coral habitat. It is one of the areas that should have been most closely surveyed.

When the reported quadrat points are plotted on Google Earth the route of the survey diver(s) becomes apparent. The area was traversed in a "zig-zag" pattern, and when the spacing of the pattern is measured in Google Earth it is apparent that the spacing of the transects was approximately 70' (or 20 meters) which is 4 times the spacing required in the SOW, and clearly too far apart to observe all features. The map below shows the reported quadrats at this location, and the apparent dive pattern traced in green. The distance was measured in Google Earth:



SUMMARY TABLE – SURVEY REQUIREMENTS VS. SURVEY REPORTED

After a thorough review of the materials and data submitted by the Applicant in Exhibit 4 (2022-2023 Benthic Survey) the discrepancies between what was required in the approved Scope of Work and what was submitted by the Applicant are summarized in the table below. For reference, the approve Scope of Work ("SOW") is attached as Exhibit 1.

Requirement in Scope of Work	Submitted in Benthic Survey	Status
Survey of 114 acres	Data provided for approximately 30 acres	**INCOMPLETE**
100% coverage by 5m transects	Approx 26% coverage with transects 10m and greater. No transect data provided.	**NOT DONE**
Diver documentation of: • sediment/seafloor substrate • depth • salinity • water temperature • current speed and direction.	Only diver documentation submitted was Braun-Blanquet cover score and canopy height. No other physical data was documented.	**NOT DONE (substrate)** **NOT DONE (depth)** **NOT DONE (salinity)** **NOT DONE (temp)** **NOT DONE (current)**
Mapped documentation of debris and anthropogenic impacts	No map or documentation was provided for these items	**NOT DONE**
Reference site documentation for assessing health of benthos	No reference site documentation was submitted.	**NOT DONE**
Cover-Abundance scores for each SAV patch with GPS coordinates for patch boundaries.	Survey data included Braun-Blanquet data with GPS coordinates for 643 quadrats. No cover data with GPS for approx 80% of survey area.	**INCOMPLETE**
Quantitative evaluation of seagrass within randomized quadrats (10x10 cell grid)	No quantitative quadrat data provided, solely visual Braun-Blanquet scores.	**NOT DONE**
50 quadrats per acre required, total 5,700 quadrats over 114 acres	1100 quadrats provided, of which 643 were geolocated	**NOT DONE**
Excel spreadsheets with all of the survey data	No spreadsheets were provided	**NOT DONE**

ADDITIONAL DISCREPANCIES IN SURVEY REPORT

In addition to the inconsistencies between the committed Scope of Work and the actual deliverable, there are discrepancies within the Benthic Survey report itself. The following is a non-exhaustive list of statements made in the report which are not supported by the data submitted with the report (statements excerpted from the report are within quotation marks, review comments are highlighted in yellow):

1. *"A total of 114 acres encompassing the Potential Impact/Action Area has been surveyed, including all of Coral Harbor, specifically the proposed marina and mooring area, and the reefs, and seagrass beds surrounding Penn and Harbor Point at the mouth of the harbor."*
   The data submitted with the report only covers a small portion of Coral Harbor, approximately 30 acres, and does not include all of the proposed marina or the mooring area..

2. *"The transects were laid out in an east west orientation perpendicular to the shoreline."*
   No data was supplied indicating east west transects. No data was supplied on transects at all. The limited information which can be inferred on transects has them following multiple different bearings.

3. *"Transects within the harbor were no more than 5 meters apart to ensure that all important features including habitat shifts and species present and to ensure that all corals were quantified."*
   The supplied data is indicative of 10-20 meter transects which could not possibly provide visible coverage of the habitat due to visibility constraints.

4. *"Transects were spaced to visually cover 100% of the action area. The transect width was approximately 5 meters."*
   No transect data was supplied and there is no evidence of 5 meter transects covering the action area nor evidence of 100% visual coverage of the action area.

CONCLUSION AND RECOMMENDATION

Based on our review of the Applicant's 2022-2023 Benthic Survey and the required Scope of Work, we respectfully offer the following conclusions and recommendations to USACE:

1. There are extensive deficiencies in the data supplied by the Applicant in the Benthic Survey, as compared to what was required in the agreed Scope of Work.

2. The Benthic Survey deficiencies identified herein should be communicated to the Applicant with a request to complete the survey, including all of the requirements defined in the Scope of Work.

3. The survey boundaries must include the 114 acres previously identified by the Corps, as well as any portions of the seagrass transplantation and coral outplanting mitigation areas which lie outside those 114 acres (see discussion on UMAM and Mitigation).

4. Until such data is made available to the Corps any further evaluation of impacts is not possible. The presently supplied data is inadequate to completely assess the presence of protected resources within the action area.

➔ REVIEW OF APPLICANT'S UMAM ASSESSMENT (EXHIBIT 23)

In the 2022 RAI, the Corps requested a UMAM assessment of Applicant's proposed compensatory mitigation plan. Paragraph 12 of the 2022 RAI states: "The applicant's 2020 Compensatory Mitigation Plan does not provide in kind mitigation for direct or indirect impacts to seagrass. Please provide a compensatory in-kind mitigation plan to offset the unavoidable impacts to seagrass…Please provide a UMAM functional assessment of the mitigation plan to determine if the proposed plan provides adequate compensatory mitigation for the proposed impacts."

Exhibit 23 contains the UMAM functional assessment provided by Applicant. This exhibit consists solely of six pro-forma assessment sheets and does not provide any context, scientific evidence or explanatory text to assist the reviewer in understanding the assessment reasoning, methodology or conclusions.

However, more troubling than the lack of supporting data and commentary are the numerous errors and inconsistencies in the Applicant's UMAM assessment. These errors include the following:

1. There should be a "Qualitative" and a "Quantitative" assessment sheet for each of the assessment areas (impact and mitigation areas). Applicant only provided a single Qualitative assessment (for the principal impact area) and did not provide a Qualitative (Part I) assessment for the three mitigation areas (sea grass transplantation, coral out planting, and mangrove establishment areas).

2. The single "Part I Qualitative Description" form has multiple errors and highly significant omissions:
    a. It does not properly identify the Affected Waterbody Class.
    b. It asserts that the Assessment Area Size is 94 acres, however this figure does not agree with the 114 acres of survey and there is no explanation provided for the 94 acre figure.
    c. The Assessment Area Description neglects to mention the extensive coral formations at Penn Point and Harbor Point.
    d. The "Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands" fails to mention the mangrove channel connection to the salt pond to the northeast of the area. It fails to mention the multiple stormwater guts entering the harbor. It fails to mention circulation currents connecting Hurricane Hole. These features are all significant hydrologic connections.
    e. The "Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)" is blank and fails to identify the fact that Coral Bay has been designated an "**Aquatic Resource of National Importance"** (ARNI) by the United

States Environmental Protection Agency. It also fails to mention the fact that Coral Bay is an "**Area of Particular Concern**" under the Virgin Islands Coastal Zone Management Act.

f. The "Significant nearby features" neglects to mention the Virgin Islands Coral Reef National Monument, the Virgin Islands National Park, and Hurricane Hole (all of national and regional significance).
g. The "Uniqueness" neglects to mention the presence of at least one historic shipwreck eligible for listing in the National Register. It fails to mention that Coral Harbor is the only public mooring area designated by DPNR on the east end of St John.
h. The "Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)" provides a minimal, generic response (Applicant states "Used by fish species, shark and ray species, sea turtles") which does not conform to the guidance. No species are listed. There is no mention of sea bird nesting areas. There is no mention of marine mammals (dolphins), shellfish (e.g. Queen conch), crustaceans (e.g. lobster), other invertebrates (sea cucumbers), and no reference to the detailed published reports of species diversity in Coral Bay.
i. The "Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)" is completed with a minimal, generic response that does not follow the guidance or provide the requested information. The species names are not listed and their classifications are omitted. There is no mention of Nassau Grouper or marine mammals. There is no mention of intensity of use. There is no mention of nesting behavior (e.g. hawksbill turtles) within the area.
j. The "Observed Evidence of Wildlife Utilization" is highly incomplete and inconsistent with other reported species sightings by the Applicant and by others.
k. The "Additional relevant factors" fails to mention that there has been substantial federal investment in upland storm water mitigation projects within the Coral Bay watershed over the past decade.

3. Without a "Qualitative Assessment" of the three mitigation areas (sea grass transplantation recipient site, coral outplanting recipient site, mangrove establishment site) it is impossible to assess the accuracy of the functional gain, if any, from the proposed mitigations. UMAM requires a Qualitative Assessment for every site, including impact sites and mitigation sites.

4. The Corps specifically requested a UMAM functional assessment addressing the different sources of functional loss. Paragraph 11 of the 2022 RAI states "The functional assessment should separate each of the types of impacts (direct, indirect and

temporary) and each activity (pilings, over-water structure, shading-mooring, spudding, propwash and shading during construction)." This has not been done.

5. There are three "Part II Quantitative Assessment" forms provided, presumably one for each of the mitigation areas. None of these forms are completed properly. The following significant errors appear in each of these forms:
    a. The box "Impact or Mitigation" should indicate whether the form is for an impact area or a mitigation area. Applicant has filled this box with the words "Impact or Mitigation" which is incorrect.
    b. The text accompanying the three principal metrics (Location, Water Environment, and Community Structure) is insufficient to justify the scores assigned. In some cases the text assigns a score which differs from the numerical value in the scoring box.
    c. There is no identifying information to ascertain which of the Quantitative Assessment forms is associated with which mitigation area. This must be inferred from the context.
    d. The "Delta" is computed incorrectly on ALL of the Part II forms. The value shown should be divided by 30 to arrive at a correct Delta. Because of this error ALL of the RFG (Relative Functional Gain) numbers are incorrect. RFG should always be a number less than or equal to 1.
    e. No justification is provided for the assigned time factors or risk factors.

6. As a consequence of these serious errors, the summary sheet (Page 5 of Exhibit 23) contains data which is not supported by the UMAM assessment sheets. In particular, the concluding section entitled "Mitigation needed to offset impacts, when not using a bank" includes figures for FG (Functional Gain) that do not appear anywhere in the UMAM assessment and are clearly erroneous.

7. There is no data within Applicant's UMAM assessment to justify Applicant's statement on page 30 of Exhibit 3 (Compensatory Mitigation Plan) regarding impacts and mitigation. Applicant states: "The mitigation has been determined utilizing the UMAN [sic] Mitigation Determination Formula. The Functional Loss is 40.8 and the Functional gain is 40.9 UMAM forms are attached here with." This is not only unsupported by the provided UMAM forms, inconsistent with the UMAM forms, but most importantly is grossly inconsistent with a properly performed UMAM assessment and is fundamentally incorrect.

These serious errors, omissions and inconsistencies in Applicant's UMAM analysis render any conclusion based on that analysis to be of little value, and the UMAM analysis provided by the Applicant clearly does not address the need for a comprehensive UMAM assessment as required by USACE.

INDEPENDENT UMAM ASSESSMENT

In order to characterize the project impacts and the adequacy of the proposed compensatory mitigation measures, we performed an independent UMAM analysis, based on published data for the project environment, local knowledge of the environment, data supplied by the Applicant, and guidance from the Army Corps and Florida DEP on the use and preparation of UMAM assessments.

METHODOLOGY – IDENTIFICATION OF ASSESSMENT AREAS

The first step in the UMAM analysis is to identify appropriate Assessment Areas ("AAs"). For impact areas, these AAs should have a single principal habitat classification (FLUCCs code) and should be subject to a single principal type of impact and activity (e.g. direct, indirect or temporary, as a consequence of pilings, over-water structures, boat shading, spudding, propwash, effluents and/or turbidity from resuspended sediments). To somewhat simplify the analysis we focused on three impact Assessment Areas:

- **Impact Assessment Area 1**: The benthic habitat within the marina footprint which is vegetated and is subject to direct impacts from dock construction, over-water structures, boat shading and turbidity from navigation, prop wash and suspended sediments. We refer to this as the Marina Operational Area. This impact area is limited to the vegetated portion of the 28.5 acres and excludes the 8.6 acres of the deepest water within the marina operational footprint which does not presently support SAV.
- **Impact Assessment Area 2**: The regions of Coral Harbor outside the marina footprint but within the 114 acre action area, subject to indirect and cumulative long term impacts from chronic turbidity due to the transport of resuspended sediments from prop wash and sediment release from sea grass die-off.
- **Impact Assessment Area 3**: The isolated colonized coral communities within the action area, subject to long term impacts of sedimentation and potential boat strikes. Although these colonized areas are in different parts of Coral Harbor we believe they are subjected to similar impacts and are treated as a single area.

UMAM Qualitative Assessments were prepared for each of the three impact AAs. These are shown in Appendix 1, pages 1-6. Following the Qualitative Assessments three Quantitative Assessments are provided, one for each impact area (Appendix 1, pages 7-11). The principal conclusions on Functional Loss, as detailed in the UMAM Part II (Quantitative) sheets, is shown in the table below:

Impact Assessment Area	Acres	Delta (impacted – current)/30	Functional Loss (FL)
1 - Marina Operational Area	19.9	(11 – 28)/30 = 0.57	11.34 ac
2 - Coral Harbor ex Marina	85.5	(18 – 27)/30 = 0.30	25.65 ac
3 - Coral Reef	1.5	(17 – 21)/30 = 0.13	0.20 ac
TOTAL FUNCTIONAL LOSS			**37.19 ac**

The calculated Functional Loss of 37.2 acres is about 10% less than Applicant's figure of 40.8 acres, although Applicant's figure does not appear to be based on any of the supplied documentation.

The Applicant is proposing three Mitigation Areas in the Compensatory Mitigation Plan. They are identified as follows:

- **Mitigation Assessment Area 1:** A 6.8 acre parcel south of Penn Point to be used as a recipient site for seagrass transplantation.
- **Mitigation Assessment Area 2**: A 1.84 acre parcel near Harbor Point to be used as a recipient site for coral outplanting.
- **Mitigation Assessment Area 3**: An 850' long stretch of marina shoreline to be used for mangrove establishment, approximately 0.1 acre (at 5' width). This area is presently unvegetated rip-rap and shallow water.

The UMAM Qualitative Assessment for the three Mitigation Areas are difficult to complete with great detail because the largest area (seagrass transplant recipient site) was outside the region investigated in the Benthic Resource Survey. The survey only extended as far south as Penn Point, and this recipient site is substantially south of Penn Point. As a consequence there is very little information available to characterize the current conditions within this Mitigation Area, as required in the UMAM Qualitative Assessment.

Due to the lack of benthic survey data, the UMAM Qualitative Assessment sheets for the seagrass mitigation area (Mitigation Area 1) is filled out under the assumption that this area is currently a healthy seagrass habitat with strong location and hydrologic support. It is assumed that the community structure is somewhat fragmented due to blowout patches which will be remediated through the seagrass transplant mitigation.

The 1.84 acre coral outplanting Mitigation Area is almost entirely outside the bounds of the Benthic Resource Survey. This location, at the tip of Fortsberg peninsula and in close proximity to the reef at Harbor Point, often experiences significant wave and current action, so it is unclear whether it will be suitable for outplanting. For the purposes of UMAM assessment we have assumed that this is a suitable site with proper hydrology, community structure and location. These assumptions were made and documented in the UMAM Qualitative Assessment for this mitigation site.

The UMAM Qualitative Assessment sheet for the mangrove establishment area (Mitigation Area 3) is based on the current physical condition of this area (bare, rocky shoreline) and the historical condition which does not indicate mangrove growth for at least the past 60 years, as further discussed later.

Following the three UMAM Qualitative (Part I) Assessment sheets for the three mitigation areas we have prepared three UMAM Quantitative (Part II) Assessment sheets, one for each aspect of the mitigation plan. Lacking current data on the condition of the resources and habitat at the recipient sites makes it difficult and somewhat speculative to compute the Delta for the before and after mitigation conditions, and therefore the expected Functional Gain. In general we have assumed reasonable success for the seagrass and coral mitigation actions.

The analysis does, however, raise some significant questions about the suitability of each of the recipient mitigation sites. For example, there is very little mooring activity at the proposed sea grass recipient site so it is unclear whether there are sufficient bare patches to receive 0.70 acres of seagrass transplant. Assuming a roughly 1 meter square sod, the site will receive 2,800 sod transplants (4047 sq meters per acre, 0.70 acres transplanted). Are there sufficient bare patches to accommodate 2,800 sod patches? And since the recipient site has been relatively undisturbed by mooring, if there are bare patches (blowouts) what was the cause of these blowouts and is this the normal condition due to wave activity, etc..? Without a comprehensive, detailed and well documented survey of the proposed recipient site these questions cannot be answered.

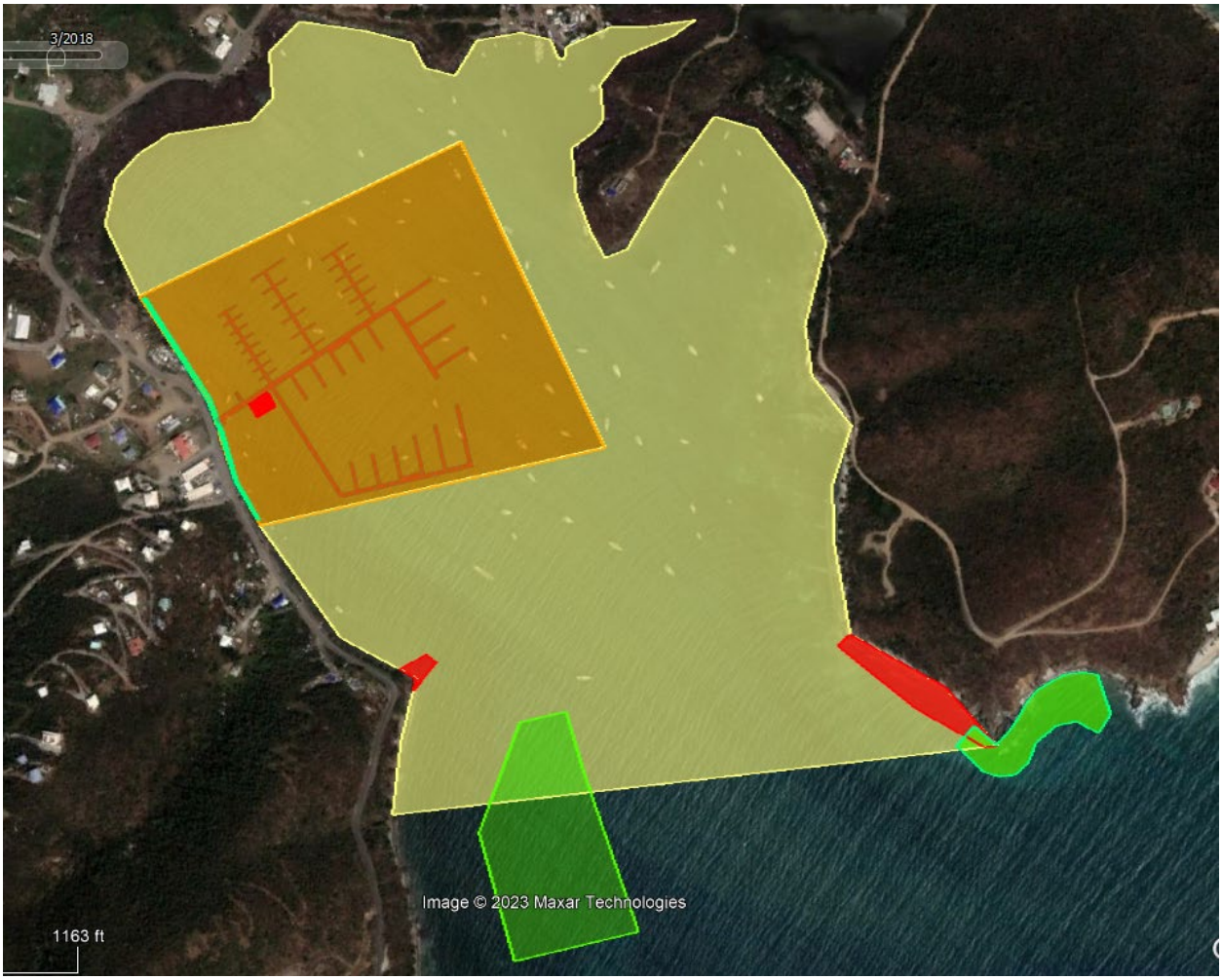
Based on the data and assumptions identified in the UMAM Part II Qualitative Assessments, the Relative Functional Gain for each of the three Mitigation Areas was computed according to the UMAM guidelines. These calculations are summarized in the table below, with the complete details provided in Appendix 1, page 18.

Mitigation Area	Acres	Delta	Time Factor (t)	Risk (r)	RFG (D/t*r)	FG
1 - Seagrass	6.8	0.27	1.14 (5 yrs)	2	0.1184	0.80 ac
2 - Coral	1.84	0.30	1.14 (5 yrs)	2	0.1316	0.24 ac
3 - Mangrove	0.1	0.50	1.25 (6-10 yrs)	2	0.2	0.01 ac
TOTAL FG						**1.05 acres**

The calculated UMAM Functional Gain from the three proposed compensatory mitigations is slightly greater than 1 acre. This is dramatically different from Applicant's claim that the UMAM Functional Gain will be 40.9 acres (completely unsupported in the submitted documents).

The gross error in Applicant's determination of UMAM Functional Gain is apparent from a cursory look at the mitigation areas. There is a total of around 9 acres of mitigation (6.8 seagrass, 1.8 coral, 0.1 mangrove). Even if all of these mitigations went from a current score of 0 to a maximum score of 30, the delta would be 1.0. So the maximum possible UMAM Relative Functional Gain (RFG) is 1.0 – assuming a risk of 1 and a time factor of 1. The highest POSSIBLE Functional Gain from the proposed mitigation is around 9 acres, not the 40+ acres claimed by the Applicant. When using the correct figures for delta, t-factor and risk, the ACTUAL Functional Gain is slightly greater than 1 acre, as opposed to over 40 acres of Functional Loss.

The location of the three UMAM Impact Assessment Areas and the three UMAM Mitigation Assessment Areas are shown in the map illustration below. The orange area surrounding the marina docks is Impact Area 1 (Marina Operational Area). The pale yellow area encompassing Coral Harbor outside the marina operational area is Impact Area 2. The three red areas are Impact Area 3 (coral reef). The three green areas are the mitigation areas (seagrass transplant, coral outplanting, and mangrove establishment along the shoreline).



As can be seen from the map the majority of the mitigation areas are outside the boundaries of the 114 acre benthic survey region. These recipient sites should be quantitatively surveyed in order to establish a baseline for mitigation.

As stated previously, the UMAM Qualitative Assessment of the three Mitigation Areas (seagrass recipient site, coral recipient site, mangrove establishment site) are difficult to complete due to lack of field observation data.

1. The seagrass recipient site (Mitigation Assessment Site 1) is mostly located outside the boundaries of the Benthic Resource Survey and therefore no information is available on the habitat conditions at that site. Previous surveys have reported this general area as

dense seagrass which would likely be appropriate for a recipient site. However it is unknown whether there is sufficient unvegetated benthos to accommodate 2,800 square meters of seagrass sod (0.7 acres transplanted). And if there are bare areas, it is unknown why they are currently unvegetated. Additional detailed investigation is required to determine whether this is a suitable recipient site for the proposed seagrass transplantation. A further concern is the possibility of transporting Halophila stipulacea seedlings from the impact site to the mitigation site. No protocol has been presented to ensure that this transplantation will not exacerbate the invaded territory of the exotic sea grass.

2. The coral outplanting recipient site (Mitigation Assessment Site 2) was not surveyed in the benthic study and there is only minimal information available regarding the conditions at that location. It raises the question of why there is limited coral cover at that site but substantial coral "around the corner" at Fortsberg. Exposure to wave action may render this a difficult site for coral outplanting.

3. The mangrove establishment site along 850' of Coral Harbor western shoreline is readily observed to be a rip-rap revetement protecting the shoreline road, proceeding into shallow mixed rocks, sand and mud. This shoreline is directly exposed to the open ocean and experiences continuous wind and wave action, generally mild to moderate but increasing to severe during tropical weather events. Its FEMA floodplain classification is VE-14, indicating a significant probability of severe wind and wave impacts. This habitat is not suitable for mangrove growth, and historical photographs demonstrate that this area has not supported mangroves for at least 80 years.

Each of the three proposed mitigation sites is problematical due to known conditions or lack of data.

For example, as stated above, the mangrove mitigation site consisting of 850' of shoreline on the western shore of Coral Bay is unlikely to be a suitable habitat for mangrove survival. The shoreline onto which the application proposes to plant 300 red mangrove propagules has not been a viable mangrove habitat for as far back as we are able to research. The image below is an aerial photograph from 1954 showing the general vicinity of the proposed marina, before the onset of significant 20th century development in Coral Bay:

In the rendering below, we have highlighted the roadway in RED and outlined the extent of the 1954 mangrove just north of the proposed marina in GREEN.

It is readily apparent from the 1954 aerial photograph that there were no mangroves along the shoreline south of the highlighted mangrove. The roadway was directly on the shoreline,

where it remains today, and it veered inland at the start of the mangrove wetland to avoid the "swamp" where the mangroves grew. There were no mangroves along the shoreline where the road traveled along the water's edge in 1954.

This area is devoid of mangroves because of constant wave action. Mangrove propagules require calm water conditions to root and thrive. Placing 300 red mangrove propagules along 850 feet of shoreline where they haven't grown in at least 70 years is highly unlikely to result in success. We therefore dispute the efficacy of this mitigation and consider it to be highly risky.

UMAM SUMMARY OF IMPACTS AND MITIGATIONS

The table below summarizes the Functional Impacts and Functional Gains from the proposed project and proposed compensatory mitigation, as detailed in the assessment sheets in Appendix 1.

Assessment Area (AA)	AA Acres	Delta	t-Factor	Risk	FG or FL
Impact Area 1 – Marina Operational Area	19.9	0.57			11.34
Impact Area 2 – Coral Harbor	85.5	0.30			25.65
Impact Area 3 – Coral Reef	1.5	0.13			0.20
TOTAL FUNCTIONAL LOSS					**37.19**
Mitigation Area 1 – Seagrass	6.8	0.27	1.14	2	0.80
Mitigation Area 2 – Coral	1.84	0.30	1.14	2	0.24
Mitigation Area 3 - Mangrove	0.1	0.5	1.25	3	0.01
TOTAL FUNCTIONAL GAIN					**1.05**
NET FUNCTIONAL LOSS					**36.14**

Based on this independent UMAM analysis, the project would result in 37.19 acres of Functional Loss and the proposed mitigations would result in 1.05 acres of Functional Gain resulting in a net Functional Loss of 36.14 acres.

CONCLUSION: The proposed mitigations are grossly inadequate for this project and would result in severe and extensive functional impacts to large areas of Coral Harbor.

APPLICANT'S STATEMENT OF MITIGATION COSTS

To further illustrate the gross inadequacy of Applicant's mitigation proposals, we have examined the per acre cost of mitigation credits and in-lieu fee ("ILF") programs for offsetting impacts to marine habitat resources and compared these costs with the budget submitted by the Applicant for Applicant's mitigation proposal. Although there are no mitigation banks or ILF programs currently available within the Virgin Islands, the comparison with these programs in

other locations within the USACE Jacksonville District provides a good benchmark for mitigation cost.

A 2015 study[1] conducted for the USACE Jacksonville District Regulatory Program, examined a large collection of seagrass mitigation projects in order to determine an appropriate per-acre fee. The introductory paragraph to this report states:

> The purpose of this review is to evaluate past methods and associated costs for multiple seagrass restoration projects located in the Florida Keys and provide recommendations for cost-effective, reliable procedures to accelerate recovery of damaged seagrasses in the area. Information presented and evaluated will be used to determine what costs should be assessed and at what price advanced credits (AC) should be sold to ensure "full cost recovery" of seagrass restoration within the Keys Restoration Fund (KRF) In-Lieu Fee Program service areas.

On May 30, 2015, the Chief, Jacksonville Regulatory Division, USACE, approved the KRF program and ILF per acre rate. The approval letter stated, in part, "The proposed rate is based upon the estimated cost of $25 to $50 per square foot of restoration" and approved a final rate of $1,089,000 per acre of UMAM impact (equivalent to $25 per square foot).

Applicant has stated in "Appendix 16 – Minimization Images" that their proposed compensatory mitigation measures will cost approximately $500,000. Although the tables in Figure 11 (2018 Proposed Mitigation Cost) and Figure 12 (2020 Proposed Mitigation Cost) are somewhat difficult to interpret and difficult to reconcile with the text of the mitigation plan, it is clear that Applicant is stating that the entirety of the proposed mitigation plan – which includes multiple components that do not qualify as restoration, enhancement, establishment or protection – amounts to $988,000 in cost.

The UMAM impacts assessed by the Applicant are shown on page 5 of "Exhibit 23 – UMAM Assessment Documents" as 40.8 acres of Functional Loss. Our independent UMAM assessment (Appendix 1) computed 37.19 acres of Functional Loss.

If the lower figure of Functional Loss is taken (37.19 acres), with the USACE approved ILF advance credit pricing of $1,089,000 per acre, the total ILF price for mitigation should be $40,499,910.

Even if a substantially lower per acre cost is used – for example $500,000 per acre – the total mitigation cost should be in the vicinity of $20 million, or more than twenty times what Applicant proposes.

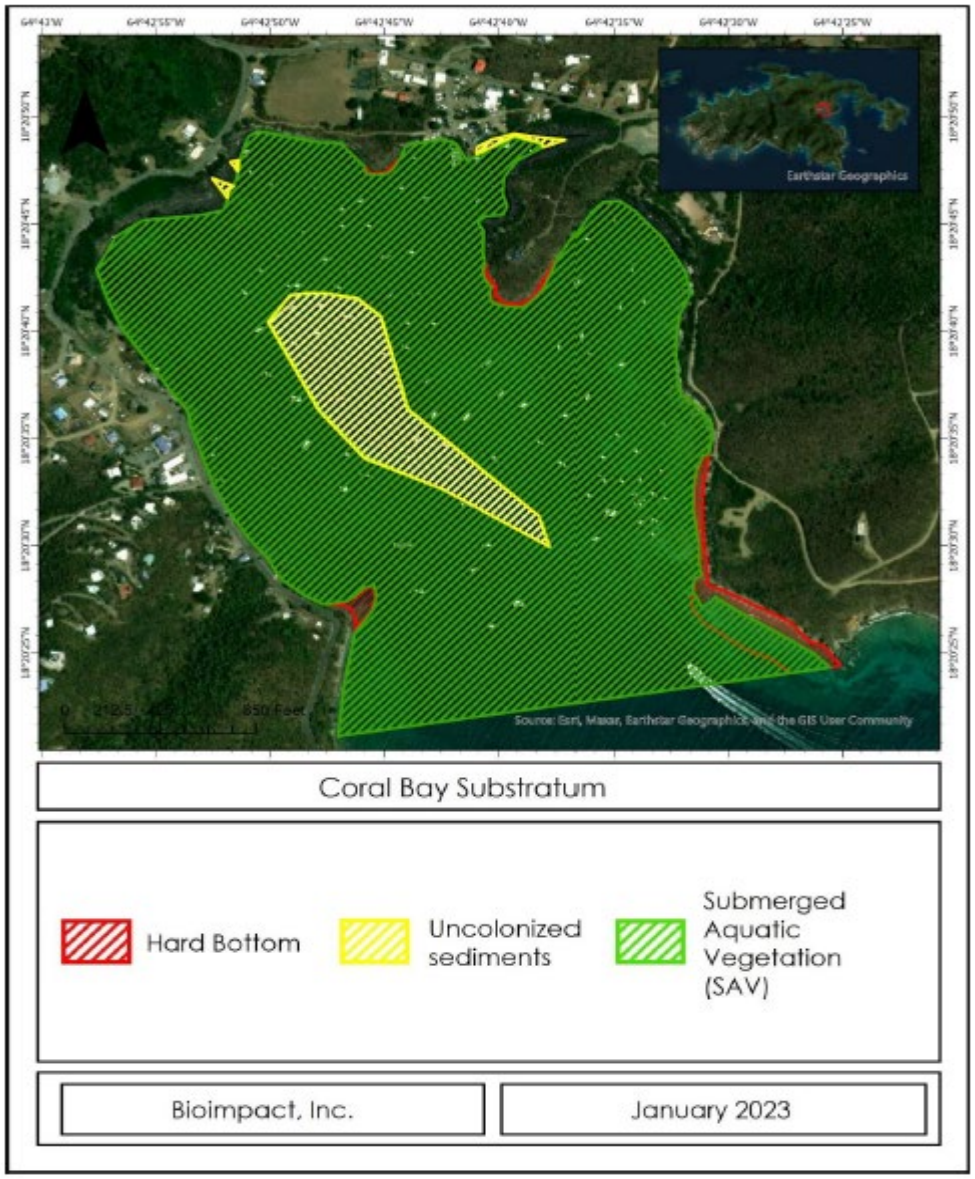
[1] PAST KEYS SEAGRASS RESTORATION PROJECTS - REVIEW AND COST ANALYSES REPORT, Coastal Resources Group, Inc., May 15, 2015, https://thebluepaper.com/wp-content/uploads/Append-B-Seagrass-Restoration-Costs-FINAL-2015.pdf

This calculation shows the gross insufficiency of Applicant's proposed mitigation measures, which, at most, are equivalent to 2.5% - 5% of the required cost (approximately $1 million proposed, as opposed to approximately $20-40 million required).

BENTHIC RESOURCE IMPACTS - SAV

Even though the data submitted by the Applicant in the 2022-2023 Benthic Survey is limited and incomplete, there is one key finding which is central to the assessment of benthic resource impacts. In the submitted document entitled "2023 0106 Supplemental Benthic Info" Applicant states "Submerged Aquatic Vegetation (SAV) is the most abundant habitat type in Coral Harbor, spanning 97.05 acres, or 84% of the survey area." This finding is consistent with multiple prior benthic surveys of Coral Harbor, which all illustrate extensive SAV cover throughout the harbor.

Except for the central, deepest portion, all of Coral Harbor has a vegetated benthos consisting of multiple species of sea grasses, rhizomatous macroalgae and drift algae, as illustrated in Applicant's benthic habitat map (2022-2023 Benthic Survey):



Although Applicant focuses almost exclusively on impacts to native sea grasses, NOAA considers ALL Submerged Aquatic Vegetation to be Essential Fish Habitat and subject to protection under the Magnuson-Stevens Act. In the online article entitled "Why Is Submerged Aquatic Vegetation Designated As Essential Fish Habitat?" NOAA Fisheries (NMFS) writes:

> Under the Magnuson-Stevens Act, EFH is defined as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity". As a result, the three fishery management councils (Gulf, Caribbean, and South Atlantic) designated SAV as EFH, important to conserve to promote sustainable fisheries.[2]

The recognition of the conservation status of SAV is further documented in the NMFS comment letter submitted in this Army Corps permit review. During the public comment period in 2015, NMFS submitted a comment letter to USACE with the following statements:

> The CFMC (Caribbean Fisheries Management Council) identifies seagrass, algal flats, live/hardbottom, and sandy bottoms as EFH under the fishery management plans for spiny lobster, queen conch, coral, and reef fish. These habitats serve as nursery areas for fishery species. Seagrass, algal flats, sandy bottoms, and live / hardbottoms are part of a habitat complex that includes mangrove and coral, and this complex supports a diverse community of fish and invertebrates. Seagrass also provides important water quality maintenance functions (such as pollution uptake), stabilizes sediments, attenuates wave action, and produces and exports detritus (decaying organic material), which is an important component of marine and estuarine food chains. [March 5, 2015 Comment Letter from NMFS]

It is apparent that NMFS has designated all SAV as EFH for managed species, including algal flats and all vegetated bottom cover providing life cycle habitat for managed species.

APPLICANT'S LIMITED COMPUTATION OF RESOURCE IMPACTS

Based on a detailed review of Applicant's computation of benthic resource impacts (found in "Exhibit 4 - 2022-2023 Benthic Survey" and in "Exhibit 3 - Compensatory Mitigation Plan") it appears that Applicant has significantly understated the impacts to protected benthic resources by systematically neglecting the impacts on all forms of SAV. Applicant has narrowly focused on impacts to native sea grasses, and neglects to consider impacts to other SAV species and habitats.

[2] https://www.fisheries.noaa.gov/southeast/habitat-conservation/why-submerged-aquatic-vegetation-designated-essential-fish-habitat

Although direct and indirect impacts to the native seagrass species are certainly highly significant, a thorough analysis of impacts to protected benthic resources must also include impacts to other species of SAV, including the seagrass Halophila stipulacea (which Applicant refers to as "sea vine") and rhizomatous macroalgae. These components of SAV, found over significant portions of the Coral Harbor survey area, contribute to the overall health and productivity of the marine environment. Applicant's failure to consider impacts to all EFH has resulted in significant errors in the estimate of benthic resource impacts.

CHARACTERIZATION OF EFH IMPACT SOURCES

The construction and operation of the proposed marina will adversely impact EFH resources, including SAV, through three main routes:

1. **Physical disruption**: The principal sources of physical disruption to the benthos include placement of barge spuds, the installation of pilings, propeller wash from large motorized vessels during construction and operation, and boat strikes and groundings. Any of these disruptions can easily detach seagrasses and macroalgae from the substrate ultimately resulting in death of the SAV.

2. **Impaired Photosynthesis**: Any degradation of light penetrating the water column and reaching the seabed will affect all photosynthetic species, including all seagrasses and macroalgae. The principal sources of light degradation include shading from fixed marina structures (pilings and decking), shading from vessels berthed at the marina, increases in turbidity due to suspended sediments from prop wash and construction, resuspended sediments released by sea grass die-off, and the dispersion of medium and fine silt sediments due to wind and tidal driven currents in Coral Harbor.

3. **Pollutant discharge**: Although the highly toxic tributyltin (TBT) has been banned in most jurisdictions, this and other toxic anti-fouling compounds are still sold outside US jurisdiction in the Caribbean. Cleaning compounds, including detergents and chemical bleaches are used extensively on larger yachts. Discharges in waste water and storm water from upland activities at the marina site will directly enter the marina site. Small fuel spills from the fueling dock and from bilge water will release hydrocarbons into the water column.

APPLICANT'S ESTIMATES OF SAV SHADING IMPACTS

Over the nine years of permit review, the Applicant has submitted widely varying estimates of SAV loss due to shading impacts, using different methodologies and different figures in each submission. In their 2015 permit application to USACE, the Applicant claimed a total of 2.9 acres of seagrass loss, with an additional undefined amount from construction barge operations and marina ongoing operations.

In 2017 the Applicant revised this figure to 3.75 acres based on a different computational methodology. And in the current 2023 submission the total impact is claimed to be only 1.84 acres. These differing totals are summarized in the table below. In our opinion, such widely differing conclusions and different methodologies for calculation are indicative of a lack of objective scientific reasoning.

Shading Source	**2015**	**2017**	**2023**
Pilings Footprint	0.06 ac	0.031 ac	Not included
Fixed Marina Structures	0.8 ac	0.487 ac	0.70 ac
Boats	2.0 ac	2.825 ac	0.61 ac
Barge Spudding	Not included	0.023 ac	0.023 ac
Construction Prop Wash	Not included	Not included	0.136 ac
CONSTRUCTION TOTAL		**3.366 ac**	**1.47 ac**
Operations	Not included	0.337 ac	0.34 ac
TOTAL REPORTED	**2.9 acres**	**3.75 acres**	**1.84 acres**

As an example of the inconsistency in methodology, the 2017 estimate for boat shading impact (found in the applicant's August 2017 submission) states:

> "At the maximum capacity and at the maximum size boat in each slip there will be 5.65 acres of shading due to vessels. It can be assumed that 50% of the seagrass under vessels will be lost due to vessels being in placed [sic] more than 2 weeks at a time."

In the current (2023) submission the method for calculating shading impacts due to boats was changed from the 2017 submission, resulting in a reduction of 78% in the boat shading impact. The 2023 document states:

> "At the maximum capacity and at the maximum sized boat in each slip there will be 1.219 acres (53,080sq.ft) of shading due to vessels within the area of dense seagrass colonization. It can be assumed that 50% of the seagrass (26,540 sq.ft. [equal to 0.61 acre]) in this footprint will be lost due to vessels being docked more than 2 weeks at a time."

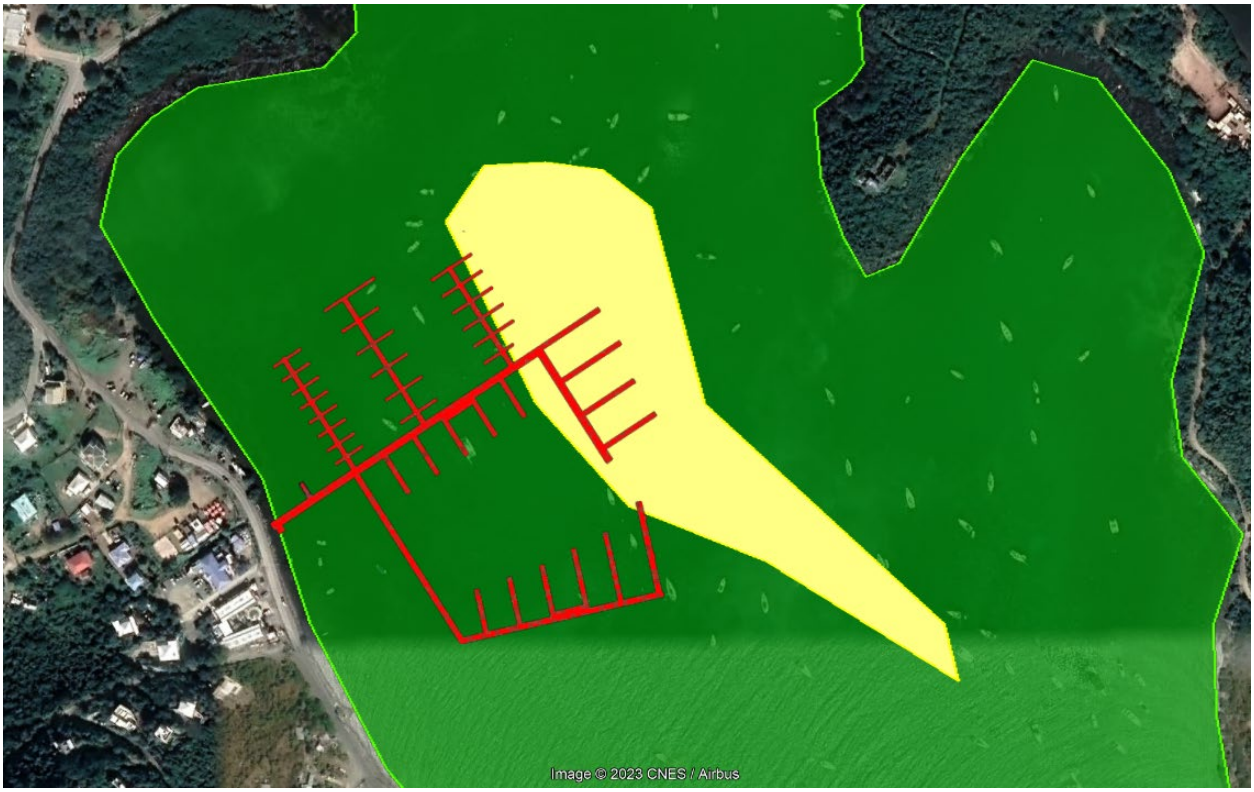
The lack of scientific rationale in Applicant's shading impact statements should be readily apparent from an examination of these two statements. The estimate in 2017 was based on 5.65 acres of boats producing 50% seagrass loss, or 2.825 acres. The estimate in 2023, with an 18% reduction in total boat area and a minor (<5%) reduction in seagrass cover, is only 0.61 acres of impact. This is equivalent to a 78% reduction in estimated boat impact, resulting from an 18% reduction in boat area, an illogical and incorrect result.

A SCIENTIFIC BASIS FOR COMPUTING SHADING IMPACTS TO SAV

In our March 2022 comments to USACE we reviewed the scientifically flawed shading model submitted by the Applicant and offered a valid, calibrated model based on actual solar elevations at the latitude of the USVI and shadow movement in the course of the year. That model, for reference, is attached to these comments as Appendix 2.

The conclusion of that model was that the area of impacted SAV depends on a number of physical factors, including dock orientation, dock width, height above the seabed and vertical depth of the dock structure. For configurations representative of the proposed marina structures the typical area of SAV impact was 140-160% of the horizontal extent of the shadow-producing object (either a dock, or a boat, or a piling). This is due to the movement of the shadow during the course of the day and the course of the year, and the maximum sunlight deprivation which SAV can tolerate before dying.

The portion of the marina located over SAV (EFH) is shown in the graphic below:



Based on the 2023 marina layout the total square footage of the dock structures is 67,833 sf and the portion that is located over SAV is 59,600 sf. Approximately 8,233 sf of dock structure is located over the unvegetated patch in the middle of the harbor. The percentage of the marina structure over SAV is 88% which is equal to 1.37 acres.

The applicant reports that 39,258 sf are located over seagrass, but this figure neglects the other SAV components in the benthos (including H. stipulacaea and macroalgae) which are subject to conservation under EFH regulations.

With the foregoing information it is now possible to summarize the impacts on EFH from marina construction and operations. The impact consists of the following components:

1. **Shadows from fixed docks located over SAV**: This is calculated as 88% of the total dock footprint, equivalent to 1.37 acres.
2. **Shadows from vertical pilings**: The 960 pilings average 15' in length from seabed to dock height (10' water depth, 5' above water), with an average diameter of 16", will cast a shadow of 20 sf when the sun is 45 degrees above the horizon (the average elevation). Total piling shadow area is 0.44 acres. Approximately 88% of the pilings will be located in SAV, for a total impact of 0.39 acres.
3. **Shadows from Boats at Marina Slips**: Using the lengths and beam of the boats slips in the marina, the total boat area is 3.94 acres. At 90% occupancy and with 88% of the slips over SAV, this produces 3.12 acres of shading over SAV. Since seagrasses will succumb to shading impacts in 2 weeks the expected mortality will be 100% from the boat shading.
4. **Shadow elongation and Shadow movement**: The model for shadow length and daily and seasonal shadow movement (Appendix 2), produces a range of values for the mortality area from horizontal structures (boats and decks). For this marina, with non-ideal dock and vessel orientation, the average mortality area is 140-160% of the structure area. We have used a figure of 140% to be conservative and to account for some degree of shadow overlaps (e.g. pilings and vessels).
5. **Marina operational impact within operations area**: The impact on EFH within the 28.5 acre operational footprint of the marina will stem primarily from the impact of resuspended fine sediments, causing increased turbidity, reduced light penetration, and sediment deposition on SAV. Our estimate of the scale of this impact is based on the UMAM Quantitative Assessment for the Marina Footprint Impact Area (see UMAM section). The UMAM Delta computed for this area is 0.50, equivalent to a 50% reduction in functional utility. There are approximately 19 acres of SAV inside the 28.5 acre marina operations area, of which approximately 7 acres are within the direct impacts of the marina docks and vessels, so an additional 12 acres are subject to high turbidity from operations. Using the UMAM assessment of 50% impact this results in an additional 6 acres of functional loss.

These SAV loss components are summarized in the table below.

Shading Component Affecting SAV	Scientific Estimate	Applicant Estimate
Fixed Docks (including construction impact)	1.37 acres (all EFH)	0.86 ac (seagrass only)
Piling Shadows	0.39 acres	not included
Boats Shadows at 90% occupancy peak month	3.12 acres	0.61 acres
Sub Total	4.9 acres	1.47 acres
Shadow Elongation and Movement (35%)	1.7 acres	not included
Total Shading Impact	**6.6 acres**	**1.47 acres**
Marina operations impact	**6.0 acres**	**0.344 acres**
Total EFH Impact	**12.6 acres**	**1.8 acres**

CONCLUSIONS – IMPACTS ON EFH WITHIN THE DIRECT MARINA OPERATIONS AREA

Based on the analysis and modeling described in this section it is our considered opinion that the computation of SAV loss submitted by the Applicant is grossly underestimated. The estimate is flawed for all of the following reasons:

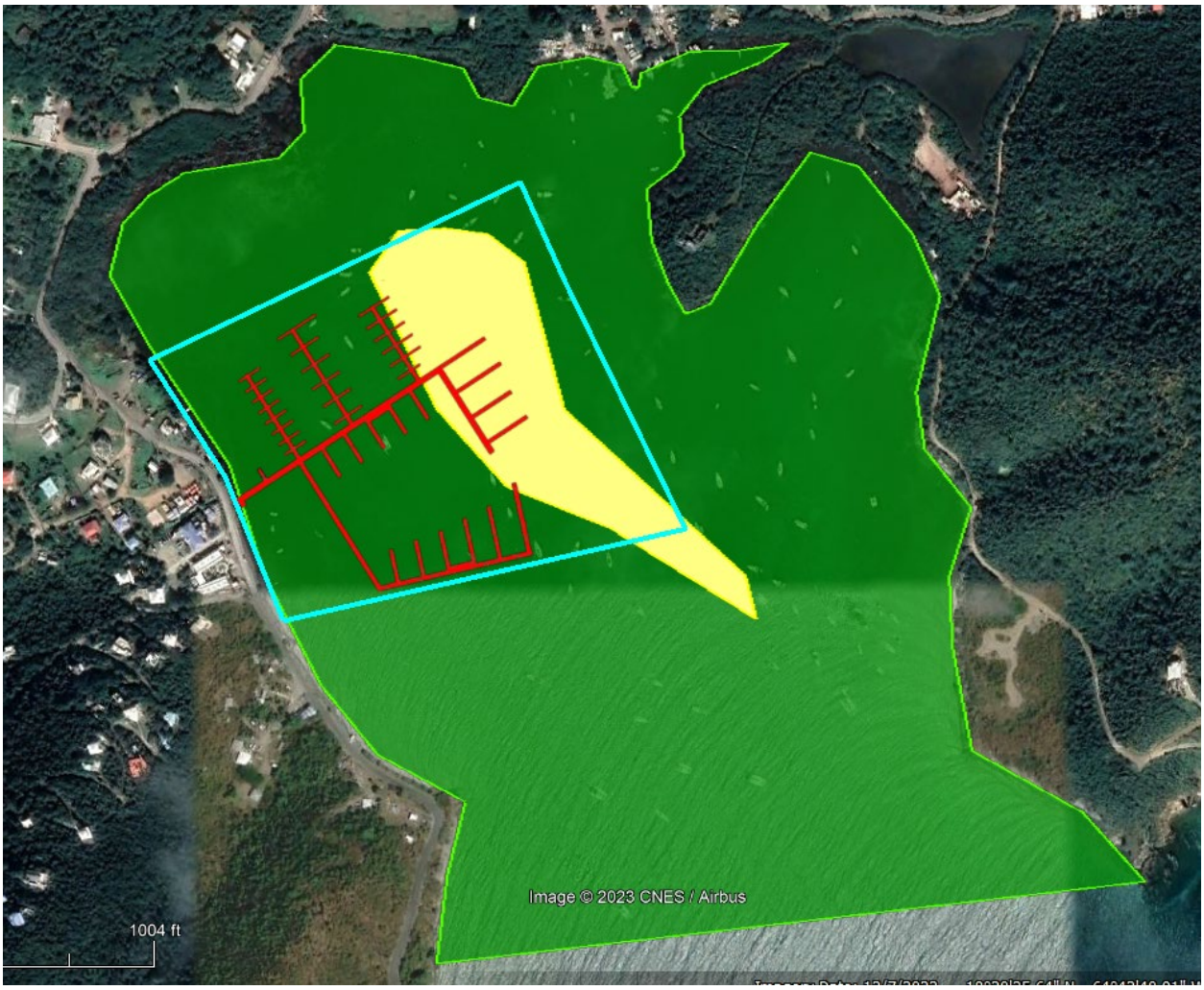
1. Applicant solely considered impacts to native seagrasses and neglected impacts to other forms of SAV, which are subject to conservation regulations as EFH.
2. Applicant failed to adequately consider the impacts of shadow movement and shadow elongation due to the constantly changing position of the sun during the course of a day and the course of a year.
3. Applicant erroneously claims that EFH impacted by boat shading will have a 50% survival rate. This is unsupported in the scientific literature and in practical experience.
4. Applicant failed to provide an objective analytical basis for the estimate of SAV impacts in the operational area, selecting an arbitrary figure which does not agree with the UMAM quantitative assessment of the operational impact area.

It is our strong belief, supported by research, models, and real-world experience, that the Applicant has understated the impacts to seagrasses and other SAV by an order of magnitude and we strongly urge the Army Corps and NOAA to consider the estimates provided by us as a more reliable and accurate statement of loss of EFH and SAV habitat. **The loss of EFH within the 28.5 acre operational impact area is estimated to be 12.6 acres, as opposed to the 1.8 acres claimed by the Applicant. This loss estimate is close to, and consistent with the UMAM estimate of 11.34 acres of functional loss within the marina operational area.**

IMPACTS TO EFH OUTSIDE THE OPERATIONAL IMPACT AREA

The 2022-2023 Benthic Resource Survey, even with all of its limitations, confirmed the extensive presence of SAV throughout the study area. Other than a relatively small, less than 10 acre patch in the deepest water, SAV is found in the benthos over the entirety of Coral Harbor.

The image below illustrates the fixed marina structures in red, the 28.5 acre operational area outlined in turquoise, and the SAV extent in green. Applicant reports SAV presence in 97.5 acres of the 114 acre study area.



The principal impact to SAV outside of the operational impact area will stem from the transport of medium and fine resuspended silt carried on wind-driven and tidal-driven circulation currents. These sediments will be continually suspended as a consequence of prop wash from boat maneuvering, release of sediments from seagrass mortality, disruption of the water column in the navigation channel, and other physical processes.

It is important to recognize that there are currently approximately 100 boats moored in Coral Harbor, of which at least 50% are sailboats. The average motorboat currently in Coral Harbor is considerably less than 50' in length, for a total motorized vessel population of less than 2,500' of vessel. The proposed marina aims to bring an additional 7,800' of motorized vessel into Coral Harbor (115 slips averaging 68' in length) which is more than three times the current population, or a 300% increase in motorized vessel residency.

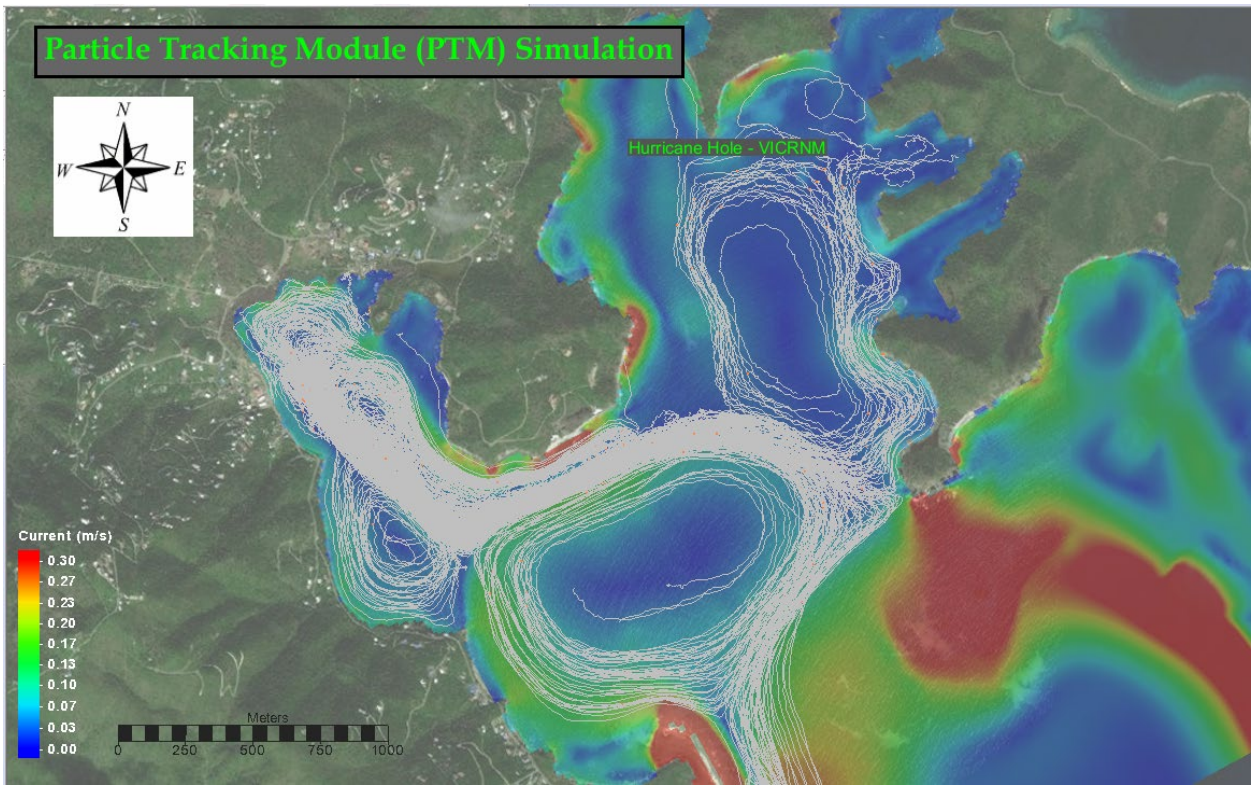
Years of experience have shown that larger vessels have extreme difficulty navigating the relatively shallow waters of Coral Harbor. With the proposed major increase in motorized vessel traffic there is little doubt that there will be significant impacts to the benthos throughout the harbor. The photograph below is one of many showing the navigational difficulty of larger yachts, a not uncommon sight:

NUMERICAL SIMULATION OF CORAL BAY WIND AND TIDAL DRIVEN CURRENTS

In March 2022 we submitted extensive comments rebutting the numerical simulations submitted by the Applicant. Among other things we demonstrated that the Applicant's model simulations had not been adequately calibrated or validated. We demonstrated that the model results did not agree with physical observations. We demonstrated that the failure to account for wind-driven currents was a major failure of the Applicant modeling work.

In addition to presenting a more comprehensive set of model simulations to the Corps, we went a step further and utilized the SMS Particle Tracking Module to illustrate potential patterns of sediment transport throughout Coral Harbor and into Coral Bay and Hurricane Hole. These PTM simulations clearly demonstrated the potential for chronic turbidity and impacts to protected resources throughout the Coral Harbor benthos.

Appendix 3 is an excerpt from our March 2022 comments. It describes the Particle Tracking Simulation and the conclusions reached from it. The primary observation from the PTM simulation is that medium and fine silt is capable of being transported outside of Coral Harbor and once these sediment plumes reach the outer harbor they can be transported by circulation currents into Hurricane Hole. The graphic below, one of the PTM simulation outputs, illustrates potential particle trajectories based on the simulated wind and tidal driven currents:



In fact, in Applicant's "Exhibit 1 – Water Quality Monitoring Plan" there is a satellite photograph showing two examples of sediment plumes extending outside the mouth of Coral Harbor and

overlapping the navigational channel. The location of these plumes coincides with the predicted location from the SMS PTM simulation.

December 30, 2018 September 10 , 2005

Figure 8. Turbidity plumes extending from Coral Harbor.

CONCLUSIONS: POTENTIAL IMPACTS TO RESOURCES OUTSIDE THE OPERATIONAL AREA

Based on the UMAM analysis, the SMS and PTM simulations, the grain size and composition of the mud and silt substrate, and physical observation of sediment transport in Coral Harbor and Coral Bay, we believe there is a very high likelihood that the construction and operation of the proposed marina will result in chronic turbidity throughout Coral Harbor with impact to EFH and protected resources throughout the Action Area.

Additionally, we believe there is a strong probability that these impacts will extend into Hurricane Hole and the Virgin Islands Coral Reef National Monument.

The UMAM Assessment computes a Functional Loss of approximately 26 acres of EFH for regions of Coral Harbor outside the marina operational area. We believe this is a conservative figure which could easily be exceeded.

AVOIDANCE AND MINIMIZATION

Throughout the nine year permit review, the Corps has reiterated the need for avoidance of losses and minimization of impacts to aquatic resources and has repeatedly recommended approaches to accomplish this. In the September 2022 RAI, the Corps reviewer wrote:

> The Corps believes that your project, as currently proposed, may be contrary to some of the public interest factors due to the failure to avoid and minimize the effects of the project impacts to the extent it is practicable to do so - 33 CFR 320.4(r)(1) (losses will be avoided to the extent practicable). In order to determine that your proposed alternative to construct the marina at Coral Bay has **avoided impacts to aquatic resources to the maximum extent practicable**, the applicant must clearly demonstrate that it is not feasible to implement alternatives that have less adverse impacts on the aquatic ecosystem than the proposed project.

Some of the suggestions proposed by the Corps over the years are listed in the table below, together with the Applicant's response to those suggestions:

Date	Proposed Avoidance or Minimization	Applicant Response
10/22/2015	please evaluate potential design modifications or reductions in the size of the proposed project footprint (including structures, as well as construction and operation footprints)	**REJECTED**
2/26/2020	Please provide onsite alternatives for the proposed project. At a minimum this must include varying configurations, varying slip counts, proposed impacts with alternative configurations.	**MOSTLY REJECTED**
	Please provide an updated alternatives analysis with a conceptual site plan for each alternative.	**NOT DONE**
9/13/2021	reduce the width of the walkways	**REJECTED**
	eliminate the southern dock	**REJECTED**
	construct the dock in phases	**REJECTED**
	downsize the footprint of the marina	**REJECTED**
	eliminate piers F & G	**REJECTED**
	move the gangway to the north at a minimum 20-feet	**REJECTED**
	Reduce the number of boat slips	**PARTIALLY ACCEPTED**

Notably, the Corps has consistently recommended minimization involving the "southern dock" consisting of piers F and G. This is the dock that the Applicant has proposed for super and mega yachts – the vessels which present the greatest impact to protected resources. Their greater size and shadow area, their greater draft and propeller wash, greater quantity of effluents and

more complex maneuvering all tend to make the largest yachts the greatest contributors to resource impacts.

In the current submission the Applicant is proposing to reduce the slip count by 29 slips – from 144 down to 115. However on closer inspection this reduction does not accomplish the type of impact avoidance and minimization requested by the Corps, and in fact this reduction is not in the public interest.

Of the 29 slips being eliminated, only five (5) slips are for vessels 80' and larger (super yachts) and the majority of the eliminated slips (24) are for vessels under 80'. Of the larger slips, four (4) were eliminated due to their proximity to a known historic resource, and their elimination would likely have been required once the Section 106 NHPA consultation is completed. Their elimination was not intended to reduce impacts on the benthic habitat, since there is far less SAV at those slips than elsewhere in the project.

The majority of the slip reduction is in the NORTH marina – where the slips are for vessels ranging in size from 30 – 75'. The Applicant is proposing the following slip reductions:

- eliminate 13 slips for vessels averaging under 40' in length,
- eliminate 11 slips for vessels averaging 63' in length, and
- eliminate only 5 slips for vessels averaging 140' in length.

The impact of this slip reduction will result in minor benefits to the benthic resources – a possible reduction of around ½ acre in SAV shading – but the impact on the interests of the St John boating community will be significant. The vast majority of St John boat owners own vessels less than 80' in length. So the proposed slip reduction will remove 24 slips from the inventory of interest to local boat owners, and only 5 slips from the inventory for super- and mega-yachts.

ERRORS IN EXHIBIT 16 – MINIMIZATION IMAGES

Applicant's claims in Exhibit 16 regarding reductions in marina structure size are incorrect and misleading. The first proposed dock footprint for this project appeared in the July 2015 Army Corps public notice. That notice stated:

> "The dock itself occupies 1.42 acres of which 181 square feet would be over areas with seagrass and coral rubble, 1,567 square feet over area of sparse seagrass, 41,546.37 square feet over areas with 30%-100% seagrass coverage, 27,072 square feet over areas with 5-30% seagrass and algae coverage and 4,717 square feet over areas with 5% seagrass/algae coverage". [July 2015 USACE Public Notice]

The square footage numbers in this 2015 description add up to 75,083 square feet, which is 1.72 acres (not the 1.42 acres stated in the public notice). The language in the public notice

was copied verbatim from the permit application submitted by Summers End in May 2014 in which this arithmetic error first appeared.

The drawings included with the public notice depicted dimensioned dock structures totaling 75,115 square feet, or 1.72 acres, which we believe is the correct figure for the initial dock area described in the 2015 public notice.

There are multiple incorrect minimization claims made by Applicant in "Exhibit 16 – Minimization Images" including the following:

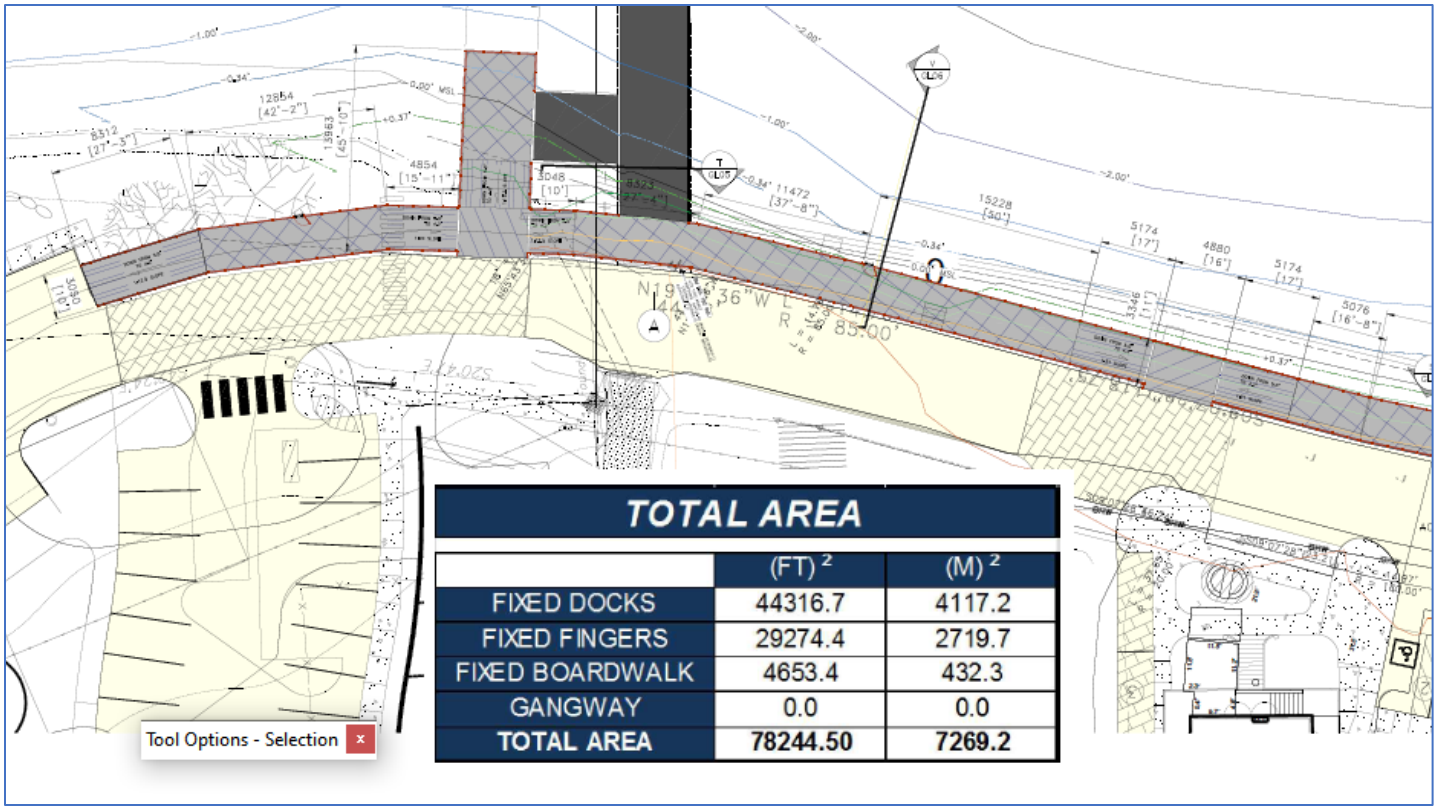
- **Exhibit 16 – Minimization Images, Figure 1**: Applicant's claim that the "Initial Total Dock Area" was 91,573.76 sq ft is simply incorrect. This initial total dock area was approximately 75,115 sq ft. The larger figure is, presumably, either an error or a plan which was never submitted for permitting.
- **Exhibit 16 – Minimization Images, Figure 3**: Applicant's claim that the initial design included a 60'x80' structure over the water is likewise incorrect – such a structure never appeared in any public notice for the project. It may have been a conceptual plan by Applicant, but it has never appeared in a permit application or public notice.
- **Exhibit 16 – Minimization Images, Figure 7**: Applicant's claim that the initial design included 24 mooring balls is likewise incorrect; the initial public notice included 12 mooring balls to the south of the marina.

An accurate assessment of the extent of structural reduction needs to compare the 2023 plans with plans submitted in 2017 and 2015.

THE 2017 PLAN MODIFICATIONS

The 2017 modification to the dock design removed one finger pier in the vicinity of the documented historic shipwreck. The removal of the finger pier was required by VISHPO, and was not done to minimize impacts to benthic resources which are fairly scarce in the deeper water at the end of the south dock. This modification reduced the dock area by 1,492 sq ft (primarily to the removal of a single 140' x 10' finger pier) to 73,591 sq ft.

Although the 2017 dock modification reduced total dock area by 1.9% (1,492 sq ft) at the same time the 2017 modification introduced a new fixed structure – a 10' wide boardwalk located over the rip-rap revetement and shallow water wetlands at the shoreline, with a total area of 4,653 sq ft. It is unclear how much of this structure is located over wetlands, however the "Total Area" reported in the 2017 drawings was 78,244.50 sq ft, an increase of around 3% from the 2015 baseline. The light grey shaded area in the graphic below is a portion of the shoreline boardwalk introduced in 2017.



THE 2023 PLAN MODIFICATIONS

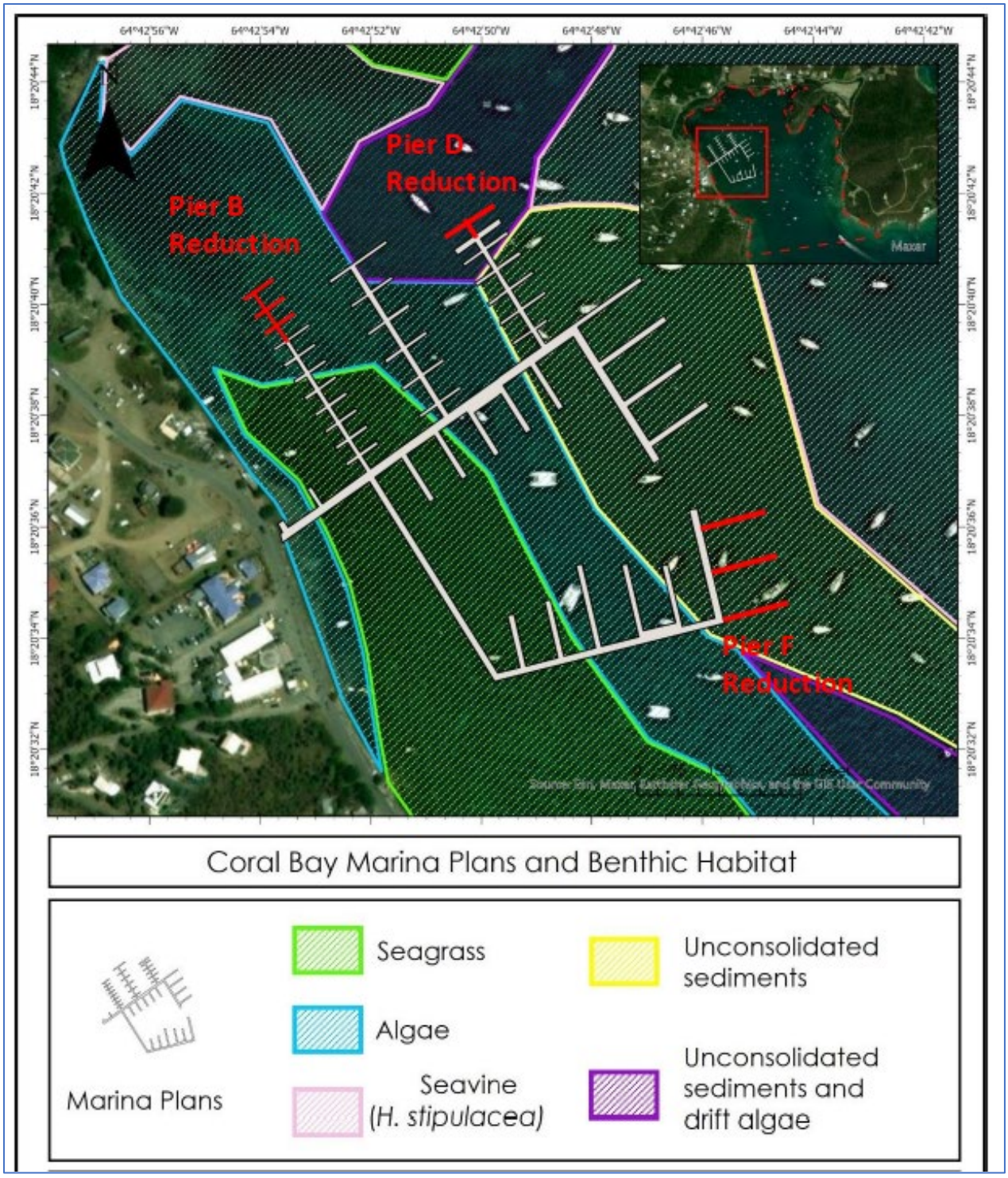
The latest dock modification has removed 5,758 sq ft of finger piers, primarily in the north marina area as compared with the 2017 plans. If the "Fixed Boardwalk" is not included in the area comparison, the 2023 plan is a total of 67,833 sq ft, which is 9.7% less than the initial plans in 2015 (75,115 sq ft). If the boardwalk is included in the area comparison, the 2023 plan is 3.5% less than the initial plans.

These small reductions in scale (3.5% or 9.7% depending on whether the boardwalk is included or not) do not, however, tell the whole story about habitat impacts. A reduction in structure size is only effective minimization if it results in lesser impacts to protected resources. In the case of this project a significant portion of the eliminated structures are located over deep water habitat which is largely devoid of SAV, and so this reduction in scale is of little or no consequence in reducing direct habitat impacts, which is the purpose of avoidance and minimization.

The graphic below overlays the 2023 dock plans (red) on the 2015 dock plans (turquoise) to highlight the areas in which the dock structure has been reduced:

When the eliminated docking areas are overlaid on the benthic habitat map, the resource impact of these dock reductions can be ascertained, based on what benthic cover is present at each location. According to Applicant's 2023 Benthic Habitat map, the largest reduction – the three docks at the southeast corner, is largely over unconsolidated sediments, so this reduction has only minimal benefit in reducing impact on SAV from shading. The three dock modifications shown in the graphic and their associated benthic impacts are summarized in the table below:

Pier Modification Area	Approximate Impact Area	Benthic Cover Type
Pier B (Northeast)	0.25 acre	Macroalgae
Pier D (North)	0.18 acre	Unconsolidated sediments and drift algae
Pier F (Southeast)	0.76 acre	Unconsolidated sediments


Pier D Reduction
Pier B Reduction
Pier F Reduction
Coral Bay Marina Plans and Benthic Habitat
Marina Plans
Seagrass
Algae
Seavine (H. stipulacea)
Unconsolidated sediments
Unconsolidated sediments and drift algae

CONCLUSION: CHANGE IN HABITAT IMPACT FROM APPLICANT'S DOCK MODIFICATIONS

The removal of 11 finger piers (6 on Pier B, 2 on Pier D, 3 on Pier F) has minimal positive effect on habitat impacts. None of these eliminated piers are located over dense seagrass. The largest reduction is located over unvegetated and unconsolidated sediments.

The purpose of avoidance and minimization is stated in 33 CFR 320.4(r)(1): "[habitat] losses will be avoided to the extent practicable." A simple reduction in structure size does not accomplish this, unless that reduction is accompanied by a corresponding reduction in habitat loss. The dock reductions proposed by Applicant in 2017 and 2023 do not have a substantial impact on reducing the shading impacts to SAV.

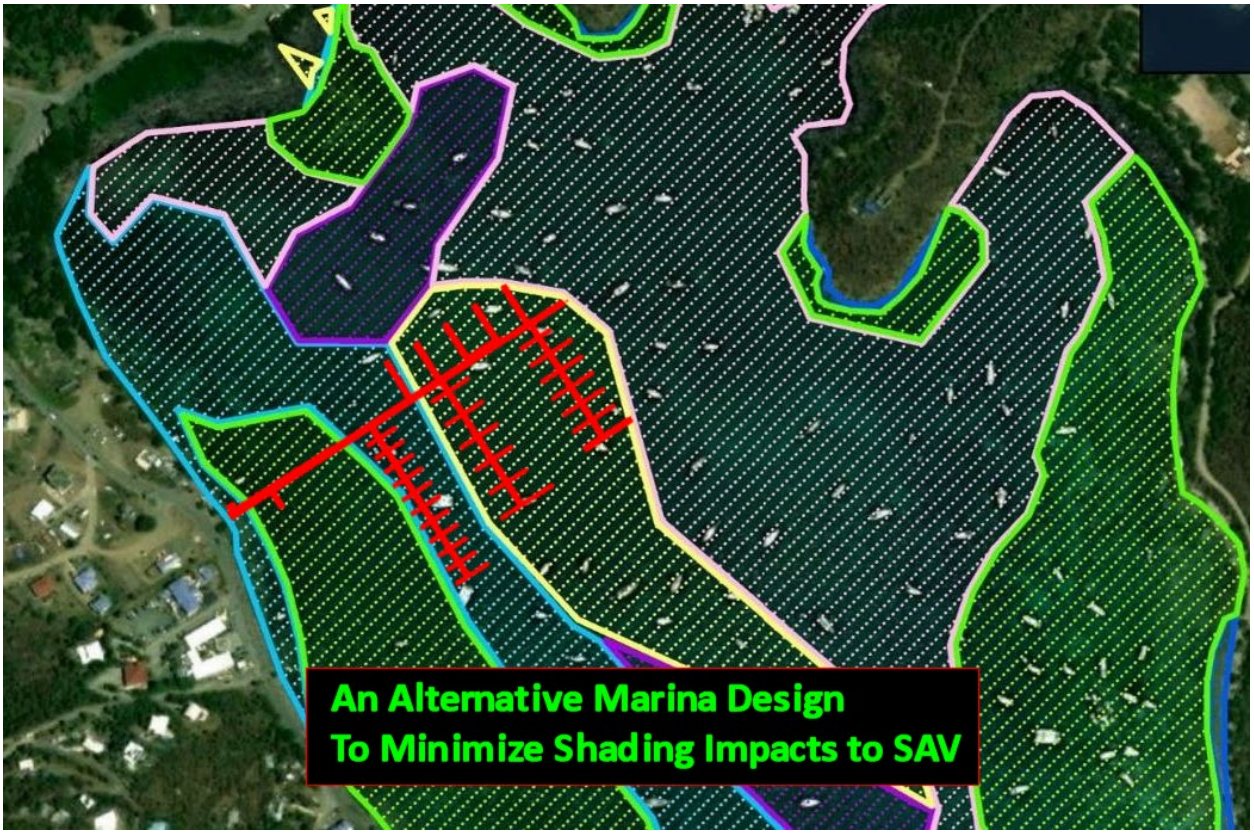
MINIMIZATION WITH SUBSTANTIAL REDUCTION IN IMPACT IS PRACTICABLE

In order to minimize impacts to SAV to the maximum extent practicable the majority of the marina slips should be located over the deeper, unvegetated portion of the harbor. The deeper water will significantly reduce the resuspension of sediments from vessel maneuvers and the unvegetated benthos will not be impacted by shading.

One possible design modification is illustrated below. This design is essentially Applicant's 2023 marina design, "flipped" 180 degrees and relocated slightly to the north.

This design moves the main pier north by about 100', placing it at a significant distance from the mature corals structures near the shoreline. The design accommodates approximately 100 slips for boats of 70' and smaller, comparable to other marinas in St Thomas. None of the slips are located over dense seagrass. This design is at a significant distance from the historic shipwreck.

We illustrate this concept simply to reinforce the evidence that the Applicant (a) has not properly assessed the effects of their dock reductions on the habitat impacts, (b) has not avoided habitat impacts to the extent practicable, and (c) has not minimized habitat loss to the extent practicable.



It is evident, after nine years, that the Applicant is not interested in development of a smaller marina, regardless of the fact that it meets the stated NEED and PURPOSE of the NEPA documentation. All serious proposals for minimization have been rejected, often based on the claim that a smaller marina would not be financially attractive to the developers. However, as the Corps has repeatedly pointed out, applicant profitability is not a factor in assessing need and purpose. In the September 2022 RAI the Corps wrote "**the project purpose in the public notice dated July 9, 2015, is stated as the Basic: 'Offshore Marina' and the Overall: 'Construct a private commercial offshore marina with ancillary and commercial facilities in adjacent uplands in ST. John, USVI.' It does not state, nor do Corps regulations define purpose and need related to the applicant's profitability**."

In fact, an examination of the facilities offered in other nearby marinas (in St Thomas) shows that there are several marinas in operation for vessels under 80' in length. See the table below for a list of five marinas whose size specifications would be far more appropriate for Coral Bay:

MARINA	# OF SLIPS	MAX SIZE VESSEL
Boater's Haven Marina	86	60'
Independent Boatyard	80	50'
Pirate's Cove Marina	30	55'
Saga Haven Marina	55	75'
Sapphire Beach Marina	65	60'

So not only is the argument about profitability of no relevance to NEPA need and purpose, but it doesn't appear to be a valid argument based on the profitability of smaller marinas in the USVI.

The only possible conclusion is that the Applicant has never seriously considered alternatives of significantly lesser impact because it simply is not in their economic interest to do so. By rejecting every suggestion for elimination of the major impacts stemming from super- and mega-yachts, the Applicant has closed the door on practical minimization of habitat losses, contrary to the public interest and contrary to NEPA regulations.

75-POSITION MOORING FIELD

In the current submission Applicant has included two exhibits relating to a proposed 75-position mooring field ("Exhibit 10 - Memorandum Of Understanding Between The Summers End Group, LLC DPNR" and "Exhibit 12 - St. John Marina Mooring Field Grant Agreement"). These exhibits are only mentioned in passing in the RAI Response.

Although there was, at one time, a proposal by SEG to construct a mooring field in Coral Harbor, this component of their Army Corps permit application was removed in the May 30, 2015 permit application to USACE and has not been a component of the federal permit application for the past 8 years.

In August 2017 the Summers End Group submitted responsive comments to USACE addressing, among other things, the removal of the mooring field component from the proposed project. SEG wrote:

> Appendix C.5 - Response To Comments Raised By The United States Environmental Protection Agency, August 15, 2015 on SAJ-2004-12518 (SP-JCM) St. John Marina Yacht Club
>
> EPA is correct in stating that the mooring field permitted as part of the project has been removed from this application even though it was previously approved the Department of Planning and Natural Resources, Division of Coastal Zone Management. ("DPNR"). This idea, which was first suggested by National Marine Fisheries Service as a mitigation measure, and which would have helped abate on going impacts caused by poor mooring practices and unauthorized boating activities. While installation and management of a properly designed mooring field could greatly reduce the ongoing degradation currently occurring within Coral Harbor as a result of illegal moorings, there was strong public objection, especially by boaters within the bay… By removing the mooring field from the ACOE permit application, Summer's End Group ("YCSE" or "Applicant") will not be seeking to obtain the remaining permits that would be necessary for the installation of the mooring field.

If, in fact, SEG is intent on reinstating their proposal to construct a 75-position mooring field (which Exhibits 10 and 12 seem to indicate) then this would be a significant change to the scope of the permit application currently under review by USACE and other involved federal agencies.

In order to make meaningful comments on the mooring field a number of procedural steps would need to take place.

1. Since it is a material change to the permit application under review by the Corps, this change should be subjected to public notice and public comment from individuals and agencies.

2. The Applicant should be required to supply sufficient information for public comment, including without limitation:
    a. Location maps for the proposed 75 moorings
    b. Habitat assessment and impacts for construction of new moorings and removal of existing moorings
    c. Engineering drawings adequate for permitting to demonstrate the size vessels that could be accommodated.
    d. Plans for relocation of existing vessels on DPNR permitted moorings.

CONCLUSION – MOORING FIELD

It is unclear why Applicant submitted two unsigned, undated documents relating to a 75-position public mooring field. If Applicant intends to develop this component they will need binding agreements from relevant territorial officials, and they will need to go through the requisite permitting process with the Department of the Army. This mooring field is NOT a component of the permit application currently under review by USACE.

MISCELLANEOUS ADDITIONAL COMMENTS

PUBLIC COMMENTS: We note that the Applicant has supplied a partial transcript of a video which was submitted to USACE in August 2017. This video transcript includes statements from 30 St John residents who apparently support the Summers End Group project.

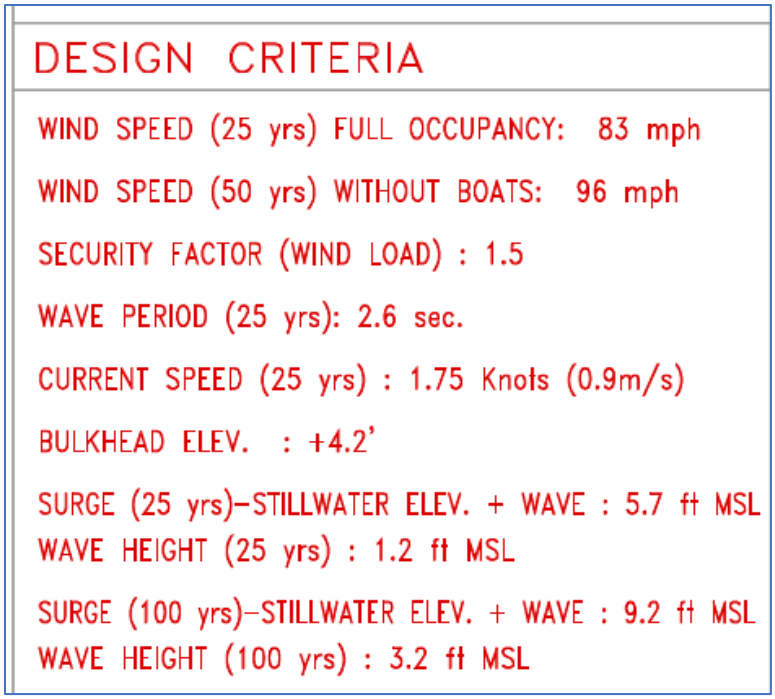
Without challenging the veracity of any of the opinions expressed in the video, we urge the Corps to consider those comments alongside the written comments from over 1,300 individuals who expressed opposition to the marina project when they signed the most recent petition in January 2023. These comments, together with another 3,500 written comments previously submitted, offer an overwhelming contrast to the verbal comments of 30 individuals.

The balance is clear: in 2017 there was some low level of support for the Summers End Project. This was prior to the devastating hurricanes which impacted virtually every structure in Coral Bay and illustrated the folly of a mega yacht marina in Coral Harbor. Today, six years later, the support for this project is substantially less than it was at the time the video was produced.

However over that same period of time, the opposition to the project has continued to grow, as more people visit Coral Bay and are overwhelmed with its unique beauty, its biodiversity, and its representation of a quality of life which is increasingly difficult to find elsewhere.

MARINA STRUCTURAL DESIGN: We have noted on prior occasions that when the Applicant reduced the piling count from 1,333 pilings to 960 pilings this reduction in structural support was accompanied by a corresponding significant reduction in design strength of the marina structures.

The engineering drawing on Page 1 of Applicant's "Exhibit 8 - Minimized Marina Layout" includes the following data on "Design Criteria":



DESIGN CRITERIA

WIND SPEED (25 yrs) FULL OCCUPANCY: 83 mph

WIND SPEED (50 yrs) WITHOUT BOATS: 96 mph

SECURITY FACTOR (WIND LOAD) : 1.5

WAVE PERIOD (25 yrs): 2.6 sec.

CURRENT SPEED (25 yrs) : 1.75 Knots (0.9m/s)

BULKHEAD ELEV. : +4.2'

SURGE (25 yrs)–STILLWATER ELEV. + WAVE : 5.7 ft MSL
WAVE HEIGHT (25 yrs) : 1.2 ft MSL

SURGE (100 yrs)–STILLWATER ELEV. + WAVE : 9.2 ft MSL
WAVE HEIGHT (100 yrs) : 3.2 ft MSL

A design speed strength of 96 mph is equivalent to a Category 2 hurricane. According to the National Weather Service the return period for a Cat 2 hurricane in the USVI is only 8.2 years, as documented in the table below[3] from NWS "Whispering Trades" publication:

Return Period in Years for Hurricanes

Category	Wind Speed	Return Period
1	74-95 mph	**9.1 years**
2	96-110 mph	**8.2 years**
3	111-129 mph	**12.3 years**
4	130-156 mph	**24.6 years**
5	> 156 mph	**86.0 years**

Table 1: Mean Hurricane Return Periods – northeast Caribbean area. Considering 171 year (1842-2013) of data for hurricanes passing near or through Puerto Rico and U.S. Virgin Islands. Considering hurricanes that pass at 100 miles or less of PR & USVI.

[3] https://www.weather.gov/media/sju/sju/2014_Vol2_Issue1.pdf

Based on the stated structural strength and the frequency of hurricane events exceeding the design strength it can be expected that the lifespan of the proposed marina is less than 10 years. And if this marina were to fail in a hurricane the impacts on the human and the natural environment would be devastating for decades to come.

Furthermore, as stated elsewhere, the marina is located in a FEMA VE-14 flood zone with a base flood elevation of 14'. The design criteria of maximum surge (5.7') is inadequate based upon the FEMA classification.

If this proposed marina were engineered for an expected lifespan of 20 years, with due consideration for climate change and sea level rise, then the structures would require substantially more support than what has been proposed. Although the Army Corps may not be directly involved in the review of building plans, the expected lifetime of a structure should be a major concern in the public interest review.

– END –

APPENDIX I

UMAM ASSESSMENT SHEETS

PART I – Qualitative Description
Impact Area 1 - Marina Operational Area

Site/Project Name	Application Number	Assessment Area Name or Number
St. John Marina (aka Summer's End)	SAJ-2004-12518(SP-CF)	Impact Area 1 - Marina Operational Area

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6000		Impact Site	19.9 Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Coral Harbor, Coral Bay	Class III	Aquatic Resource of National Importance (US EPA) Area of Particular Concern (USVI CZM)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The site is open surface water. It is connected via a mangrove channel to an ephemeral salt pond at the northeast corner of the harbor. Several stormwater drainage guts flow into Coral Harbor, primarily from the northern shore and from the watershed on the western shore. There are circulation currents into the adjacent bay (Hurricane Hole). Much of the northern and eastern shoreline is a mangrove wetland.

Assessment area description

There are dense grass beds offshore with a shoreline which is a mixture of muddy/cobble. There was a narrow band of muddy sand between the cobbly shore seagrass beds to the north and a mixture of seagrass and cobble to the south. There are fringing mangroves on the northeast and western shorelines. There are 6 large coral heads offshore of the culvert discharge in the middle of the property and two large colonized coral reef areas at Penn Point and Marina Point. Dense seagrass, primarily Thalassia testudinum, are found in the offshore environment between 2-3ft and 11-14ft, at which point they begin to diminish and algal species become more prevent. There is extensive SAV cover over approximately 70% of the marina footprint (28.5 acres) area.

Significant nearby features

The Virgin Islands National Park occupies much of the upland region of the Coral Bay watershed. The Virgin Islands Coral Reef National Monument includes much of the offshore waters outside of Coral Harbor. Hurricane Hole is directly adjacent to Coral Harbor.

Uniqueness (considering the relative rarity in relation to the regional landscape.)

Coral Harbor is the only public mooring field located on the east end of St John. It has been utilized by small and moderate sized sailing vessels since the 18th century.

Functions

Habitat and nursery for multiple marine species and ESA species. It is a documented nursery for shark species, forage for fish and conch species and other invertebrates. It is one of the most extensive sea grass meadows in the Virgin Islands.

Mitigation for previous permit/other historic use

N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)

See attached Coral Harbor species inventory.

Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)

(E) Green Sea Turtles (Chelonia mydas)
(E) Hawksbill Sea Turtles (Eretmochelys imbricata)
(MMPA) Bottlenose Dolphin (Tursiops truncatus)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Queen conch (Strombolis gigas), milk conch (Strombus costatusa), lobsters (Panularis argus), fire worms(Eurythoe complanata), feather dusters (Anamobaea oerstedi, Bispira variegata), spagetti worms (Loimia medusa), starfish (Oreaster reticulatus), sea cucumbers (Holothuria mexicana), Urchins (Echinometra lucunter, Diameda antillarum), mutton snapper(Lutjanus analis), blue runner(Caranx crysos), yellowtail jacks (Lutjanus chyrsurus), parrot fish (Scarus sp), damsel fish, barracuda (Sphyraena barracuda), tarpon (Megalops atlanticus), black tipped sharks (Carcharhinus limbatus), hawksbill sea turtles (Eretmochellys imbricata), green turtles(Chelonia mydas), Lemon Shark (Negaprion brevirostris), black tip reef sharks (Carcharhinus melanopterus), nurse sharks (Ginglymostoma cirratum)

Additional relevant factors:

Site is a DPNR designated mooring area and is used for vessel moorings by approximately 75-100 small vessels. Site has been impacted by Sargassum influxes over the past several years which temporarily impacts water quality and on occasion has had direct benthic impact due to smoothering and anoxia from decomposition. The invasive seagrass Halophila stipulacea has become established within previously disturbed areas of Coral Harbor. Federal investment in upland stormwater mitigation projects has had a beneficial effect in reducing the pollutants reaching the harbor during heavy rainfall events.

Assessment conducted by:	Assessment date(s):
Save Coral Bay Inc.	2/25/2023

PART I – Qualitative Description
Impact Area 2 - Coral Harbor Outside Operational Area

Site/Project Name	Application Number	Assessment Area Name or Number
St. John Marina (aka Summer's End)	SAJ-2004-12518(SP-CF)	Impact Area 2 - Coral Harbor ex Marina

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6000		Impact Site	85.5 Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Coral Harbor, Coral Bay	Class III	Aquatic Resource of National Importance (US EPA) Area of Particular Concern (USVI CZM)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The site is open surface water. It is connected via a mangrove channel to an ephemeral salt pond at the northeast corner of the harbor. Several stormwater drainage guts flow into Coral Harbor, primarily from the northern shore and from the watershed on the western shore. There are circulation currents into the adjacent bay (Hurricane Hole). Much of the northern and eastern shoreline is a mangrove wetland.

Assessment area description

There are dense grass beds offshore with a shoreline which is a mixture of muddy/cobble. There was a narrow band of muddy sand between the cobbly shore seagrass beds to the north and a mixture of seagrass and cobble to the south. There are fringing mangroves on the northeast and western shorelines. There are 6 large coral heads offshore of the culvert discharge in the middle of the property and two large colonized coral reef areas at Penn Point and Marina Point. Dense seagrass, primarily Thalassia testudinum, are found in the offshore environment between 2-3ft and 11-14ft, at which point they begin to diminish and algal species become more prevent. There is extensive SAV cover over approximately 90% of the area.

Significant nearby features

The Virgin Islands National Park occupies much of the upland region of the Coral Bay watershed. The Virgin Islands Coral Reef National Monument includes much of the offshore waters outside of Coral Harbor. Hurricane Hole is directly adjacent to Coral Harbor.

Uniqueness (considering the relative rarity in relation to the regional landscape.)

Coral Harbor is the only public mooring field located on the east end of St John. It has been utilized by small and moderate sized sailing vessels since the 18th century.

Functions

Habitat and nursery for multiple marine species and ESA species. It is a documented nursery for shark species, forage for fish and conch species and other invertebrates. It is one of the most extensive sea grass meadows in the Virgin Islands.

Mitigation for previous permit/other historic use

N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)

See attached Coral Harbor species inventory.

Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)

(E) Green Sea Turtles (Chelonia mydas)
(E) Hawksbill Sea Turtles (Eretmochelys imbricata)
(E) Nassau Grouper (Epinephelus striatus)
(MMPA) Bottlenose Dolphin (Turciops truncatus)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Queen conch (Strombolis gigas), milk conch (Strombus costatusa), lobsters (Panularis argus), fire worms(Eurythoe complanata), feather dusters (Anamobaea oerstedi, Bispira variegata), spagetti worms (Loimia medusa), starfish (Oreaster reticulatus), sea cucumbers (Holothuria mexicana), Urchins (Echinometra lucunter, Diameda antillarum), mutton snapper(Lutjanus analis), blue runner(Caranx crysos), yellowtail jacks (Lutjanus chyrsurus), parrot fish (Scarus sp), damsel fish, barracuda (Sphyraena barracuda), tarpon (Megalops atlanticus), black tipped sharks (Carcharhinus limbatus), hawksbill sea turtles (Eretmochellys imbricata), green turtles(Chelonia mydas), Lemon Shark (Negaprion brevirostris), black tip reef sharks (Carcharhinus melanopterus), nurse sharks (Ginglymostoma cirratum)

Additional relevant factors:

Site is a DPNR designated mooring area and is used for vessel moorings by approximately 75-100 small vessels. Site has been impacted by Sargassum influxes over the past several years which temporarily impacts water quality and on occasion has had direct benthic impact due to smoothering and anoxia from decomposition. The invasive seagrass Halophila stipulacea has become established within previously disturbed areas of Coral Harbor. Federal investment in upland stormwater mitigation projects has had a beneficial effect in reducing the pollutants reaching the harbor during heavy rainfall events.

Assessment conducted by:	Assessment date(s):
Save Coral Bay Inc.	2/25/2023

INVENTORY OF MARINE SPECIES OBSERVED IN CORAL BAY

GORGONIAN AND HARD CORALS

OTHER MARINE SPECIES

Common Name	Scientific Name
Coral Species	
Staghorn coral	*Acropora cervicornis (dead)*
Elkhorn coral	*Acropora palmata*
Tan lettuce leaf coral	*Agaricia agaricites*
Boulder brain coral	*Colpophyllia natans*
Elliptical star coral	*Dichocoenia stokesii*
Sharp-hilled Brain Coral	*Diploria clivosa*
Symmetrical brain coral	*Diplora strigosa*
Grooved brain coral	*Diploria labyrinthiformis*
Golfball coral	*Favia fraqum*
Maze coral	*Meandrina meandrites*
Boulder star coral	*Montastraea annularis*
Mustard hill coral	*Porites astreoides*
"Blue coral"	*Porites branneri*
Finger coral	*Porites porites*
Solitary disk coral	*Scolymia* sp.
Lesser starlet coral	*Siderastrea radians*
Massive starlet coral	*Siderastrea siderea*
Blushing star coral	*Stephanocoenia intersepta*
Branching fire coral	*Millepora alcicornis*
Common sea fan	*Gorgonia* sp.
Delicate spiny sea rod	*Muricea* sp.
Rough sea plume	*Muriceopsis flavida*
Common Bushy Soft Coral	*Plexaura homomalla*
Split-pore sea rods	*Plexaurella* sp.
black sea rod	*Plexaura homomalla*
porous sea rods	*Pseudoplexaura* sp.
Sea plumes	*Pseudopterogorgia* sp.
Total Coral Species Observed: 27	

Common Name	Scientific Name
Other Marine Species	
Dolphin - Bottle-nosed	*Tursiops truncatus*
Green turtle	*Chelonia mydas*
Fire sponge	*Tedania ignis*
Branching tube sponge	*Pseudoceratina crassa*
Branching hydroid	*Sertularella speciosa*
Giant anemone	*Condylactis gigantea*
Sun Anenome	*Stoichactis helianthus*
Hydroid zoanthid	*Parazoanthus tunicans*
Sun zoanthid	*Palythoa grandis*
Mat zoanthid	*Zoanthus pulchellus*
Sea walnut	*Mnemiopsis mccradyi*
Social feather duster	*Bispira brunnea*
Magnificent feather duster	*Sabellastarte magnifica*
Varieoated feather duster	*Bispira varieqata*
Christmas tree worm	*Spirobranchus qfqanteus*
Eleqant Fanworm	*Hypsicomus elegans*
Medusa worm	*Loimia medusa*
Caribbean spiny lobster	*Panulirus argus*
Blue Crab	*Callinectes sapidus*
Decorator crab	*Cvclocoeloma tuberculata*
Elkhorn Coral crab	*Domecia acanthophora*
White speckled hermit crab	*Paguristes punticeps*
Nimble spray crab	*Percnon gibbesi*
Fiddler Crab	*Uca pugnax*
Queen conch	*Strombus qiqas*
Scallop	*Argopecten sp.*
Limpet	*Clypdina sp.*
Rough file clam	*Lima scabra*
Pin Cushion sea star	*Culcita novaguineae*
Harlequin brittlestar	*Ophioderma apressum*
West Indian sea egg	*Tripneustes ventricosus*
Reef urchin	*Echinometra viridis*
Long-spined urchin	*Diadema antillarum*
Donkey dung sea cucumber	*Holothuria mexicana*
Black tunicate	*Ascidia nigra*
Total Other Marine Species Observed: 35	

INVENTORY OF MARINE SPECIES OBSERVED IN CORAL BAY[4]

BONY FISH AND SHARKS

Common Name	Scientific Name
Fish Species	
Flat needlefish	*Ablennes hians*
Sergeant major	*Abudefduf saxatilis*
Ocean surgeonfish	*Acanthurus bahianus*
Doctorfish	*Acanthurus chirurgus*
Blue tang	*Acanthurus coeruleus*
Scrawled filefish	*Aluterus scriptus*
Trumpetfish	*Aulostomus maculatus*
Jolthead porgy	*Calamus bajonado*
Orangespotted Filefish	*Cantherhines pullus*
Bar Jack	*Caranx ruber*
Blacktip reef shark	*Carcharhinus limbatus*
Foureye butterfly fish	*Chaetodon capistratus*
Banded butterfly fish	*Chaetodon striatus*
Porcupinefish	*Diodon hystrix*
Sand perch	*Diplectrum formosum*
Rock hind	*Epinephelus adscensionis*
Highhat	*Equetus acuminatus*
Yellowfin Mojarra	*Gerres cinereus*
Fairy Basslet	*Gramma loreto*
Greenbanded goby	*Gobiosoma multifasciatum*
Smallmouth grunt	*Haemulon chrysargyreum*
French grunt	*Haemulon flavolineatum*
White grunt	*Haemulon plumieri*
Bluestriped grunt	*Haemulon sciurus*
Striped grunt	*Haemulon striatum*
Slippery dick	*Halichoeres bivittatus*
Ballyhoo	*Hemiramphus brasiliensis*
Rock beauty	*Holacanthus tricolor*
Squirrelfish	*Holocentrus adscensionis*
Longspine squirrelfish	*Holocentrus rufus*
Black Hamlet	*Hypoplectrus nigricans*
Barred Hamlet	*Hypoplectrus puella*
Tan Hamlet	*Hyoplectrus sp.*
Bermuda Chub/Yellow Chub	*Kyphosus sectatrix/incisor*
Mutton Snaooer	*Lutjanus analis*
Gray snaooer	*Lutjanus griseus*
Schoolmaster	*Lutjanus apodus*
Sand Tilefish	*Malacanthus plumieri*
Yellowtail damselfish	*Microspathodon chrysurus*
Striped mullet	*Mugil cephalus*
White mullet	*Mugil curema*
Blackbar soldierfish	*Myripristis jacobus*
Glassy Sweeper	*Pempheris schomburgkii*
Cocoa Damselfish	*Pomacentrus variabilis*
Spotted Goatfish	*Pseudupeneus maculates*
Yellowtail snapper	*Ocyurus chrysurus*
Redlip blenny	*Ophioblennius macclurei*
Striped parrotfish	*Scarus croicensis*
Princess parrotfish	*Scarus taeniopterus*
Queen parrotfish	*Scarus vetula*
Cero	*Scomberomorus regalis*
Stoplight parrotfish	*Sparisoma viride*
Great Barracuda	*Sphyraena barracuda*
Longfin damselfish	*Stegastes diencaeus*
Dusky Damselfish	*Stegastes adustus*
Beauqregory	*Steqastes leucostictus*
Bluehead wrasse	*Thalassoma bifasciatum*
Houndfish	*Tylosurus crocodilus*
Tarpon	*Megalops atlanticus*
Total Fish Species Observed: 59	

[4] The species observations reported in these table were conducted by the Coral Bay Community Council during 2005, so the information is somewhat dated. Nevertheless we believe that the majority of the species found in 2005 are still present in the environment.

INVENTORY OF MARINE SPECIES OBSERVED IN CORAL BAY

SEA PLANTS AND BIRDS

Common Name	Scientific Name
Sea Plant Species	
Lavender crust algae	Phylum: Rhodophyta
White mermaid's wine glass	*Acetabularia crenulata*
Paddle blade algae	*Avrainvillea longicaulis*
Green grape algae	*Caulerpa racemosa*
Green feather algae	*Caulerpa sertularioides*
	Crustose coralline algae
	Dictyota algae
Watercress algae	*Halimeda opuntia*
White scroll algae	*Padina jamaicensis*
Flat-top bristle brush	*Penicillus ovriformis*
Red mangrove	*Rhizophora mangle*
"Brown sea weed"	*Sargassum*
Manatee grass	*Syringodium filiforme*
Turtle grass	*Thalassia testudinum*
Three corner hat algae	*Turbinaria turbinate*
Needle grass	*Holodule uninervis*
Mermaid's fans	*Udotea sp.*
Sea pearl	*Ventricaria ventricosa*
Total Sea Plant Species Observed: 16	

Common Name	Scientific Name
Bird Species	
Great blue heron	*Ardea herodias*
Cattle egret	*Bubulcus ibis*
Red-tailed hawk	*Buteo jamaicensis*
Green-backed heron	*Butorides striatus*
Sanderling	*Calidris alba*
Belted kingfisher	*Ceryle alycyon*
Mangrove cuckoo	*Coccyzus minor*
Snowy egret	*Egretta thula*
Magnificent frigatebird	*Fregata magnificens*
Laughing gull	*Larus atricilla*
Brown pelican	*Pelecanus occidentalis*
Least tern	*Sterna antillarum*
Royal tern	*Sterna maxima*
Brown booby	*Sula levcogaster*
Gray Kinabird	*Tyrannus dominicensis*
Total Bird Species Observed: 15	

PART I – Qualitative Description
Impact Area 3 - Coral Reef Structures

Site/Project Name	Application Number	Assessment Area Name or Number
St. John Marina (aka Summer's End)	SAJ-2004-12518(SP-CF)	Impact Area 3 - Coral Reef

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6000		Impact Site	1.5 Acres (in 3 locations)

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Coral Harbor, Coral Bay	Class III	Aquatic Resource of National Importance (US EPA) Area of Particular Concern (USVI CZM)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

This impact area is a collection of three sites where coral reef is found. The sites all located are in open ocean.

Assessment area description

There are 6 large coral heads offshore of the culvert discharge near the middle of the western shoreline of the project site and two large colonized coral reef areas at Penn Point and Marina Point. A total of 390 corals were located in these sites during the 2022-2023 benthic survey.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The Virgin Islands National Park occupies much of the upland region of the Coral Bay watershed. The Virgin Islands Coral Reef National Monument includes much of the offshore waters outside of Coral Harbor. Hurricane Hole is directly adjacent to Coral Harbor.	Coral Harbor is the only public mooring field located on the east end of St John. It has been utilized by small and moderate sized sailing vessels since the 18th century.

Functions	Mitigation for previous permit/other historic use
Coral reef provides habitat for multiple marine species, and builds shoreline protection from storm impacts. With recent mass die-off events (coral bleaching, SCTLD) the survival of remaining intact coral features is critical to long-term recovery of this resource.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
See attached Coral Harbor species inventory.	There are three listed corals found within the impact area: Orbicella faveolata, O. annularis and O. faveolata. Previous surveys have found A. palmata and a Dendrogyra cylindrus but they were not located in the 2023 survey.

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Queen conch (Strombolis gigas), milk conch (Strombus costatusa), lobsters (Panularis argus), fire worms(Eurythoe complanata), feather dusters (Anamobaea oerstedi, Bispira variegata), spagetti worms (Loimia medusa), starfish (Oreaster reticulatus), sea cucumbers (Holothuria mexicana), Urchins (Echinometra lucunter, Diameda antillarum), mutton snapper(Lutjanus analis), blue runner(Caranx crysos), yellowtail jacks (Lutjanus chyrsurus), parrot fish (Scarus sp), damsel fish, barracuda (Sphyraena barracuda), tarpon (Megalops atlanticus), black tipped sharks (Carcharhinus limbatus), hawksbill sea turtles (Eretmochellys imbricata), green turtles(Chelonia mydas), Lemon Shark (Negaprion brevirostris), black tip reef sharks (Carcharhinus melanopterus), nurse sharks (Ginglymostoma cirratum)

Additional relevant factors:

Many coral features in the greater Coral Bay area have been lost due to widespread impacts, including coral bleaching, sargassum smothering, and most recently Stony Coral Tissue Loss Disease. Those coral colonies which have survived may present superior genetic traits which provide adaptation to climate change and other impacts. It is critical to provide the greatest practical protection to all healthy corals within the impact area.

Assessment conducted by:	Assessment date(s):
Save Coral Bay Inc.	2/25/2023

PART II – Quantification of Assessment Area (impact or mitigation)

IMPACT AREA 1 – MARINA FOOTPRINT - QUANTITATIVE

Site/Project Name	Application Number	Assessment Area Name or Number
Summers End Marina	SAJ-2004-12518	Impact Area 1 – Marina Operational Area
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	SCB Inc.	2/24/2023

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		current condition	with project impacts
Location and Landscape Support	a	9 - adjacent areas fully support most wildlife species	4 – introduction of 10,000' of additional marine vessels and traffic in areas adjacent to marina will adversely impact foraging and nesting behavior
	b	8 – some Halophila is present currently	4 – impacts to native sea grasses will create an environment in which Halophila will expand significantly
	c	10 – no existing impediments to wildlife access to and from site	6 – installation of 960 pilings and presence of up to 10,000' of vessels will present barriers to wildlife
	d	10 – Coral Bay is a documented nursery for shark species, sea grass is habitat for shellfish and reef fish	4 – impacts to fringing mangroves and SAV will impact habitat which benefits wildlife outside the area
	e	8 – land uses outside area are predominantly residential, with minor impacts to habitat	6 – large scale commercial development in upland, including extensive impermeable surfaces, will adversely affect habitat
	f	7 – Coral Harbor is a largely enclosed embayment which provides minor hydrologic function to adjacent areas	4 – Development will not significantly impact hydrologic function, however marina structures will impede water flow and clearing of sargassum
	g	0 – Open connection to the ocean, no impacts to downstream habitats from discharges	0 – Potential for discharges from marina vessels to adversely impact downstream habitats and wildlife
	h	N/A to wetland areas	N/A to wetland areas
current / With Dev	i	10 – Undeveloped shoreline provides protection to uplands from hurricane impacts	4 – Extensive shoreline and marina development present risks of debris and contamination to uplands from storm surge
9 / 4	j	N/A to marine environment	N/A to marine environment

		current condition	with project impacts
Water Environment	a	10 – site is fully connected to tidal flows	9 – site is fully connected to tidal flows, some impediments to surface currents from marina fixed structures
	b	10 – site is open marine environment	10 – site is open marine environment
	c	N/A to marine environment	N/A to marine environment
	d	7 – some terrigenous sediment deposition in storm water	0 – potential for extreme erosion of benthic sediments resulting from sea grass shading and die-off
	e	10 – vegetation (SAV) is comparable to reference sites and appropriate for habitat	0 – large areas will be denuded of SAV due to shading and resuspension of sediments
	f	N/A to marine environment	N/A to marine environment
	g	10 – all expected wildlife (marine, terrestrial, avian) is found in the area	4 – anticipate reduced use by sea turtles, shell fish, shark due to impaired hydrologic and water quality issues
	h	9 – SAV is found in expected variety and quantity; some impairment due to turbidity in water column	2 – chronic turbidity, shading by boats and docks, prop wash, will all significantly affect plant communities and diversity
	i	0 – standing water N/A to marine environment	0 – standing water N/A to marine environment
	j	7 – existing water quality is somewhat impaired by terrestrial sediment runoff, but not significantly impacting the ecology	0 – anticipate severe impacts to water quality from vessel discharges, toxic effluents, resuspension of sediments, and large-scale sea grass die-offs, creating a "dead zone" in the marina footprint
	k	7 – water depths and wind-driven currents adequate to support SAV, turbidity impairs SAV habitat at deeper locations	2 – project will impair circulation and adversely impact light penetration within the marina footprint
Current / with dev	l	10 – existing shoreline is stable and able to withstand hurricane impacts	4 – installation of piling-supported shoreline boardwalk presents clear risks to shoreline stability and roadway stability during major storms
8 / 3	m	N/A to marine environment	N/A to marine environment

Community Structure (Benthic Community)		current condition	with project impacts
	I	10 – area has all species typical for this benthic community	2 – anticipate major loss of species within the marina footprint, as is seen in other Virgin Islands marinas
	II	7 – Halophila, predominantly in disturbed sea grass beds	4 – disruption to native sea grass communities will provide conditions for significant spread of Halophila
	III	7 – age distribution typical of this habitat, including productive fish and shellfish, shark, habitats and reproduction.	0 – expect the marina footprint to lose most species due to extensive shading, discharges and sediment suspension.
	IV	9 – sea grass exhibits some epiphyte encrustation, but extensive patches of healthy native sea grasses are found	0 – marina construction and operation will likely eliminate most benthic organisms within the footprint of the project
	V	7 – some structural impacts due to hurricane debris and poor mooring practices	0 – major structural impacts, including loss of entire benthic community due to operational impacts of marina, as seen in other Virgin Island marinas
	VI	10 – topographic features support variety of sub-habitats, including coral reef, sea grass meadow, shoreline mangrove	4 – installation of shoreline boardwalk and 960 pilings will adversely impact topographic support
Current 9	VII	10 – spawning, nesting, and nursery habitat for reef fish, shellfish and shark species all exist within the marina footprint	0 – the construction and operation of the marina will essentially eliminate the majority of wildlife from the immediate marina site, and will render the shark nursery largely inaccessible
with dev 2			

Score = Sum of Above Scores / 30	
current	With dev
26/30 = 0.87	9/30 = 0.30

If Preservation as mitigation	
Preservation Adjustment Factor	
Adjusted Mitigation Delta	

For Impact Assessment areas	
Assessment Area Acres	19.9
Functional loss (impact x acres)	**11.34**

Delta = (with dev – current)
0.30 – 0.87 = 0.57

If mitigation	
Time lag (t-factor) =	
Risk Factor =	

For Mitigation Assessment Areas	
Relative Functional Gain(RFG) Delta/(risk*t-factor)	

Total Functional Loss (FL) within the impact assessment area consisting of the benthic habitat within the 28.5 acre marina "footprint" is computed to be **11.34 acres**. This figure is based on the fact that there currently exists a relatively healthy and complete benthos community in that region, and experience throughout the Virgin Islands demonstrates that marinas have extreme impacts on the benthic habitat in their immediate vicinity. The combination of construction impacts, shading from fixed structures and large vessels, toxic discharges of cleaning compounds and anti-fouling paints, hydrocarbons and heavy metals all contribute to this habitat degradation.

PART II – Quantification of Assessment Area (impact or mitigation)

IMPACT AREA 2 – CORAL HARBOR OUTSIDE MARINA FOOTPRINT - QUANTITATIVE

Site/Project Name	Application Number	Assessment Area Name or Number
Summers End Marina	SAJ-2004-12518	Impact Area 2 – Coral Harbor outside Marina Footprint
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	SCB Inc.	2/24/2023

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

			current condition	with project impacts
Location and Landscape Support		a	9 - adjacent areas fully support most wildlife species	4 – introduction of 10,000' of additional marine vessels and traffic in areas adjacent to marina will adversely impact foraging and nesting behavior
		b	7 – Halophila is present currently	4 – impacts to native sea grasses will create an environment in which Halophila will expand significantly
		c	10 – no existing impediments to wildlife access to and from site	7 – installation of 960 pilings and presence of up to 10,000' of vessels will present barriers to wildlife
		d	10 – Coral Bay is a documented nursery for shark species, sea grass is habitat for shellfish and reef fish	4 – impacts to fringing mangroves and SAV will impact habitat which benefits wildlife outside the area
		e	8 – land uses outside area are predominantly residential, with minor impacts to habitat	6 – large scale commercial development in upland, including extensive impermeable surfaces, will adversely affect habitat
		f	7 – Coral Harbor is a largely enclosed embayment which provides minor hydrologic function to adjacent areas	4 – Development will not significantly impact hydrologic function, however marina structures will impede water flow and clearing of sargassum
		g	0 – Open connection to the ocean, no impacts to downstream habitats from discharges	0 – Potential for discharges from marina vessels to adversely impact downstream habitats and wildlife
current	**With Dev**	h	N/A to wetland areas	N/A to wetland areas
		i	10 – Undeveloped shoreline provides protection to uplands from hurricane impacts	4 – Extensive shoreline and marina development present risks of debris and contamination to uplands from storm surge
9	5	j	N/A to marine environment	N/A to marine environment

			current condition	with project impacts
Water Environment		a	10 – site is fully connected to tidal flows	10 – site is fully connected to tidal flows
		b	10 – site is open marine environment	10 – site is open marine environment
		c	N/A to marine environment	N/A to marine environment
		d	7 – some terrigenous sediment deposition in storm water	4 – potential for chronic turbidity due to erosion of benthic sediments resulting from sea grass shading and die-off
		e	10 – vegetation (SAV) is comparable to reference sites and appropriate for habitat	7 – reduced light penetration due to turbidity from resuspension and prop wash will decrease SAV abundance
		f	N/A to marine environment	N/A to marine environment
		g	10 – all expected wildlife (marine, terrestrial, avian) is found in the area	5 – anticipate reduced use by sea turtles, shell fish, shark due to impaired hydrologic and water quality issues
		h	9 – SAV is found in expected variety and quantity; some impairment due to turbidity in water column	7 – chronic turbidity due to transport of suspended sediments will all affect plant communities and diversity
		i	standing water N/A to marine environment	standing water N/A to marine environment
		j	7 – existing water quality is somewhat impaired by terrestrial sediment runoff, but not significantly impacting the ecology	4 – anticipate significant impacts to water quality throughout Coral Harbor from vessel discharges, toxic effluents, resuspension of sediments and entrapment of sargassum
		k	7 – water depths and wind-driven currents adequate to support SAV, turbidity impairs SAV habitat at deeper locations	7 – water depths and wind-driven currents adequate to support SAV, turbidity impairs SAV habitat at deeper locations
		l	10 – existing shoreline is stable and able to withstand hurricane impacts	10 – existing shoreline away from the marina site is stable and able to withstand hurricane impacts
Current	**with dev**			
9	7	m	N/A to marine environment	N/A to marine environment

		current condition	with project impacts
Community structure (Benthic Community)	I	10 – area has all species typical for this benthic community	4 – anticipate reduced use of Coral Harbor by most species due to heavy marine traffic and impaired water quality
	II	7 – Halophila, predominantly in disturbed sea grass beds	4 – disruption to native sea grass communities and chronic turbidity will provide conditions for significant spread of Halophila
	III	7 – age distribution typical of this habitat, including productive fish and shellfish, shark, habitats and reproduction.	4 – loss of species diversity and productivity is anticipated throughout Coral Harbor
	IV	9 – sea grass exhibits some epiphyte encrustation, but extensive patches of healthy native sea grasses are found	7 – marina construction and operation will likely result in chronic turbidity throughout Coral Harbor, impairing health of benthic communities
	V	7 – some structural impacts due to hurricane debris and poor mooring practices	6 – some structural impacts due to vessel groundings should be anticipated
	VI	10 – topographic features support variety of sub-habitats, including coral reef, sea grass meadow, shoreline mangrove	10 – alteration to topography is principally associated with the main marina site, the remainder of the harbor supports diverse topography
Current 9	VII	10 – spawning, nesting, and nursery habitat for reef fish, shellfish and shark species all exist within the marina footprint	7 – outside the marina footprint there will be some reduction in spawning and nesting behavior due to the increased vessel traffic and impairment of water quality
with dev 6			

Score = Sum of Above Scores / 30	
current	With dev
27/30 = 0.90	18/30 = 0.60

If Preservation as mitigation	
Preservation Adjustment Factor	
Adjusted Mitigation Delta	

For Impact Assessment areas	
Assessment Area Acres	85.5
Functional Loss (impact x acres)	**25.65**

Delta = (with dev – current)
0.60 – 0.90 = 0.30

If mitigation	
Time lag (t-factor) =	
Risk Factor =	

For Mitigation Assessment Areas	
Relative Functional Gain(RFG) Delta/(risk*t-factor)	

Total Functional Loss (FL) within the impact assessment area consisting of the 85.5 acres of Coral Harbor outside of the marina "footprint" is computed to be **25.65 acres**. The impact "delta" is lower in this area (0.30) than within the marina footprint (0.50) due to less shading and less direct impact. The principal impact outside the marina is secondary and due to chronic turbidity from resuspended sediments. Impacts will be to SAV, coral communities, reef fish, the shark nursery, sea turtles and other species which forage or nest in Coral Harbor and the surrounding mangroves.

PART II – Quantification of Assessment Area (impact or mitigation)
Impact Area 3 - Coral Reef Structures

Site/Project Name	Application Number	Assessment Area Name or Number
Summers End Marina (St John Marina)	SAJ-2004-12518	Impact Area 3 - Coral Reefs
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Impact	SCB Inc.	2/24/2023

Scoring Guidance	**Optimal (10)**	**Moderate(7)**	**Minimal (4)**	**Not Present (0)**
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

		current	with dev
Location and Landscape Support	Existing - (7) Condition is less than optimal, but sufficient to maintain most wetland/surface water functions. The site has coral damage due to hurricanes, and has the potential of being impacted by vessel strikes groundings. With development - (5) - Some corals will be lost in the marina vicinity and other losses may occur at Penn Point and Marina Point due to boat strikes and sedimentation	7	5
Water Environment	Existing - (7) Condition is less than optimal, but sufficient to maintain most wetland/surface water functions. The site in is current condition is subject to potential impact by vessel strikes and anchoring and turbidity and nutrient impacts due to existing anthropoloic impacts in bay. With development - (5) Decrease in water quality due to suspended sediment transport.	7	5
Community structure	Existing - (7) Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions, coral coverage is minimal and provides limited habitat structure.. With development - (7) Condition is less than optimal, but sufficient to maintain most wetland/surface waterfunctions, coral coverage is minimal and provides limited habitat structure.	7	7

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with dev
	0.7	0.57

Delta = [with-current]
0.13

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

If mitigation
Time lag (t-factor) =
Risk factor =

For impact assessment areas
Assessment Area Acres = 1.5 ac **FL = delta x acres = 0.20 ac**

For mitigation assessment areas
RFG = delta/(t-factor x risk) = Assessment Area Acres = Functional Gain =

Total Functional Loss (FL) within the impact assessment area consisting of the 1.5 acres of existing coral reef is **0.20 acres**. The impact "delta" is relatively low in this area because the majority of the reef structures are at a distance from the operational area.

PART I – Qualitative Description
Mitigation Area 1 - Seagrass Transplantation Recipient Site

Site/Project Name	Application Number	Assessment Area Name or Number
St. John Marina (aka Summer's End)	SAJ-2004-12518(SP-CF)	Mitigation Area 1 - Seagrass Transplantation Site

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6000		Mitigation Site	6.8 Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Coral Harbor, Coral Bay	Class III	Aquatic Resource of National Importance (US EPA) Area of Particular Concern (USVI CZM)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The site is open surface water. It is located just outside the mouth of Coral Harbor and is freely connected to the greater Coral Bay.

Assessment area description

The 2022 Benthic Resource Survey did not cover this site, however it is believed to be dense, healthy seagrass beds. There may be patchy blowout areas from storm debris, but the area is not used for mooring or anchoring.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The Virgin Islands National Park occupies much of the upland region of the Coral Bay watershed. The Virgin Islands Coral Reef National Monument includes much of the offshore waters outside of Coral Harbor. Hurricane Hole is directly adjacent to Coral Harbor.	This site is fairly typical of the healthy seagrass beds found in Coral Bay.

Functions	Mitigation for previous permit/other historic use
Site is Essential Fish Habitat (EFH) consisting primarily of dense seagrass, supporting a wide range of juvenile and adult marine species, including ESA listed species.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
See attached Coral Harbor species inventory.	(E) Green Sea Turtles (Chelonia mydas) (E) Hawksbill Sea Turtles (Eretmochelys imbricata) (E) Nassau Grouper (Epinephelus striatus) (MMPA) Bottlenose Dolphin (Turciops truncatus)

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

The site has not been surveyed for wildlife utilization.

Additional relevant factors:

The site is outside the DPNR designated mooring area and is not generally used for anchoring or mooring due to the seagrass cover and the exposure to wind and waves. It is unknown whether or not the 6.8 acres has sufficient bare patches to accommodate 0.7 acres of transplanted seagrass sods (approximately 2,800 sq meter sods).

Assessment conducted by:	Assessment date(s):
Save Coral Bay Inc.	2/25/2023

PART I – Qualitative Description
Mitigation Area 2 - Coral Outplanting Recipient Site

Site/Project Name	Application Number	Assessment Area Name or Number
St. John Marina (aka Summer's End)	SAJ-2004-12518(SP-CF)	Mitigation Area 2 - Coral Outplanting Site

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6000		Mitigation Site	6.8 Acres

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Coral Harbor, Coral Bay	Class III	Aquatic Resource of National Importance (US EPA) Area of Particular Concern (USVI CZM)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The site is open surface water. It is located just outside the mouth of Coral Harbor and is freely connected to the greater Coral Bay.

Assessment area description

The 2022 Benthic Resource Survey did not cover this site, however it is believed to be harbottom habitat suitable for coral growth. It is in close proximity to the reef structure at Penn Point.

Significant nearby features

The Virgin Islands National Park occupies much of the upland region of the Coral Bay watershed. The Virgin Islands Coral Reef National Monument includes much of the offshore waters outside of Coral Harbor. Hurricane Hole is directly adjacent to Coral Harbor.

Uniqueness (considering the relative rarity in relation to the regional landscape.)

This site is near one of the healthy coral reef structures of Coral Harbor.

Functions

Site is Essential Fish Habitat (EFH) consisting primarily of hardbottom coral habitat, supporting a wide range of juvenile and adult marine species, including ESA listed coral species.

Mitigation for previous permit/other historic use

N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)

See attached Coral Harbor species inventory.

Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)

(E) Green Sea Turtles (Chelonia mydas)
(E) Hawksbill Sea Turtles (Eretmochelys imbricata)
(E) Nassau Grouper (Epinephelus striatus)
(MMPA) Bottlenose Dolphin (Turciops truncatus)
(ESA Listed Corals) Orbicella faveolata, O. annularis, O. faveola
A. palmata, Dendrogyra cylindrus

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

The site has not been surveyed for wildlife utilization.

Additional relevant factors:

The site is outside the DPNR designated mooring area and is not generally used for anchoring or mooring due to the live coral and the exposure to wind and waves.

Assessment conducted by:	Assessment date(s):
Save Coral Bay Inc.	2/25/2023

PART I – Qualitative Description
Mitigation Area 3 - Mangrove Establishment Site

Site/Project Name	Application Number	Assessment Area Name or Number
St. John Marina (aka Summer's End)	SAJ-2004-12518(SP-CF)	Mitigation Area 3 - Mangrove Establishment Site

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
6000		Mitigation Site	5,000 sf (0.1 acre)

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Coral Harbor, Coral Bay	Class III	Aquatic Resource of National Importance (US EPA) Area of Particular Concern (USVI CZM)

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

The site is on the western shoreline of Coral Harbor, a lee shore subject to year-round wind and wave action. It is freely connected to the open water. There is a major stormwater gut entering the shoreline near the center of the proposed mangrove site.

Assessment area description

The site is a narrow strip of rocky shoreline and rip-rap revetement between the shoreline road and Coral Harbor. It has not supported mangrove growth for at least 60 years based on historic photographs and the path of the historic road which is directly on the shoreline. Where mangroves had grown in the past the road was inland from the "swamp". The habitat is not conducive to mangrove establishment, and the proposed construction of a boardwalk on the same shoreline will present additional challenges.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The Virgin Islands National Park occupies much of the upland region of the Coral Bay watershed. The Virgin Islands Coral Reef National Monument includes much of the offshore waters outside of Coral Harbor. Hurricane Hole is directly adjacent to Coral Harbor.	This site is near one of the healthy coral reef structures of Coral Harbor.
Functions	**Mitigation for previous permit/other historic use**
Site provides some protection to upland roadway, however it is frequently heavily impacted by storm events, having an open fetch to the prevailing wind and waves.	rip-rap revetement protecting the roadway from storm erosion and undermining
Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	**Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)**
n/a	n/a

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

The site has not been surveyed for wildlife utilization.

Additional relevant factors:

It is unclear how mangroves can be established, and if established how they can be maintained at this location. The mangroves are proposed to be located seaward of the boardwalk but it is unclear if the depth of water is appropriate.

Assessment conducted by:	Assessment date(s):
Save Coral Bay Inc.	2/25/2023

PART II – Quantification of Assessment Area (impact or mitigation)

MITIGATION AREA 1 – SEAGRASS TRANSPLANTATION RECIPIENT SITE

Site/Project Name	Application Number	Assessment Area Name or Number
Summers End Marina	SAJ-2004-12518	Mitigation Area 1 – Seagrass Recipient Site
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	SCB Inc.	2/24/2023

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

	current condition	with mitigation
Location and Landscape Support	Existing - (7) Condition is less than optimal, but sufficient to maintain most wetland/surface water functions. The site has loss of seagrass due to scouring by hurricanes, blowouts continue to result in impact was wave turbulence scours advancing edge.	With mitigation- (9) - Seagrass will be restored and future erosion of blowout which can be completely filled will be abated and partially filled blow outs will have loss abated. Placement of information buoys protect seagrasses from future anchoring and groundings.
current 7 / **With Mit** 9		
Water Environment	**current condition**	**with mitigation**
	Existing - (7) Condition is less than optimal, but sufficient to maintain most wetland/surface water functions. The site in is current condition is subject to continuing erosion and loss of additional seagrass due to erosion of leading edges of blowouts, exposed sediments are resusupended.	With Mitigation - (10) less exposed sediment will be present.
Current 7 / **With Mit** 10		
Community structure (Benthic Community)	**current condition**	**with mitigation**
	Existing - (7) Condition is less than optimal, but sufficient to maintain most wetland/surface water functions, the loss of seagrass has resulted in loss of habitat and forage.	With mitigation - (10) relocation of 0,85 acres of seagrass will restore the seagrass beds to former size and function has habitat.
Current 7 / **With Mit** 10		

Score = Sum of Above Scores / 30	
current	With mit.
21/30 = 0.70	29/30 = 0.97

Delta = (with mit – current)
0.97 – 0.70 = 0.27

If Preservation as mitigation	
Preservation Adjustment Factor	
Adjusted Mitigation Delta	

If mitigation	
Time lag (t-factor) =	1.14
Risk Factor =	2

For Impact Assessment areas	
Assessment Area Acres	
Functional Loss (impact x acres)	

For Mitigation Assessment Areas	
Relative Functional Gain(RFG) Delta/(risk*t-factor)	0.1184
Assessment Area Acres	6.8
Functional Gain (acres)	**0.80**

Total Functional Gain (FG) within the mitigation assessment area consisting of the 6.8 acre sea grass recipient site south of Penn Point is **0.80 acre**. This area presently has reasonably healthy sea grass beds, so the addition of transplants will not contribute to significant increase in functional value.

PART II – Quantification of Assessment Area (impact or mitigation)

MITIGATION AREA 2 – RECIPIENT SITE FOR CORAL OUTPLANTING

Site/Project Name	Application Number	Assessment Area Name or Number
Summers End Marina	SAJ-2004-12518	Mitigation Area 2 – Coral Outplanting Recipient Site
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	SCB Inc.	2/24/2023

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

	current condition	with mitigation
Location and Landscape Support	Existing - (7) Condition is less than optimal, but sufficient to maintain most wetland/surface water functions. The site has coral damage due to hurricanes, and has the potential of being impacted by vessel strikes and groundings.	With mitigation- (10) - Additional corals will be planted to enhance the coral community and provide increase habitat.
current 7 / **With Mit** 10		
Water Environment	Existing - (7) Condition is less than optimal, but sufficient to maintain most wetland/surface water functions. The site in is current condition is subject to potential impact by vessel strikes and anchoring and turbidity and nutrient impacts due to existing anthropogenic impacts in bay.	With mitigation - (9) increase in number of corals to provide habitat, buoys will protect corals.
Current 7 / **With Mit** 9		
Community structure (Benthic Community)	Existing - (7) Condition is less than optimal, but sufficient to maintain most wetland/surface water functions, coral coverage is minimal and provides limited habitat structure.	With mitigation - (10) outplanting of additional corals will increase habitat structure.
Current 7 / **With Mit** 10		

Score = Sum of Above Scores / 30	
current	With mit.
21/30 = 0.70	30/30 = 1.00

If Preservation as mitigation	
Preservation Adjustment Factor	
Adjusted Mitigation Delta	

For Impact Assessment areas	
Assessment Area Acres	
Functional Loss (impact x acres)	

Delta = (with mit – current)
1.00 – 0.70 = 0.30

If mitigation	
Time lag (t-factor) =	1.14
Risk Factor =	2

For Mitigation Assessment Areas	
Relative Functional Gain(RFG) Delta/(risk*t-factor)	0.1316
Assessment Area Acres	1.84
Functional Gain (acres)	0.24

Total Functional Gain (FG) within the mitigation assessment area consisting of the 1.84 acre coral outplanting recipient site near Penn Point is **0.24 acre**. This area presently has reasonably healthy coral reef so the addition of small amounts of coral outplants will not contribute to significant increase in functional value.

PART II – Quantification of Assessment Area (impact or mitigation)

MITIGATION AREA 3 – MANGROVE ESTABLISHMENT SITE

Site/Project Name	Application Number	Assessment Area Name or Number
Summers End Marina	SAJ-2004-12518	Mitigation Area 3 – Mangrove Establishment Site
Impact or Mitigation	**Assessment conducted by:**	**Assessment date:**
Mitigation	SCB Inc.	2/24/2023

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetland/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland/surface water functions	Condition is insufficient to provide wetland/surface water functions

	current condition	with mitigation
Location and Landscape Support	Current (0) – Area is unsuited for mangrove e habitat.	With (4) – Potential for minimal mangrove survival
current 0 / **With Mit** 4		
Water Environment	**current condition**	**with mitigation**
	Current (0) – The wind and wave action and bottom topography is unsuited for mangrove habitat.	With (4) – Minimal potential for mangrove survival
Current 0 / **With Mit** 4		
Community structure (Benthic Community)	**current condition**	**with mitigation**
	Current (0) – There is no evidence of mangrove habitat in this area for the past 70 years.	With (4) – Minimal potential for mangrove establishment
Current 0 / **With Mit** 4		

Score = Sum of Above Scores / 30	
current	With mit.
0 / 30 = 0.00	12 / 30 = 0.40

If Preservation as mitigation	
Preservation Adjustment Factor	
Adjusted Mitigation Delta	

For Impact Assessment areas	
Assessment Area Acres	
Functional Loss (impact x acres)	

Delta = (with mit – current)
0.40 – 0.0 = 0.40

If mitigation	
Time lag (t-factor) =	1.14
Risk Factor =	3

For Mitigation Assessment Areas	
Relative Functional Gain(RFG) Delta/(risk*t-factor)	0.117
Assessment Area Acres	0.1
Functional Gain (acres)	0.01

Total Functional Gain (FG) within the mitigation assessment area consisting of the 0.1 acre mangrove establishment site on the western shore of Coral Harbor is **0.01 acre**. This area is exposed to constant wind and wave action and has not supported mangrove habitat for at least the past 60 years.

SUMMARY OF UMAM FUNCTIONAL GAINS & LOSSES

Based on the individual UMAM assessments – both Qualitative and Quantitative – for the three defined Impact Assessment Areas and the three defined Mitigation Assessment Areas, **the UMAM analysis concludes that the functional gains in the compensatory mitigation provided by the Applicant proposal is insufficient to offset the functional losses from the proposed development**. The table below summarizes the impact (loss) and mitigation (gain) detailed in the assessment sheets in this appendix.

Assessment Area (AA)	AA Acres	Delta	t-Factor	Risk	FG or FL
Impact Area 1 – Marina Operational Area	19.9	0.57			11.34
Impact Area 2 – Coral Harbor	85.5	0.30			25.65
Impact Area 3 – Coral Reef	1.5	0.13			0.20
TOTAL FUNCTIONAL LOSS					**37.19**
Mitigation Area 1 – Seagrass	6.8	0.27	1.14	2	0.80
Mitigation Area 2 – Coral	1.84	0.30	1.14	2	0.24
Mitigation Area 3 - Mangrove	0.1	0.5	1.25	3	0.01
TOTAL FUNCTIONAL GAIN					**1.05**
NET FUNCTIONAL LOSS					**36.14**

APPENDIX 2

QUANTITATIVE SHADING MODEL

SPATIALLY AND TEMPORALLY VARYING SHADE SIMULATION MODEL

Description of Shade Simulation Model

The graphical shading simulator developed for this review is based on the simple principle that the position of the shadow of a point[5] projected onto a plane is determined by a straight line connecting the light source and the point creating the shadow, extended to where that line intersects the plane. This is shown schematically below.

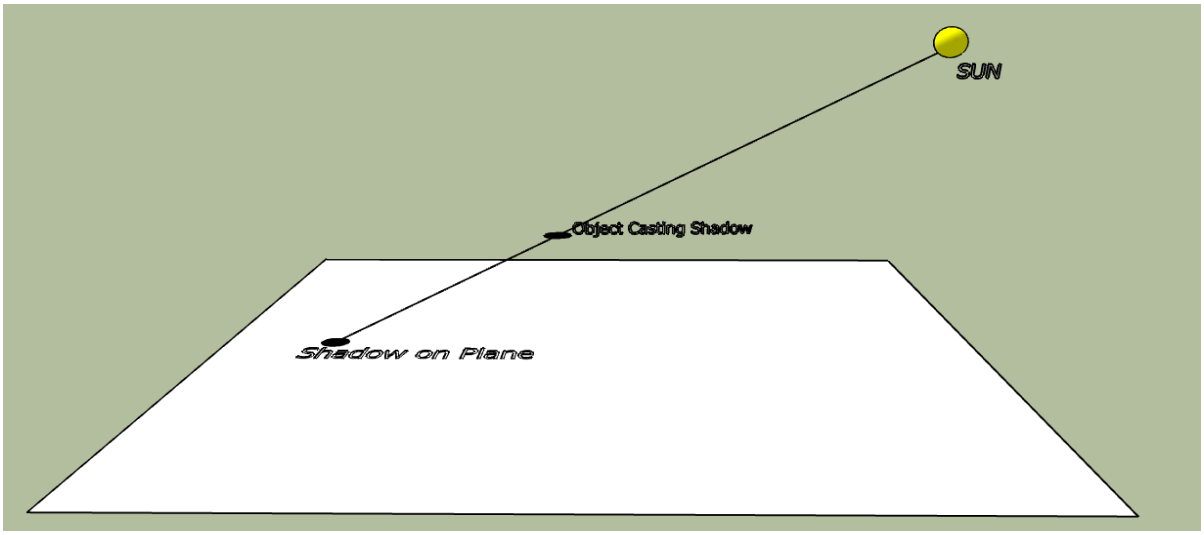


Figure 1: Projection of a Point Onto a Plane

As the position of the light source moves (while the object remains fixed), the connecting line moves and the shadow point projection moves on the shadow plane. Simple geometry gives the coordinates of the shadow point depending on the polar coordinates of the light source and the object casting the shadow relative to the shadow plane. The Altitude of the Sun (angle above the horizon) determines the overall displacement distance of the shadow and the Azimuth (degrees from North) determine the shadow displacement in the Y direction (North-South) and the X direction (East-West). This is illustrated in the figure "Geometry of Shading Model" below.

If we conceptualize a vertical line from the shadow object to the shadow plane, then it is straightforward to calculate the length of the shadow and the x and y positions of the end of the shadow. This corresponds to the position of the shadow of the elevated object onto the shadow plane. The length of the shadow is a function only of the Height of the object (e.g. the dock) above the shadow plane (e.g. the sea bed), and the Altitude of the Sun (0 degrees is on the horizon and 90 degrees is directly overhead).

The shadow length is:

[5] This model intentionally ignores the effects of diffraction and diffusion which will tend to "blur" the edges of shadows.

$$L = H / \tan(ALT)$$

where L = Shadow Length, H = Height of object above shadow plane and ALT = Altitude

From basic geometry we can derive expressions for the ”X-Displacement” (DX) and the “Y-Displacement” (DY) of the end of the shadow (where X is North-South and Y is East-West). The X- and Y-Displacements of the Shadow are:

$$DX = L * \sin(AZ)$$

$$DY = L * \cos(AZ)$$

where L = Shadow Length and AZ = Azimuth of the Sun in Degrees from North

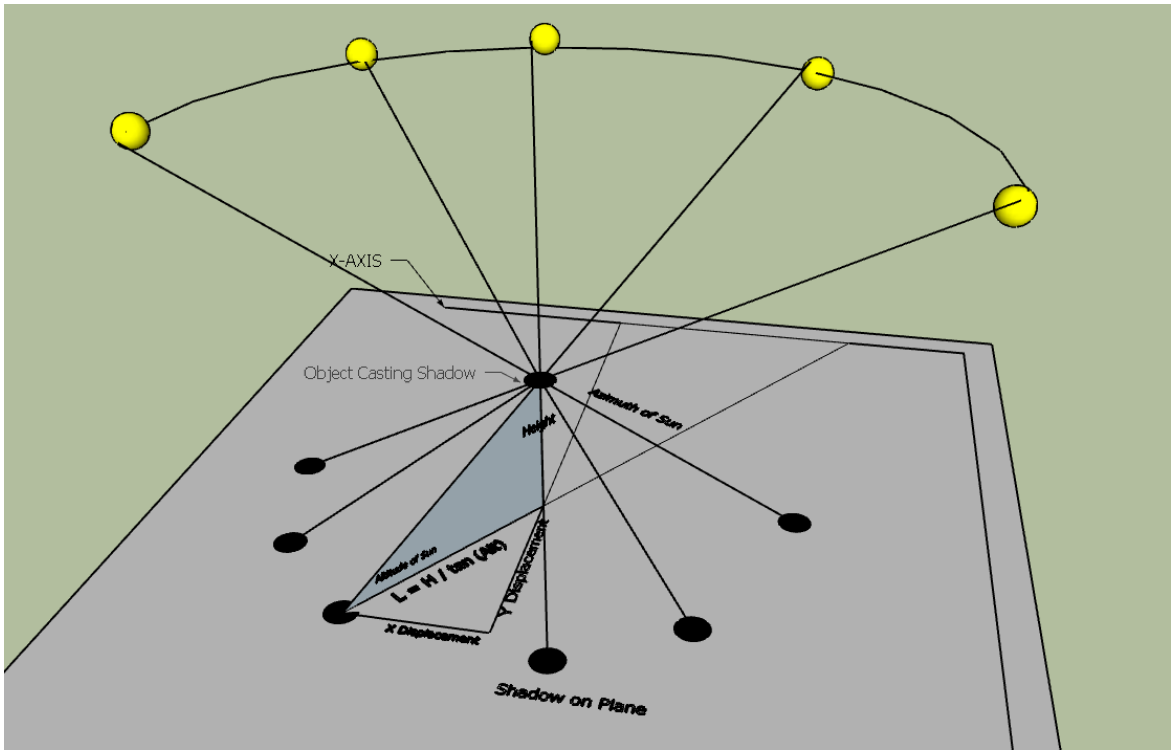


Figure 2: Geometry of Shading Model

This model is then used to compute the shadow position of simulated dock structures on the seabed as described in the remainder of this section.

Use of Shadow Simulator to Compute Dock Shading Impacts

The shadow simulator was developed in order to quantify the extent of shading impacts from dock structures above sea grass beds. Due to movement of the shadow in the course of a day and in the course of a year different regions of the seabed beneath a dock (or other opaque or semi-opaque surface) are shaded at different times.

The impact of shading on sea grasses is well documented (see refs. Beal(2000), Burdick(1999), Gladstone(2014), Shafer(1999), Trevathan(2017)). Our native sea grass Thalassia testudinum

requires a minimum of 15% of ambient light (light on the surface of the water) in order to survive. Shading beneath the minimum light requirement will cause die-off of sea grasses.

We set up the simulator to compute the projection of the dock onto the seabed under different conditions of depth to sea bed (i.e. dock height), dock dimensions, and dock orientation. We then ran the simulation for a variable period of days, beginning on a particular starting date.

The altitude and azimuth of the Sun are computed based on astronomical functions for the latitude and longitude of Coral Bay, St John.

Since the amount of Photosynthetically Available Radiation ("PAR") varies by time of day, a shadow cast in the early morning will have less impact than a shadow cast at mid-day. To account for this the model incorporates a PAR curve approximating the availability of photosynthetic energy during the daylight hours. See references Vongcharoen(2018) and Kim(2011).

The input parameters to the model include the starting date and days to run, the percentage of ambient light required for sea grass survival, and the number of consecutive days below the minimum light requirement which will kill the sea grass. The results of the model are presented both graphically and numerically.

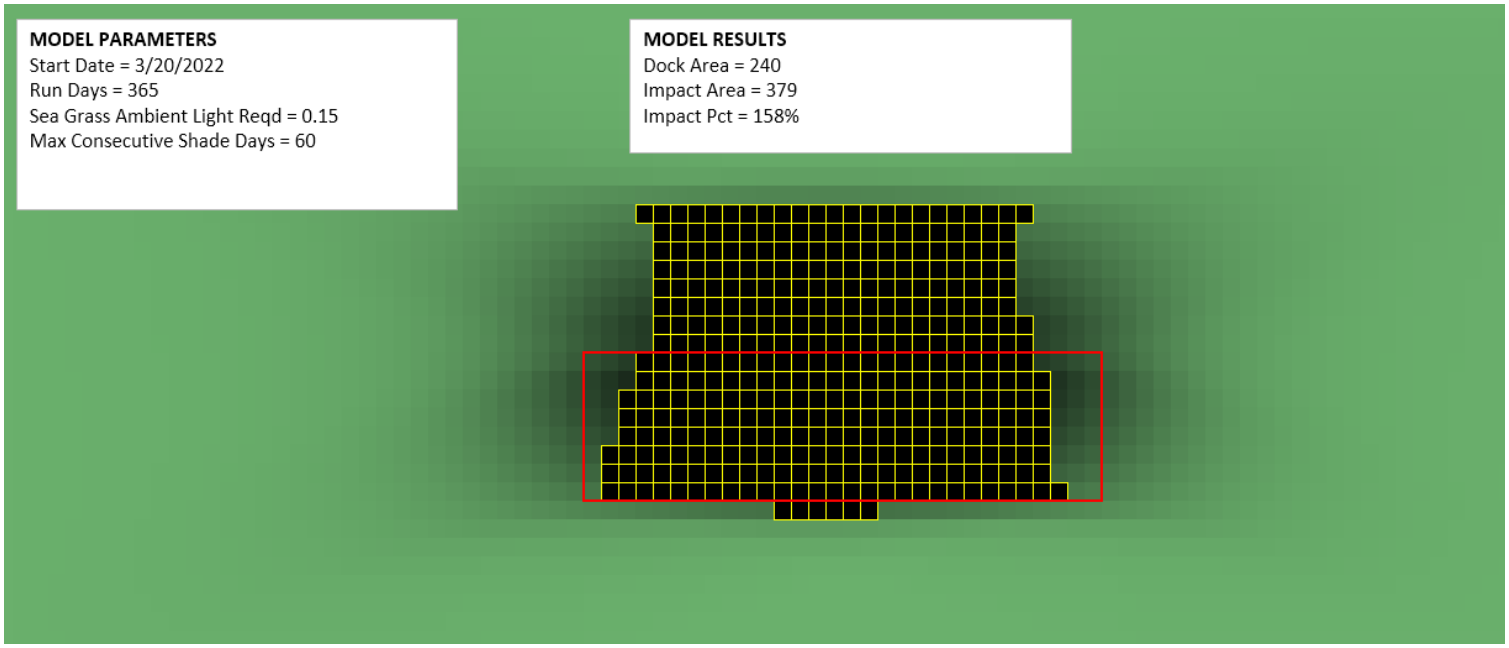
For example, the model output below was executed for the latitude and longitude of Coral Bay, St John, beginning on 3/20/2022 and running for 365 days, for a dock section of dimension 8' x 30' oriented in an East-West direction at a height of 10' above the seabed. The sea grass vitality parameters were a requirement for 15% of ambient light for survival, a shading duration of 60 days until death of the grasses, and light diminution factor of 50% in the water column due to turbidity and diffusion.

The coloration of the graphical model results includes the following features:

1. The outline of the dock section is in red.
2. Cells are nominally 1'x1'.
3. Cells colored black and outlined in yellow are the death zone for sea grasses. In these cells the available light was below the minimum required for survival for a number of consecutive days greater than the "Max Consecutive Shade Days" parameter.
4. Cells colored in shades of grey are partially impacted by shading but fall beneath the threshold for sea grass death. There may be some reduction in shoot number and vitality in this region.
5. Cells in green did not experience significant shading during the model run.
6. The Model Results table indicates the area of severe sea grass impact as a percentage of total dock area. In this run a 240 square foot dock impacted 379 square feet of sea grass impact (death) resulting in an impact percentage of 158%.

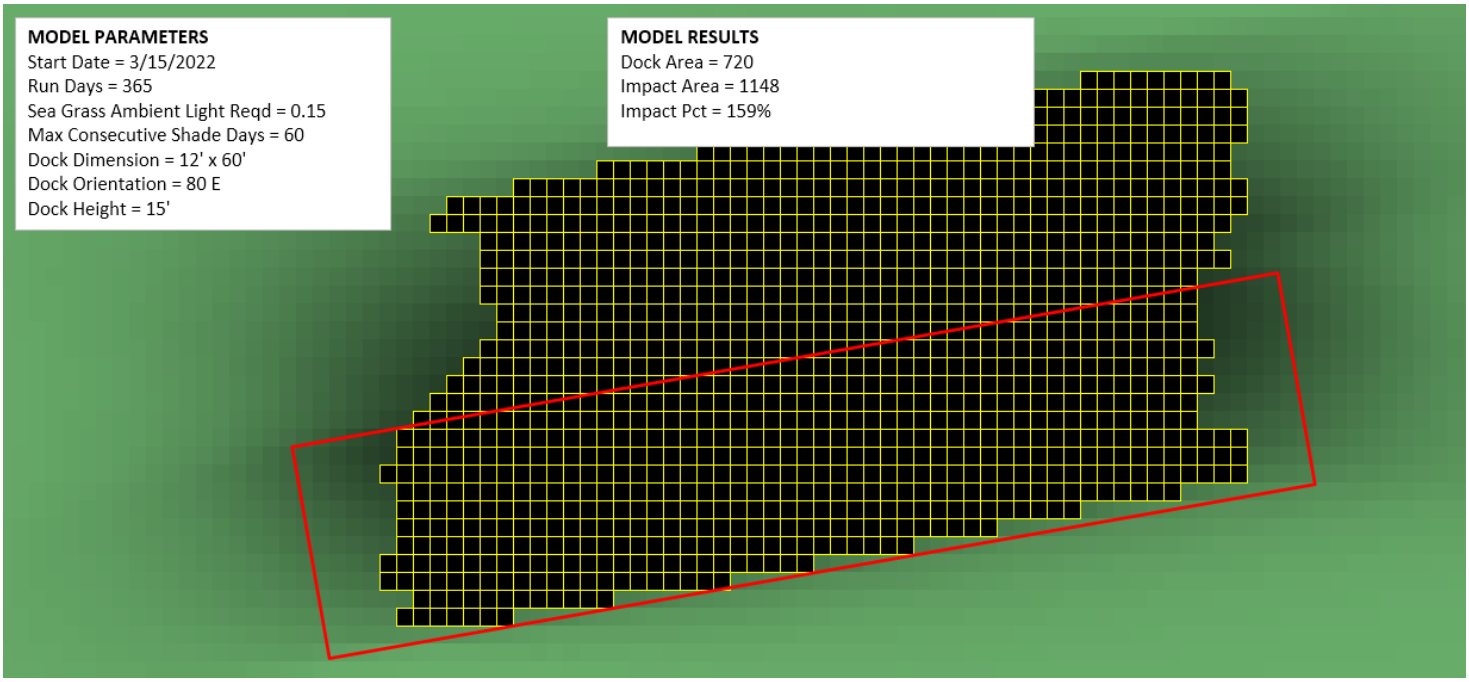
As the graphical model results demonstrate, at the latitude of St John (18^{o} N) the Sun is generally in the southern sky during most of the year. For a short period around the Summer

Solstice the sun moves to the northern sky. Shadows are displaced to the North for most of the year, hence the area of densest shading is to the north of the dock structure.

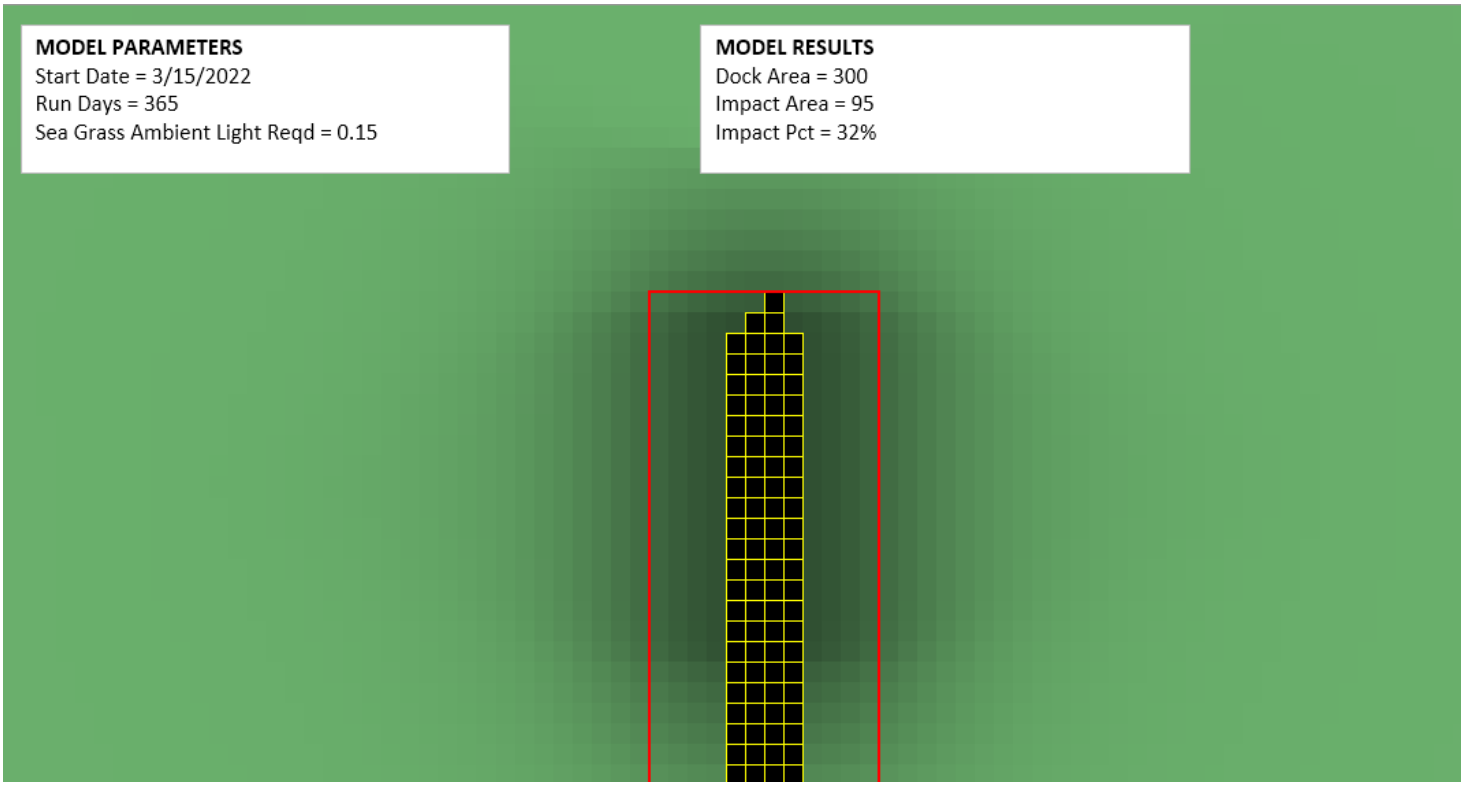


The model also clearly illustrates that the impacted sea grass area is not limited to the area directly beneath the dock structure, as was assumed in the model presented by the applicant.

When the shading simulation is run for the dimensions, elevation and orientation of the main mega yacht dock (oriented at 80^{o} East and 12’ wide at an average elevation of 15’ above the seabed), the model results are as shown below. The dock will result in shading impacts equal to 159% of the dock area, primarily to the North of the dock structure, under these parameters.

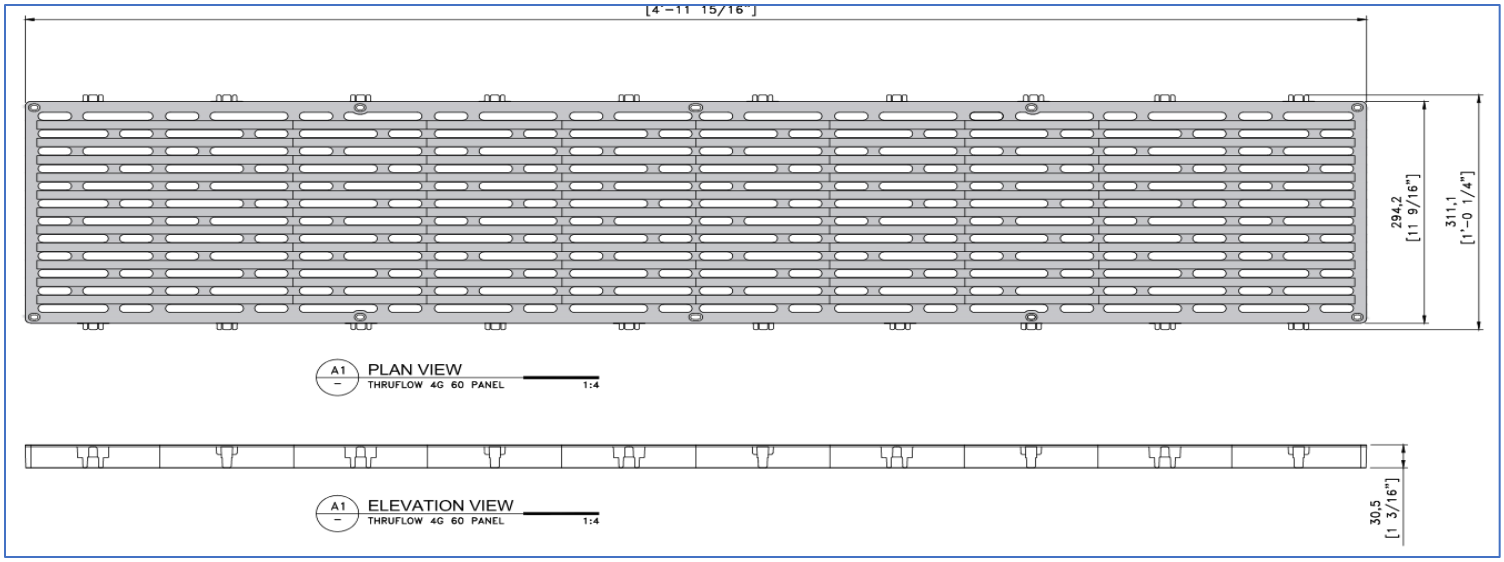


The model also demonstrates that dock structures oriented in a North-South direction have far less shading impacts, particularly if the dock width is less than 8'. The model below demonstrates shading impacts for the main dock closest to the shoreline (12' wide, oriented 30^{o} West, 10' height).



The "ThruFlow" Grated Decking

In addition to the shading modeled in this section, we also have looked at the physical geometry of the "ThruFlow" grated decking proposed by the applicant for use in the Coral Bay marina structures. This grated decking has longitudinal openings approximately ½" wide by 3-7" long throughout the deck section. The section is 1.25" thick, as shown in the engineering drawing below:



Because the side walls of the deck openings are substantially deeper than the opening itself (1.25" deep by 0.5" wide), the sides of the opening will obscure the opening anytime the sun's altitude is less than 68^{o} (arctan(1.25/0.5). The actual degree of shadowing of the cell opening by the cell wall depends on the angle of the deck section as well as the elevation of the sun. But under most circumstances the "ThruFlow" grated decking will allow far less than the best-case 43% of light penetration claimed by the applicant. In fact, the only time this physical geometry will allow 43% light penetration is with the light source directly overhead, which, at the latitude of St John, happens for only 2 days per year. A photograph of ThruFlow grated decking illustrating the shading effect of the side walls is shown below.

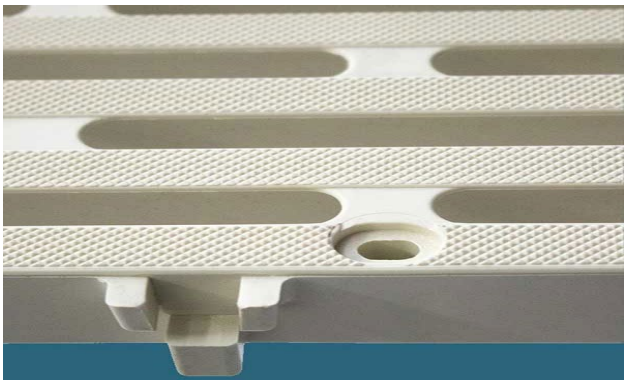


Figure 3: ThruFlow Grated Decking

APPENDIX 3

CORAL BAY SMS AND PTM
CURRENT AND SEDIMENT TRANSPORT MODEL

In this appendix the results of a Particle Tracking Model simulation are discussed. The simulation indicates a strong probability that fine sediments can be transported outside of the inner Coral Harbor, and then transported on circulation currents into the Coral Reef National Monument, including Hurricane Hole.

SMS PARTICLE TRACKING MODULE (PTM)

Benefits and Limitations of PTM

In order to form a better understanding of the potential for sediment transport in Coral Harbor and Coral Bay we enhanced the SMS / CMS-FLOW and CMS-WAVE model with the SMS Particle Tracking Module (PTM). The PTM module provides for limited modeling of sediment transport within the water column due to the combined currents generated by tides, waves and wind.

Because of the 2-dimensional limitations of CMS-FLOW (it only provides a depth-averaged velocity), it was not possible for us to obtain reliable quantitative results from SMS PTM. There is strong scientific and empirical evidence that currents in Coral Harbor are variable in the water column, with stronger wind and wave driven currents in the uppermost 2 meters, and counter currents in the middle of the water column. SMS is unable to model this 3-dimensional structure.

For this reason we did not attempt to use PTM for quantitative modeling of sediment transport and deposition. The PTM model was used to confirm possible particle trajectories emanating from the marina site. The PTM model used the current velocity vector and water surface elevation generated by CMS-FLOW and CMS-WAVE, and a modeled an arc of potential sediment resuspension traversing the marina site. We used the "buoyant particle" option of SMS PTM in order to model trajectories.

This modeling exercise provides analytical confirmation of several hypotheses concerning sediment transport in Coral Harbor and Coral Bay. First, the combination of shallow water currents moving in a predominantly NW direction along the shorelines of Coral Harbor, with a return current in a predominantly SE direction in the central, deeper part of the harbor, generates particle flows that head to shallow water north of the marina site and then are picked up by a stronger central current headed towards Pen Point, Harbor Point, and outside the mouth of Coral Harbor.

Once outside the mouth of Coral Harbor there is a strong circulation into Hurricane Hole, and the PTM model predicts that particles can become trapped in this current and circulate along the eastern and northern shoreline of Hurricane Hole. This is obviously of great concern because Hurricane Hole is a coral refuge within the Virgin Islands Coral Reef National Monument.

SMS PTM Simulation Outputs

The PTM simulation was set up with a single particle source – an arc traversing the marina site – simulating the potential suspension of particles resulting from yacht operations in the channel,

in the marina turning basins, entering and leaving docks, and so forth. It was clearly not possible to model individual resuspension events so the generalized particle source provided a qualitative model of particle sources throughout the marina vicinity.

The current magnitude and current velocity inputs to PTM were taken from the CMS-FLOW Model Run 4 (with tide, wind and wave forcing). No sediment traps were specified since fall velocities were unknown so trap depths would not be meaningful.

The output of one PTM model run is shown in the figures below, with the orange dots representing "particles" in the simulation. This plot is after 66 hours of simulated time. The first plot is a closeup of Coral Harbor and Hurricane Hole.

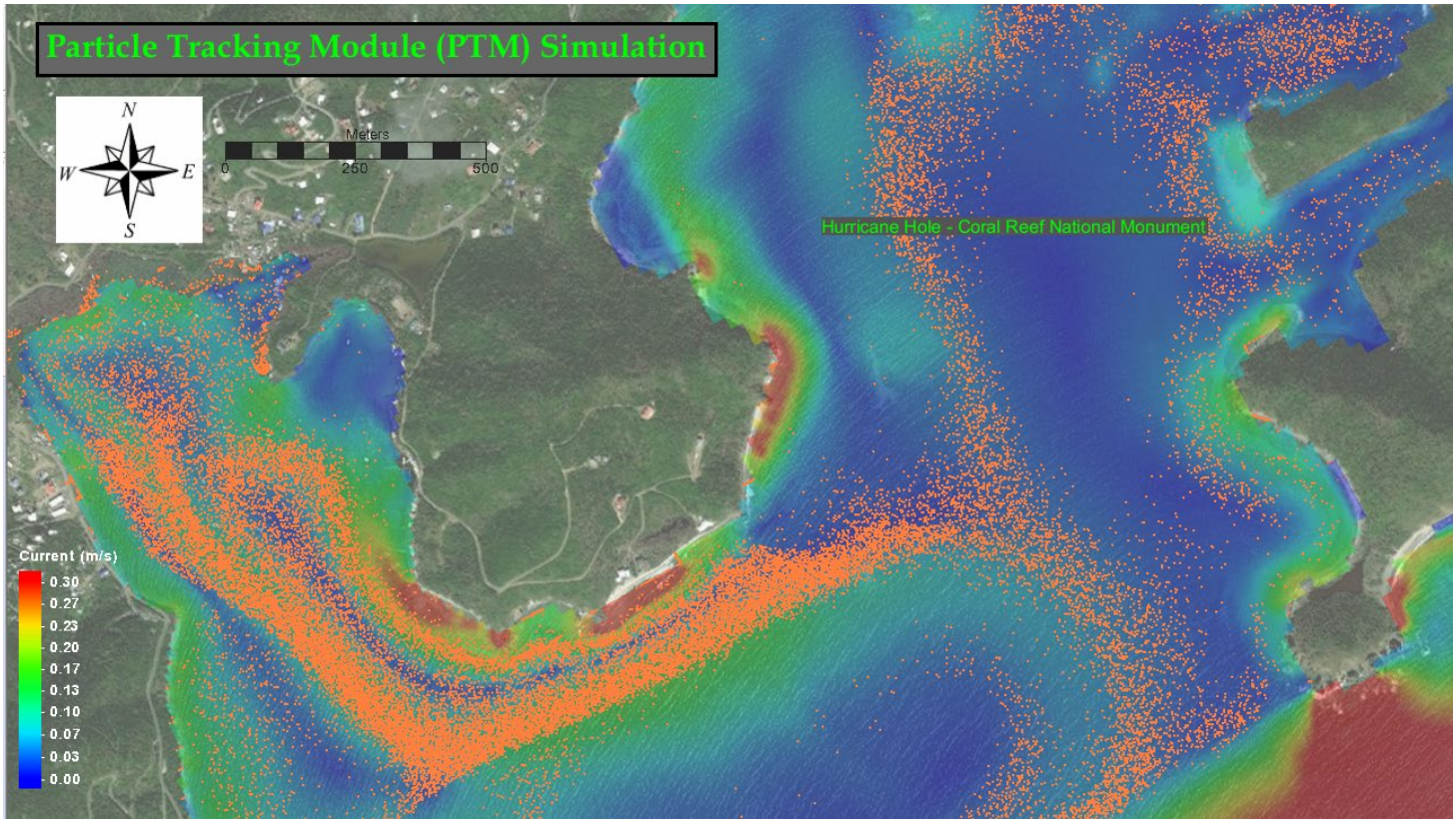


Figure 4: SMS PTM Model Output - Coral Harbor and Hurricane Hole

The particle map indicates that it is possible for particles to be transported outside of Coral Harbor, at which point they encounter circulation currents pulling particles into Hurricane Hole. Hurricane Hole is within the Virgin Islands Coral Reef National Monument and is a nursery for multiple coral species. Any impacts to Hurricane Hole would be of great concern.

The particle map also illustrates widespread particle distribution throughout most of Coral Harbor, as is to be expected.

The next plot is a "particle trajectory" plot covering a larger portion of Coral Bay. This plot illustrates the paths which simulated particles traversed during the running of the model.

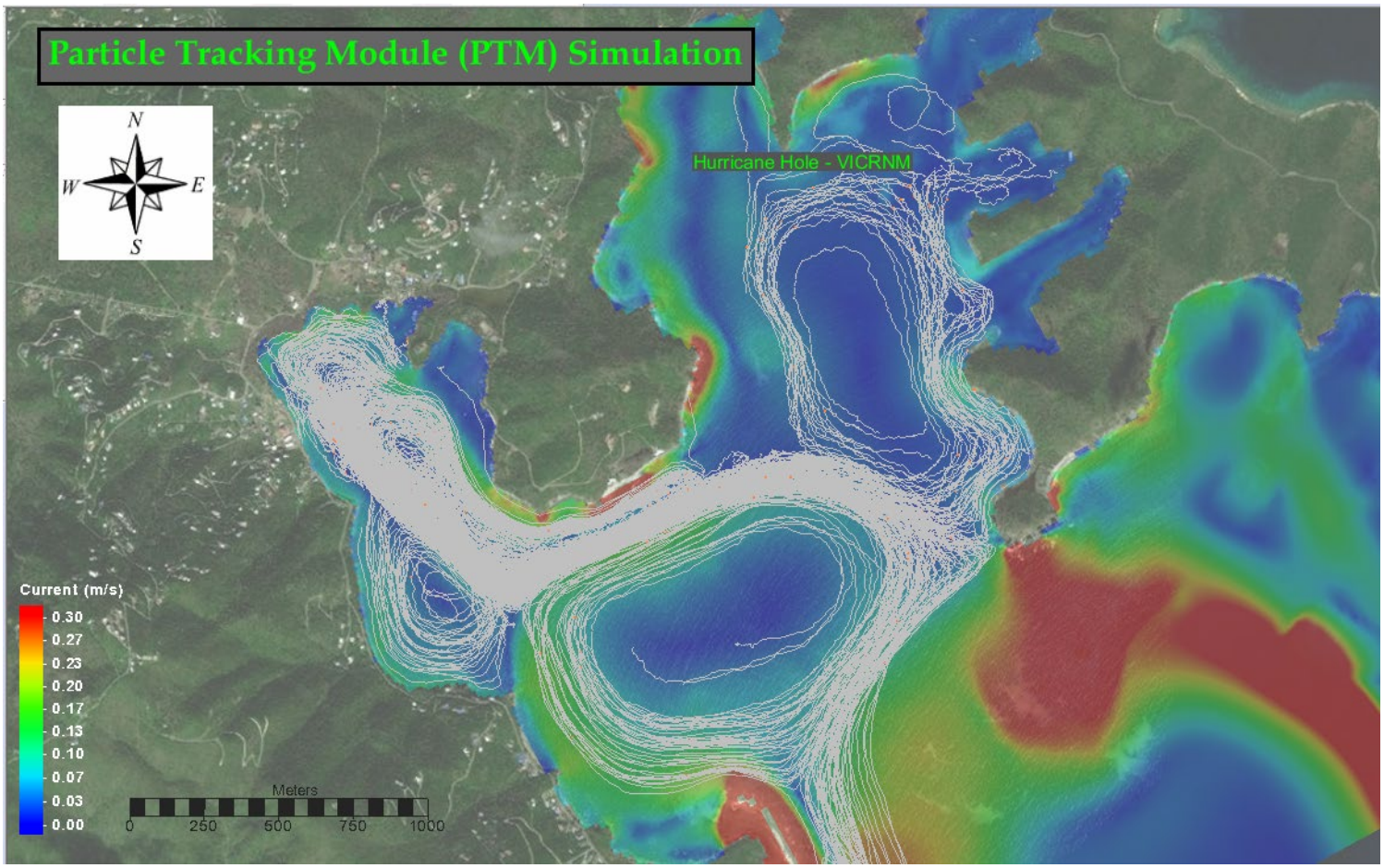
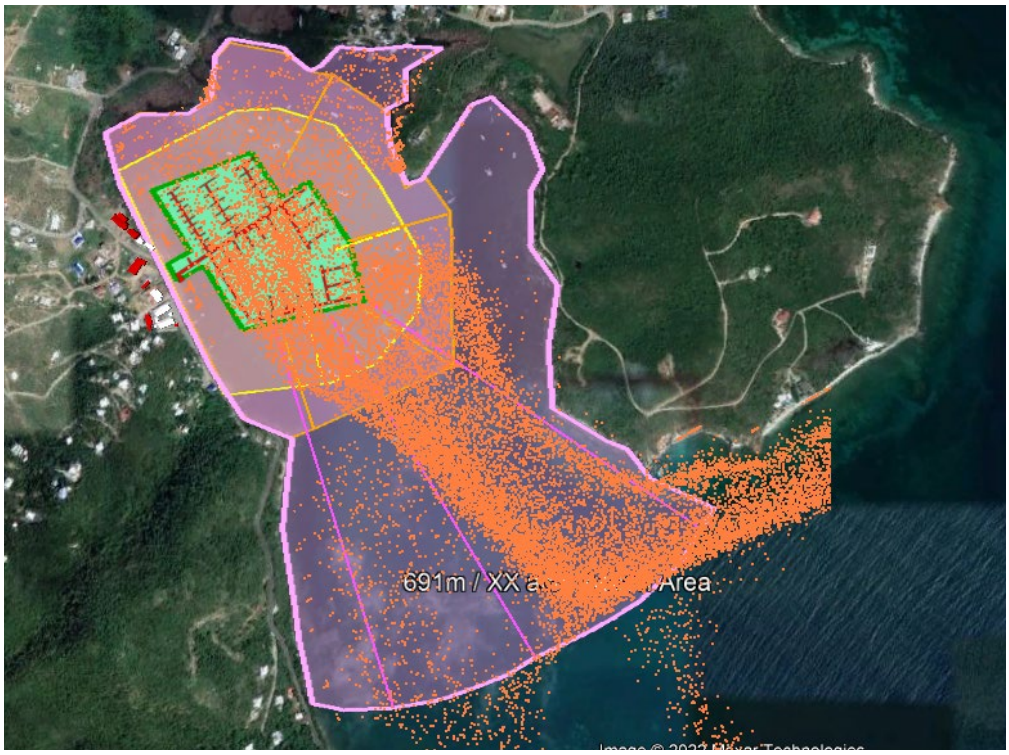


Figure 5: SMS PTM Particle Trajectory Model

We note here that in her 2014 report, Dr. Gray stated that "our research indicates that the fine-grained, land-derived sediments typical of sediments found in Coral Bay Harbor have been transported out to offshore coral reef sites (30% terrigenous sediment at offshore reef sites)." The PTM trajectory model illustrating pathways to offshore reef sites is consistent with Dr. Gray's finding.

The final illustration is an overlay of the particle map on the "Action Area" diagram. This illustrates that the small (45 acre) Action Area proposed by the Applicant is clearly inadequate to encompass the modeled particle distribution.



A video capture of the PTM simulation is available here: https://SaveCoralBay.com/ptm/

Interactions Between Currents, Sediments and Navigational Channel

The applicant has provided a detailed chart of the proposed navigational channel, which generally follows the deepest bathymetry of the harbor. Although this might be a good location for the channel from a bathymetric perspective, it is a very poor location from a sediment transport perspective.

The previous illustrations from SMS PTM indicated that there is a well-defined particle transport trajectory along the deeper water in the middle of the harbor entrance. When this particle trajectory is overlaid on the chart for the navigational channel it is apparent that large yachts – 100' and greater with drafts of 1m and greater – will regularly navigate in the channel where sediments are most likely to be transported. This will create chronic resuspension from propeller wash, potentially resulting in even greater transport distances.

The first illustration below is the navigation channel proposed by the applicant (highlights added to outline the channel):

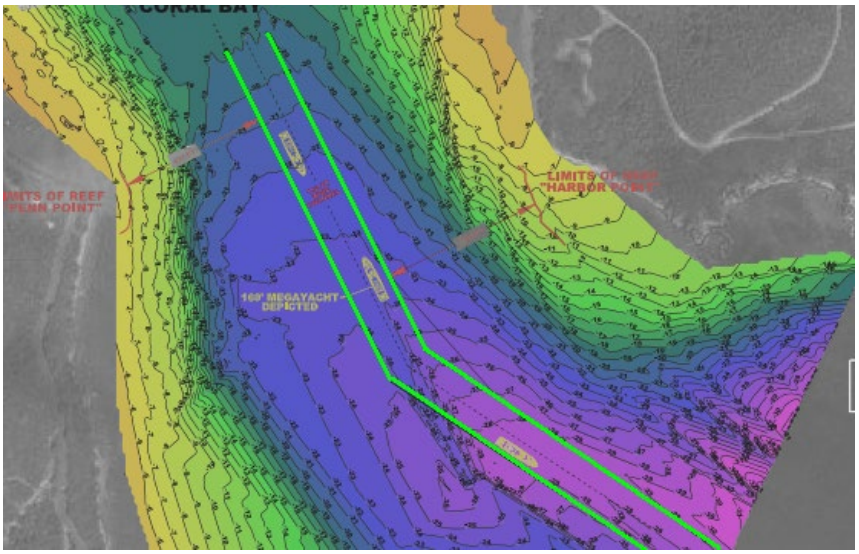


Figure 6: Proposed Navigation Channel

The next illustration overlays the PTM particle map on the channel map, demonstrating the overlap between vessel navigation and particle transport locations.

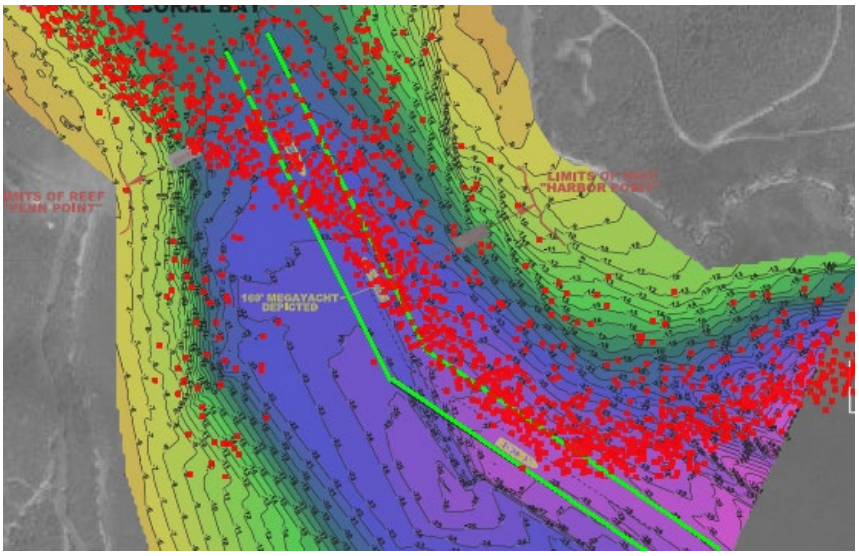


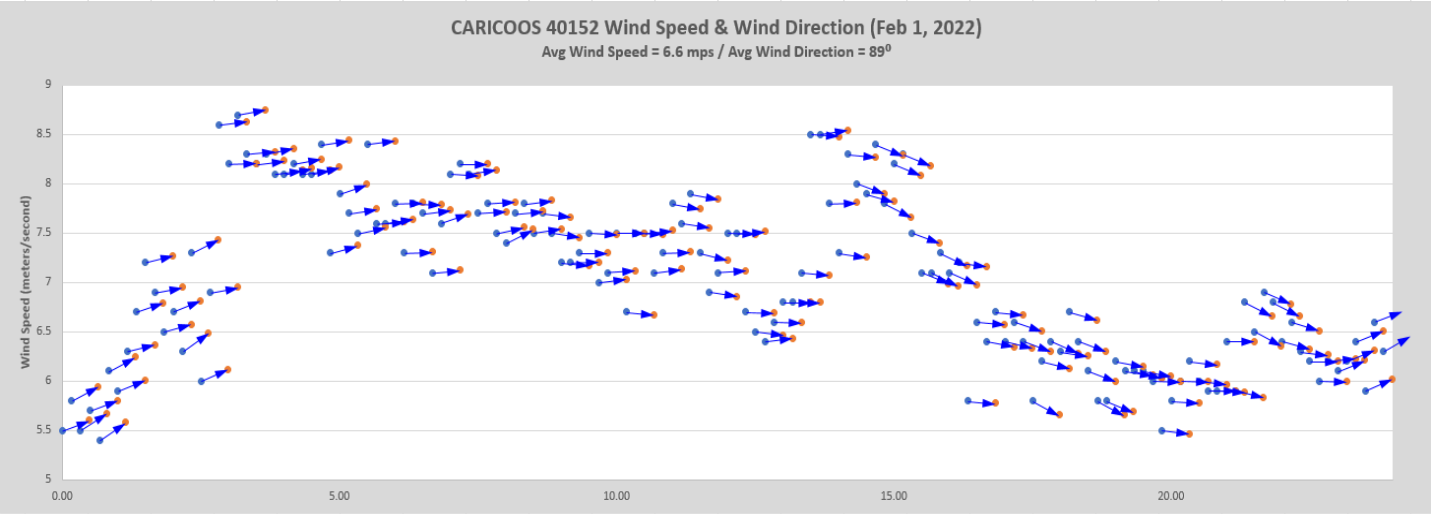
Figure 7: PTM Particle Distribution Overlay on Navigation Channel

Without further validation of the PTM model we cannot say with any certainty if this is a significant risk, however all of the models prepared by applicant as well as prepared by us indicate that there is a southeasterly current in the middle of the harbor mouth, and this is where the channel is proposed to be located. With a draft of 1m or greater there is a significant risk of resuspending sediments that have settled to 1-2m as larger yachts traverse the channel.

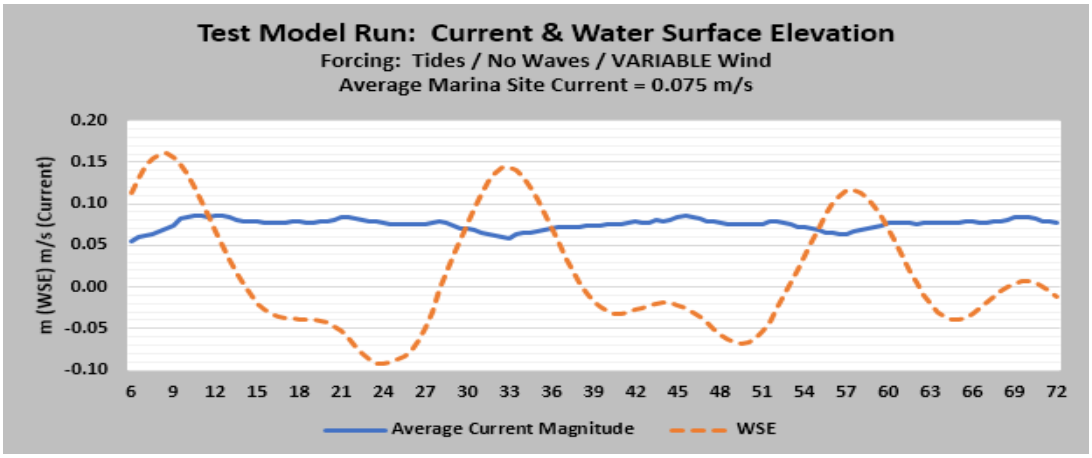
Variable Wind Conditions in Coral Harbor

The modeling reported in this analysis used a spatially and temporally constant wind speed of 6.5 meters/second from the East (90^{o}), which is the mean speed and direction based on annual meteorological data. In order to verify that this simplifying assumption did not distort model results we ran an additional simulation under identical tide conditions and bathymetry, using 72 hours of actual recorded wind speeds and direction from the Caricoos #40152 buoy, during a time period when the recorded wind speed was very close to the annual average. The wind speed and directional input to the real-world wind speed model run is shown below.

In this 72 hour dataset the mean wind speed was 6.6 m/s with a standard deviation of 0.96 m/s. The mean wind direction was 90.0^{o} with a standard deviation of 8.9^{o}. The first 24 hours of the dataset are charted below (height of point is wind speed, arrow is pointed in wind direction).



The CMS-FLOW model was run using the 72 hour variable wind speed and direction chart, without wave input. The CMS-FLOW reported current magnitude based on this wind dataset, with tidal forcing but without wave forcing predicted an average current at the Marina Site of 0.075 m/s. The model results are shown below.



The average current magnitude in the variable wind speed model run was slightly higher than in the constant wind speed model run (0.075 m/s versus 0.061 m/s) but this is probably not a significant difference, and it confirms that our use of a spatially and temporally constant wind speed and direction did not distort model results.

The ability of a variable wind, without any wave forcing, to transport sediments in Coral Harbor was simulated using the Particle Tracking Module of SMS. The results of this simulation show the potential for widespread particle transport throughout Coral Harbor from variable wind driven currents alone. This is a significant result and bears further study. The PTM model output is shown below (using buoyant particles and a run time of 48 hours).

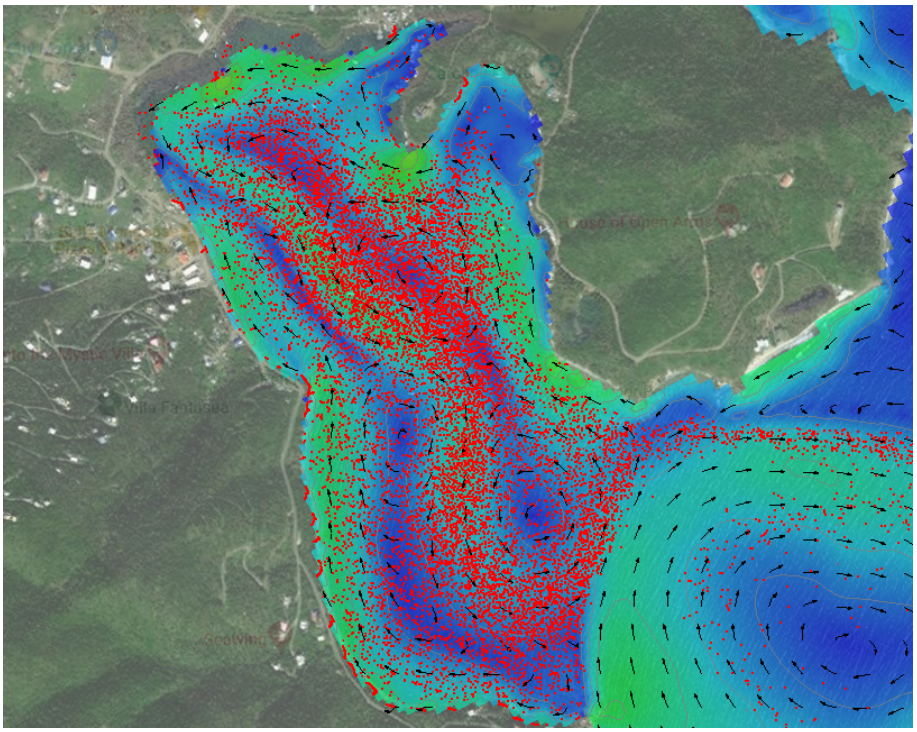


Figure 8: Particle Tracking for Variable Wind Speed and No Waves

Conclusions of PTM Study

Since it was not possible to conduct a quantitative model of sediment transport using PTM, the results of the PTM study must be seen as indicative of possible particle transport rather than predictive. Nevertheless, the PTM model confirms our earlier hypothesis that if sediment is transported outside of Coral Harbor there is a strong possibility that it could be picked up by the much stronger currents outside the harbor and transported around Fortsberg and into Hurricane Hole. This conclusions only reinforces the need for a much more credible model of sediment resuspension and transport based on considerably more quantitative sediment analysis, current measurement, modeling, calibration and validation.

EXHIBIT 1

BENTHIC SURVEY SCOPE OF WORK

(HIGHLIGHTED)

Purpose

The purpose of the benthic survey characterizing resources in the action area is to provide sufficient detail for NMFS to conduct their EFH and ESA Section 7 consultations. The applicant proposes to conduct a comprehensive benthic resource survey of the project footprint and the action area as delineated by NMFS, which includes all benthic resources at risk form project construction and operational impacts, including any areas at risk of potential impact from sedimentation.

The survey is intended to characterize the quantity and quality of habitats at the action area, with a focus on coral, hardbottom, coral critical habitat, and seagrass habitats. Habitat characterizations will be used to guide the development of monitoring protocols as well as mitigation which may be needed for unavoidable impacts related to the project.

Methods are based on those utilized currently by the National Park Service in St. John, the University of the Virgin Islands and Guidance documents from NMFS and Florida DEP.

Seagrass/Coral Benthic Survey Proposed Methods

A total of 114 acres encompassing the Potential Impact/Action Area will be surveyed, including all of Coral Harbor, specifically the proposed marina and mooring area, and the reefs, and seagrass beds surrounding Penn and Harbor Point at the mouth of the harbor.

Figure 1. Proposed Area of Study

All benthic surveys will be made by divers on SCUBA with vessel and surface support. Staff qualification and Quality Assurance Quality Control (QAQC) is discussed following methods.

Belt transects will be used to document and delineate habitats, species composition, the presence of ESA- listed coral colonies and where coral critical habitat is present. Due to poor water quality transects within the harbor are proposed to be no more than 5 meters apart to ensure that all important features, habitat shifts, and species are identified and to ensure that all corals are quantified since there are individual coral heads and coral colonized debris within the project area. Surveys will not be conducted when water quality is such that visibility is under 3m and transect width may be reduced to ensure QAQC protocols are met. If Sargassum has built up in the bay it is probable that the survey may have to be delayed.

Sargassum when on the surface impacts light transmission and thus visibility. Also, if there is sunken sargassum in the bay it will impact the ability to assess the benthic community and surveys may have to be delayed until such time the Sargassum moves out of the bay by changing sea condition. The transects will be laid out in a east west orientation perpendicular to the shoreline. The divers will utilize a handheld GPS on the surface in a waterproof case to mark locations of habitat shifts, changes in species abundance, corals and substrate changes. The GPS marking and recording will be done by a team member on the surface with a paddle board who makes and records each event/coral/shift as signaled by the diver. The degree of error will be minimized by utilizing a weight and line level when the seafloor is not clearly visible from the surface. The start and end of each transect will also be marked by GPS. Still photographs will be taken to document species, and all transects will be videoed to allow for confirmation and review of species identification and densities. Transect will be spaced to visually cover 100% of the proposed survey area. The transect width is proposed as 5 meters. The width of the transect may be reduced on some days during the course of the survey as water quality changes or as density of organisms changes in order to provide the most accurate data. Belt transect width will not exceed the area the surveyor can easily assess. The transects will extend from shore to shore and will cover the entire action area. It should be noted that not only benthic flora and fauna will be noted but also the presence of fish, especially ESA species (Nassua Grouper), sea turtles and other marine fauna. Divers will document the following: sediment/seafloor substrate, depth, salinity, water temperature, and current speed and direction. Water depth will be measured with dive depth meter (in meters), as well as the vessel depth finder which has been calibrated. Depths will be corrected for tidal variation. Apparent water quality issues such as filamentous green algal blooms and signs of eutrophic conditions (i.e. mats of cyanobacteria), and sargassum will be recorded.

Anthropogenic impacts such as the presence of debris, propeller scars or vessel blowouts within the Action Area will be mapped.

We request that both NMFS EFH and NMFS review this protocol and approve this protocol for the assessment of habitats present and evaluation of anticipated impacts. The methods have been designed utilizing the methods provided to SEG and those which have been previously used in Coral Harbor by UVI and or the NPS and based on extensive knowledge of conditions within Coral Harbor and both before and after the 2017 hurricanes. With the spread of *Halophila stipulacea* within the harbor there has been an increase in visibility which should facilitate the survey.

Corals

Corals within the project area occur as scattered corals within the seagrass beds, on debris and on hardbottom areas which are both consolidated and unconsolidated. Hardbottom areas in the project areas range from 0m to a depth of -7 meters and are persistent hardbottoms with low to medium relief that are a mix of rock pavement and dead coral. The edges of the hardbottom will be delineated by divers utilizing a GPS, sufficient points will be taken to accurately delineate the hardbottom.

Three physical features will be identified and mapped: relief, substratum type, and sediment within hardbottom areas. Turf and macroalgal cover will be noted to assist in critical habitat identification for both the acropoid corals and the proposed critical habitat for the other 5 listed Caribbean corals as well water quality parameters. The proposed critical habitat for the additional 5 listed Caribbean corals include a combination of certain substrate and water column characteristics as the essential features.

For the proposed critical habitat for *Orbicella annularis, O. faveolata, O. franksi, Dendrogyra cylindrus*, and

Mycetophyllia ferox, the depth range is between 0.5 and 90m (except for D. cylindrus which is 0.5 to 25m) which means that all areas of the survey area deeper than 0.5m could be habitat if the other features are present. The parameters for the proposed critical habitat also includes water quality. The proposed critical habitat listing includes "(3) Marine water with levels of temperature, aragonite saturation, nutrients, and water clarity that have been observed to support any demographic function; and (4) Marine water with levels of anthropogenically-introduced (from humans) chemical contaminants that do not preclude or inhibit any demographic function." A significant amount of data is available for the harbor for turbidity, temperature and dissolved oxygen. Five samples will be taken in the harbor both during a period with no runoff and after 0.5" of rainfall to assess contaminants including ICP Metals (heavy metals), TPH (total petroleum hydrocarbons, PAH's, pesticides and herbicides and aragonite saturation.

Relief characteristics will be recorded by divers as the hardbottom is mapped, relief is measured as the height of positive relief features relative to adjacent negative relief features. Small scale and Intermediate scale relief will be assessed as per the Standard Operation Procedures for Nearshore Hardbottom Monitoring of Beach Nourishment Projects. Substrate type will be delineated, in Coral Harbor this will vary from limestone pavement, cobbles and rubble, bedrock or anthropogenic material. Areas composed of cobbles and rubble will be identified as consolidated and unconsolidated. Sediment within (on) the hardbottom area will also be located and depth and type of sediment recorded. Detailed observations and counts will be made of the flora and fauna on the hardbottoms as quantitative assessments are undertaken.

All corals will be identified to species, the size of each colony will be measured (greatest length, width, height , in mm), percent of live versus dead tissue assessed and if possible determination as to whether tissue loss is recent or old (Lirman et al. (2014), and coral condition, i.e., , bleaching; disease, including SCTLD, sediment accumulation (sediment on the surface of the coral or in grooves), sediment partial burial due to settling sediment or shifts in bottom profile (a more severe category of sediment stress with sediment burying the coral tissue ."Recent tissue loss is an important metric in accessing current reef health.,(Kramer and Lang, 2003)..The delineation will be made as minimally encrusted skeletons whose calyces are still discernable will be considered recent mortality. Representative still photographs of colonies along each transect will be collected with the measuring device for scale.

Divers will swim at a speed slow enough to detect small corals and maintain a depth of approximately 1m from the bottom. GPS coordinates of each colony (decimal degrees (NAD)83) along with a description of where each colony occurs (measurement along transect). A site map with locations of each colony shall be created. Special note of any coral recruits will be made.

Divers will record types of fauna encountered such as tube worms, urchins, anemones as well as more mobile organisms. Special note will made of *Diadema* and whether the new *Diadema* urchin syndrome is present.

Critical Habitat Delineation

The Acropora coral critical habitat's essential is substrate of suitable quality and availability (i.e., consolidated hard bottom or dead coral skeletons free from fleshy macroalgae or turf algae and sediment cover) that will support successful larval settlement, recruitment, and reattachment and recruitment of asexual fragments. Drones will be used to acquire high resolution aerials of both Harbor Point and Pen Point to assist in delineation of hard bottom areas. Divers will then survey the areas and use handheld GPS in waterproof cases to delineate the extent of consolidated hard bottom which meets the requirements of critical habitat for both acropoid species as well as the proposed critical habitat for the other ESA listed Caribbean corals.

ESA Species Qualification

Surveys of critical habitat will be completed on SCUBA and only went visibility exceeds 10ft(~3 meters). The areas of consolidated hard bottom are found off Harbor Point and off Pen Point. Due to the limited size of the hardbottom areas 100% visual reconnaissance of the areas can be made so that all corals on the hardbottom can be quantified. The density will then be calculated for each hardbottom area.

Divers will work in teams of two. Divers will swim approximately 1 meter from the seafloor at a slow enough speed to detect small corals and care will be taken to observe all sides of rocks, and shelves. Transects will be spaced so that 100% visual reconnaissance can be made. All divers will carry underwater slates and will record the following:

1. Species name;
2. Largest linear dimension of the colony or length, height, and width (in mm);
3. Note Percentage live tissue and recent partial area of mortality (i.e., 1-25%, 26-50%, 51-75%, 76-100%);
4. GPS coordinates of each colony will be marked utilizing handheld GPS by an accompanying team member on the surface. GPS locations will be recorded as decimal degrees. The position of where thecoral occurs along the transect line will also be noted. Location will be recorded as Transect number, Direction of Transect, and length along transect as noted on the metered line and distance and direction from transect line.
5. Photograph each coral with a metered scale within the photograph.
5. Site map with locations of each colony will be prepared in ArcGIS.

Seagrass

Seagrass density and composition is highly variable throughout the project areas, *Thalassia testudinum, Saringodium filiforme, Halodule wrightii* and *Halophila stipulacea* are found throughout the survey area in various densities and mixes.

Seagrass assessment will be made utilizing the N-) Florida Department of Environmental Protection (FDEP)seagrass survey protocols (Surveys for Submerged Aquatic Vegetation Compensatory Mitigation Projects) and Florida DEP's Guidance on Surveys for Potential Impacts to Submerged Aquatic Vegetation. The survey will include the proposed development area, the anticipated spud drop area for construction vessels which will be utilized during construction, mooring areas and areas of vessel transect within the bay. The belt transects will assess seagrass and algal species composition, density (approximate percent cover of seagrass and other identified species), and relative health of seagrasses (Dead and dying blades, sloughing of blades, epiphytes coverage, presence of new blades, color). Reference sites will be established for both coral and seagrasses in Hurricane Hole offshore of undeveloped areas to be used for comparison when addressing coral and seagrass health. Reference sites must be at the same depth, and contain the same species as found within the study area.

Due to limited water quality within the vast majority of Coral Harbor, aerial photography is not a useful assessment tool. And due to numerous vessels in the harbor towed diver surveys are no feasible or safe. In water surveys by divers will be made and as stated above belt transects by divers will be spaced based on visibility.

The spatial distribution of SAV within the Action Area will be mapped delineating density and species composition shifts. The percent cover of SAV will be visually assessed utilizing the Braun-Blanquet Cover-Abundance Scores. The edge of each SAV patch (unit) shall be marked with the GPS. The general condition of the seagrass such as canopy height, epiphyte coverage, new growth and blade sloughing will be noted. The seagrass will be quantitatively evaluated within randomized quadrats placed within SAV patches (units). Quadrat placement shall not be biased; however, only vegetated areas shall be quantified. Quadrats landing within uncolonized areas within the SAV habitat will be noted and repositioned into areas containing SAV. A 1 m^2 (1 m x 1 m) quadrat be used for this survey; At least 5 m2 should be sampled in small patches (those less than 0.1 acres). For larger patches, at least 1 m^2 be sampled per 80 m^2, (density of approximately 50 (1 m x 1 m) quadrats per acre. A description off the community structure, including the species composition and percent cover of SAV based on quadrat data, will be provided. See tables below.

From Florida DEP Guidance on Surveys for Potential Impacts to Submerged Aquatic Vegetation

Table 1: Guidance on approximate number of quadrats to be sampled within SAV patches.

Patch size (acres)	Patch size (square meters)	Number of quadrats (1 m x 1 m)
<0.01	< 40	3
0.01 to 0.025	40 - 101	5
0.025 to 0.05	101 - 202	10
0.05 - 0.1	202 - 405	20
0.1 to 0.25	405 - 1012	50
0.25 to 0.5	1012 - 2024	100
0.5 to 1	2024 - 4047	200
> 1 acre	> 4047	300 or 5% of the area, whichever is less.

Quantitative data will be determined using a quadrat that is divided into 100 assessment units. Cover-abundance (percent cover) of SAV will be determined by counting the number of cells with SAV and then calculating the percentage of cells within the quadrat with SAV. Since *Thalassia* and *Syringodium* are present and they have long blades, care will be taken to ensure that the counted "unit" contains the seagrass shoots (or rhizome) and not just blades which are laying in the unit.

Drift algae within a quadrat shall be recorded in the field notes as sparse, moderate or abundant and then removed prior to assessing the seagrass or macroalgae. The total cover-abundance of all macroalgae species shall also be reported.

Non-sessile species

During surveys, divers will document sightings of fish and invertebrates to species if possible, and presence of Nassau groupers, Giant Mantas, marine mammals (including manatees), and/or sea turtles. If ESA listed animals are observed, divers will document the species, habitat and depth at which animals were observed, behavior (e.g., resting, feeding, mating), and approximate size if possible. Similarly, a log will also be kept of sea turtle and marine mammal sightings made from the vessel while tending the divers. The boat log will include the following: species observed, number of animals per sighting, approximate size of animals (if possible), behavior of the animals when sighted, GPS location of the vessel when animals were sighted and the distance and heading from the boat. Information regarding sea state, weather conditions, visibility, and light conditions (i.e. sunny, partly cloudy, cloudy) will be noted on the field data sheet.

Staff Qualifications

All field work and Quality Assurance/Quality Control (QA/QC) of the surveys and data collected will be completed by qualified biologists who meet the following requirements (1) a Bachelor 's of Science in Marine Biology; (2) At least 3 years documented experience monitoring coral hardbottom / coral reef communities in the USVI or Caribbean; (3) Experience and Expertise in surveying SAV; (4) Knowledge of marine benthic ecosystems and organisms, including but not limited to identification of Caribbean coral species, seagrass species, algal species and all ESA listed species in the project area.

Reporting

A georeferenced map (ArcGIS) will be prepared of Potential Impact/Action Area which will include the transect locations, locations of ESA-listed coral colonies observed, habitat types, species compositions and densities and presence any coral critical habitat delineated within the Action Area. Coral critical habitat)substrate of suitable quality and availability, in water depths of 30 meters or less (the entire project area), to support successful recruitment and population growth. This includes areas of exposed hard substrate and dead coral skeleton free of sediment cover and turf and fleshy macroalgae cover. Indicators of both acropoid critical habitat and the proposed critical habitat for the 5 other listed Caribbean coral species as provided in NOAA's Proposed Rule will be documented. Natural areas of loose sediment, fleshy macroalgal covered hardbottom, or seagrasses do not

provide the feature essential to the conservation of threatened corals). Clear documentation showing the presence between suitable coral critical habitat and that which does not possess the necessary features will be provided. Hardbottom areas subject to sand movement or heavy sedimentation or loose material or heavy algal growth will be identified and described as to why they are not suitable critical habitat and sufficient photographic documentation will be provided to allow NMFS to make the determination. Seagrass beds will be delineated and described (by species and percent cover(density). A Biological Assessment will be prepared which include a detailed assessment of all species under EFH and ESA within the project area.

Maps will include a legend, metric scale bar and north arrow for reference. Map(s) will be shown at an appropriate scale that allow features to be readily discerned on a standard-size printed page. The map figures will be overlaid on a recent aerial. Geographical information should be provided in the State Plane Coordinate System (SPCS) for the Virgin Islands (NAD83) and coordinates (latitude and longitude) should be provided in decimal degrees to the fifth decimal place (hundred-thousandths). An ArcGIS Map Package (".mpk" file format) will be provided with spatial data and metadata. SAV areas with different species compositions and/or densities will be distinguished with clear symbology (e.g., coloration and fill patterns). Map figures will be shown at an appropriate scale that allow features to be clearly discerned on a standard-size printed page. Map figures will be overlaid on recent aerial imagery and will include polygons or lines depicting project boundaries and significant features (e.g., footprint of structures, moorings and potential spudding area). Bathymetry will be provided on the maps.
Hardbottom areas will be clearly defined, and a map will be provided showing hardbottom relief and substrate type. Individual corals will be mapped depicting both species and size. A sufficient number of maps will be provided, and maps will be scaled so that they are easily readable.

Excel spreadsheets will be provided with the following information:

• Transect number GPS location, length, direction and width.

• ESA-listed coral colonies including; GPS location, species, colony size, percent of live versus recent partial mortality, and coral condition as describe above.

• Data for any Nassau grouper, sea turtles, marine mammal observed during underwater surveys will include: site, transect number, and location, species, habitat and depth at which animals were observed, behavior (e.g., resting, feeding, mating, swimming through), and approximate size, if possible.

• Non-ESA coral colonies including; GPS location, species, colony size, percent of live versus recent partial mortality, and coral condition as describe above.

• Seagrass Quadrat Analysis, quadrat location, species present, density, height, health and observations on grazing or species use.

Representative still photographs of colonies and habitats along each transect will be collected, and a photo appendix provided with the photograph's location. All work sheets and coral identification from digital images shall be QA/QC'd to confirm identification.

Quality Control/Quality Assurance

A quality assurance/quality control (QA/QC) plan will be implemented to ensure that data collected in the field is properly entered into spatial data files and Excel spreadsheets. Measures will be taken to ensure the data is accurate, complete, and consistent. During field surveys, marine biologists shall check their field datasheets to ensure completeness, legibility, and accuracy. Field data shall be entered into an Excel spreadsheet. The spreadsheet data shall be checked against the original datasheet to ensure data were transferred correctly. Datasheets shall be electronically scanned, saved as PDF files for future reference. Still photographs and videos will be used to check species identifications.

Prior to starting the survey, the survey team (boat operators, divers, data transcribers, and QA/QC reviewers) will

meet to review the survey protocols, QAQC requirements, field data sheets, and to review the identification of the species expected to occur within the survey and to walk through the approved survey methodology.

The following QAQC will be undertaken.

1. Ten percent of the transects will be repeated to assess accuracy. After the first 10 transect one of the transects will be chosen at random and reassessed. The result of the repeated transects cannot vary more than 10%. If it is within 10% the survey will continue and after 10 more transects one will be repeated. If assessment find more than 10% variation a reassessment of the transect will be made, and the reason for the variation will be determined and discussed between the team. Two additional transects will then be reran for comparison. If the variation remains under 10% the survey will continue, if variation is found the cause will be determined and actions taken to correct so that variation does not exceed 10%

3. An attendance recorded will be kept of the review of the methods and all surveyors will sign the methods stating that they have read and understand.

4. All field data sheets will be signed by the divers and QA/QC reviewer.

5. The QA/QC reviewer will be a separate qualified biologist who is responsible for verifying survey results and ensuring proper implementation of the survey protocols.

QA/QC results should reflect consistency of greater than or equal to 90% for species identification and quantification.

6. For all water quality samples 10% duplicate samples will be taken.

Literature Cited/Referenced:

Endangered and Threatened Species; Critical Habitat for the Threatened Caribbean Corals, 85 F.R., 76302 (proposed November 27, 2020)(to be codified at 50 CFR Parts 223 and 226) https://www.federalregister.gov/documents/2020/11/27/2020-21229

Florida Department of Environmental Protection, Office of Resilience and Coastal Protection, December 2020. Guidance on Surveys for Potential Impacts to Submerged Aquatic Vegetation

Kosmynin, Vladmir, Lainie Edwards, Jennifer Peterson and Brendan Biggs, 2016. Standard Operation Procedures For Nearshore Hardbottom Monitoring Of Beach Nourishment Projects. Florida, DEP.

Kramer, P.R., Lang, J.C., 2003. The Atlantic and Gulf Rapid Assessment protocols: former version 2.2. Atoll Res. Bull. 496, 611–624.

Lirman, D., et al., Percent recent mortality (PRM) of stony corals as an ecological indicator of coral reef condition. Ecol. Indicat. (2013), http://dx.doi.org/10.1016/j.ecolind.2013.10.021

NOAA, Southeast Regional Office, July 2019. ESA-Listed Coral Colony and Acropora Critical Habitat Survey Protocol

Office of Resilience and Coastal Protection, Florida Department of Environmental Protection Dec. 8, 2020.Guidance on Surveys for Submerged Aquatic Vegetation Compensatory Mitigation Projects