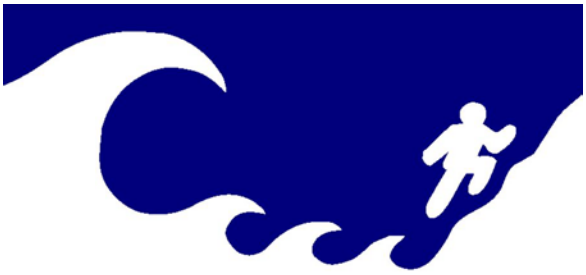
Tsunami Incident Annex 2011

United States Virgin Islands Emergency Management Agency (VITEMA)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Promulgation Statement

Transmitted herewith is the Virgin Islands Territorial Emergency Management Agency (VITEMA) is the *Tsunami Incident Annex* for the United States Virgin Islands. This plan supersedes all previous plans and may not be reproduced without prior authorization. It provides a framework for prescribing policies, responsibilities and procedures for the territory and its district to respond to a tsunami event.

This plan is in accordance with existing federal, territorial and district statutes and understandings of the various departments involved. It has been concurred in by VITEMA and the Federal Emergency Management Agency (FEMA). It will be reviewed and recertified periodically by the Director of the VITEMA. All recipients are requested to advise VITEMA of any and all changes which might result in its improvement or increase in its usefulness.

By virtue of the authority vested in me, by the United States Virgin Islands, I hereby promulgate and issue the *Tsunami Incident Annex* as the official guidance of all concerned.

Approval: _____ Date: _____

Concurrence: _____ Date: _____

Executive Summary

The goal of the *Tsunami Incident Annex* is to coordinate emergency response efforts to save lives, reduce injuries, and preserve property. Although the *Tsunami Incident Annex* addresses emergency issues before and after an emergency, its primary goal is to assemble, mobilize and coordinate a team of responders and coordinators that can deal with a tsunami incident.

Consistent with the government responsibilities to provide for the protection of the lives, property, and welfare of citizens, visitors and business, VITEMA examined the status of the Territory's emergency preparedness and response capabilities to respond to a tsunami incident. Recognizing the importance of the undertaking, VITEMA engaged Witt Associates, a recognized leader in Emergency Management, to assist in its endeavor. VITEMA and Witt Associates coordinated with managers of support functions, federal stakeholders and private sector partners within the Territory, who through their participation strengthen the Territory's readiness.

Broadly stated, the process adopted by VITEMA and Witt Associates was a comprehensive review of existing documents, agreements and plans coupled with extensive interviews designed to capture the most reliable picture of the current state of emergency preparedness. With extensive document review and in-depth interviews, VITEMA, assisted by Witt Associates, was able to develop this *Tsunami Incident Annex* to the Territorial Emergency Operations (TEOP). The *Tsunami Incident Annex* assigns responsibilities to USVI departments for coordinating emergency response activities before, during, and after a tsunami incident. The *Tsunami Incident Annex* does not contain specific instructions as to how each department will respond to an emergency.

During an emergency, all involved personnel will use the Incident Command System (ICS) to manage the incident or event. The Emergency Operations Center (EOC) will coordinate additional resources when needed according to the TEOP and will continue to use the EOP to restore the community after an emergency.

This Tsunami Incident Annex was provided to the VITEMA Director, Elton Lewis (E-mail: elton.lewis@vitema.vi.gov), for review, and is presented herein.

Section 1: Introduction

Background

A tsunami is a series of long waves generated in the ocean by a sudden displacement of a large volume of water. Underwater earthquakes, landslides, volcanic eruptions, meteor impacts, or onshore slope failures can cause this displacement. Tsunami waves travel faster in deep water than in shallow water with speeds up to 600 miles per hour. As a tsunami nears the coastline, its speed diminishes, its wavelength decreases, and its height can increase greatly. If the disturbance that caused the tsunami occurs close to the coast, local tsunamis can impact coastal communities within a few minutes. A very large disturbance can cause extensive local devastation.

The first wave of a tsunami may not necessarily be the largest in the series of waves, nor may it be the most significant. In regions where there is extensive flatland contiguous to the sea, low-lying areas could experience severe inland inundation of water and deposition of debris for miles inland.

For the Caribbean, the most likely causes of tsunamis from local sources are earthquakes, coastal and submarine landslides resulting from slope failure, and volcanic eruptions. Locally, faults in the Virgin Islands Basin, Anegada Passage, and the Puerto Rico Trench are active and occasionally release stresses thus causing earthquakes. Slope failure along the submerged north coast of Puerto Rico, such as in the Loiza amphitheater, has been listed as a potential mechanism to trigger large tsunamis. The most recent tsunamis affecting the United States Virgin Islands (USVI) and Puerto Rico have occurred in 1867, 1918 and 1946. Atwater (2008) and Mercado (2003) have presented geological evidence that one or more tsunamis coming from sources to the north of the Virgin Islands have impacted coasts from Puerto Rico to Anegada.

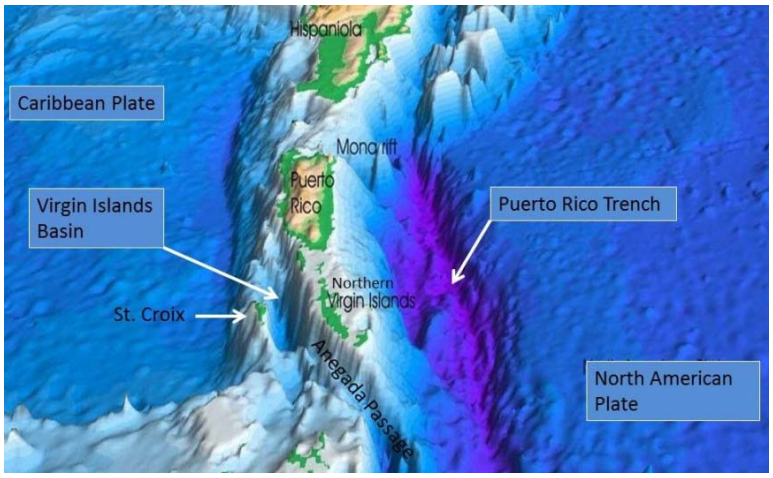


Figure 1: 3-D view of the Puerto Rico Trench and Virgin Islands Basin (Christopher Polloni, United States Geological Survey and Jack Cook, Woods Hole Oceanographic Institution)

Tsunami Threat to United States Virgin Islands

Tsunami hazard areas are all coastal areas, particularly those that are low lying and relatively flat. Tsunami impacts will vary in the USVI due to several factors including the near shore, coastal and submarine topography, density of coastal reefs and vegetation, and level and type of development (see Appendix B for Tsunami Inundation Maps).

Many low elevation coastal areas of the USVI are intensively developed. Charlotte Amalie, for example, is urbanized and has extensive infrastructure and road networks and is considered most vulnerable to the tsunami hazard. Similarly on St. John, the flat lands of Cruz Bay are urbanized with waterfront development, port facilities and commercial development such as shopping centers and hotels along the coastline that could be affected by a tsunami. Both islands have secondary locations of high population density, such as Red Hook and Smith Bay on St. Thomas, and Coral Bay on St. John, that are vulnerable to the tsunami hazard. These locations have experienced significant development in recent years creating a potential for considerable property damage and loss of life. Although deserted after dark, Magens Bay on St. Thomas presents a very high population density during the day with as many as 2,000 tourists and local beachgoers at risk of a tsunami in a confined embayment.

The physiographic composition of St. Croix is considerably different from St. John and St. Thomas. The result is a landscape with much less topographic relief than the other islands. Nevertheless, it has two coastal urban areas, Christiansted and Frederiksted, which are particularly exposed to the tsunami hazard. Inundation of Frederiksted in the 1867 tsunami was extensive, deadly and well documented. The waves penetrated deep inland and left a significant US Navy warship deposited in the waterfront area. At the same time, houses were washed into the sea at Gallows Bay, just east of Christiansted.

The amount of warning time of a tsunami for the USVI depends on the source of the tsunami and there are several potential sources. Depending on travel time for the resulting tsunami, sources are defined as *local* (less than 25 minutes travel time), *regional* (25 minutes to 2 hours) or *distant* (more than 2 hours travel time). The 1867 tsunami was local in that it resulted from an earthquake with epicenter in the Virgin Islands (VI) Basin (between St. Thomas and St. Croix) and gave five (5) to six (6) minutes for all USVI ports. If the epicenter location were farther away, more time would be anticipated.

Computer modeling is necessary to get precise approximations of arrival times, but in general, rough estimates of arrival times for tsunamis from potential source areas that are as follows:

- **Slope Slumping on Puerto Rico Northeast Slopes or in the Puerto Rico Trench** – approximately 30 minutes for St. Thomas and St. John; about 40 minutes for St. Croix;
- **Anegada Passage** – approximately 15 minutes for St. Thomas, a little less for St. John, 20–25 minutes for St. Croix;

- **Northwest Puerto Rico or Eastern Hispaniola Coasts** – possibly 1 hour for St. Thomas, a little more for St. John, and approximately ten minutes more for St. Croix;
- **Slope Collapse North Coast of Dominica** – maybe 40 minutes for St. Croix, about 50 minutes for St. Thomas and St. John;
- **Kick-'em-Jenny Submarine Volcano** (calculated by Simpson and Shepherd, 1992) – 80 minutes for St. Croix, 95–100 minutes for St. Thomas and/or St. John;
- **Lisbon, Portugal or Canary Islands** – approximately 7 hours.

There is a possibility that a damaging tsunami could occur from an event that would not be felt in the USVI. Whether spontaneous or triggered by a relatively small earthquake, slope collapses may not be felt yet, but could generate a big tsunami. For events that could impact the islands with less than five minutes with no felt earthquake, the only likely warning would be visual and auditory – the tsunami makes noise as it disturbs the ocean floor. How well the tsunami could be seen would depend on what the coastal and submarine topography is like near the particular community. With pre-planned escape routes and signs, and with good citizen education, many lives could still be saved.

For small islands such as the USVI, it is ***very likely*** that a tsunami would eventually affect all coasts no matter where the source area was. Tsunami wave mechanics can be complicated and each case would require specific computer modeling.

The north coast of St. Croix and the south coasts of St. John and St. Thomas saw the 1867 tsunami first because the source was in the center of the VI Basin. Although all coasts would be impacted in turn, the north coasts of all USVI would *first* see the tsunamis coming from the following source areas:

- Puerto Rico Northeast Slopes, Hispaniola or the Puerto Rico Trench
- Anegada Passage
- Northwest Puerto Rico or Eastern Hispaniola Coasts
- The Eastern Coast of North America; Lisbon, Portugal; or Canary Islands

Tsunami-generating events in the eastern Caribbean, such as the eruption of Kick-`em-Jenny submarine volcano or major landslides on Dominica's northern slopes, would *first* impact all USVI *southern* coasts.

These threats underscore the risk to two main elements of the USVI economy – tourism and petroleum.

Tourism is the primary economic activity, accounting for 80% of GDP and employment. Each year the USVI hosts approximately 2.4 million visitors while hosting some of the largest cruise ships in the world. Standard cruise ships may carry up to 3,000 passengers attended by approximately 1,000 staff and crew members. However, the port in St. Thomas is also able to accommodate the recording-setting vessels *Oasis of the Seas* and the *Allure of the Seas* which can each carry up to

6,000 passengers and crew. During the day, when multiple cruise ships are in port, more than 12,000 persons may be around these vessels on the dock or in other parts of coastal St. Thomas itself.

The HOVENSA oil refinery on St. Croix is the largest single exporter of petroleum products to the United States. In 2001, the refinery produced and exported to the United States approximately 236,000 barrels per day. However, the oil refinery lays within one quarter mile of the sea as do many of the USVI Government offices, several schools, both airports, and the electrical power and desalination plants of the USVI Water and Power Authority.

Purpose

The purpose of this Annex is to establish guidelines for the Virgin Islands Territorial Emergency Management Agency (VITEMA) to utilize in an effort to reduce the potential for loss of life from a **Tsunami Incident**. The Annex will help the USVI become better prepared for a Tsunami Incident by providing guidance on how VITEMA can provide timely, accurate, reliable, and effective tsunami information and support to at risk populations, government agencies, and other organizations and institutions within the Territory.

Scope

The Tsunami Incident Annex applies to the USVI Territory only and does not address response and recovery operations for governments or agencies outside of the USVI. The primary audiences for this Annex are VITEMA, USVI government agencies, and special districts (transit and school districts) within the USVI that have responsibility for implementing this Annex and/or have responsibilities detailed herein. VITEMA will share this Annex in electronic format with all such entities within the USVI to encourage and assist them with their tsunami planning efforts.

Assumptions

This Annex is based on the following assumptions:

- The two most likely causes of tsunami hazard in the USVI are seismic events in the Caribbean region and from a submarine landslide in the Puerto Rico Trench. It would be appropriate to consider a repeat of the 1867 event as a most likely scenario.
- Time to warn the public, evacuate vulnerable facilities, and secure coastal areas will vary from minutes to hours, depending on the location of the source.
- The first wave may not be the largest nor the most destructive.
- After the arrival of the first tsunami wave, waves may continue for several hours. Pending notification from official US tsunami warning centers, risk areas may be re-opened from several hours to several days after the last observed wave, or at least two (2) hours after the Estimate Time of Arrival (ETA) has passed without a wave coming ashore.
- A precursor to arrival of the wave may or may not be a rapid withdraw of the sea, or an earthquake that is felt (one that makes it difficult to stand or walk).
- The destructive power of a tsunami is amplified by the burden of rocks, damaged structures, vehicles, and sand that it brings, particularly after the first incoming wave.
- After maximal run-up inland, retreating tsunami flow presents as significant a hazard as incoming waves; retreating and incoming waves may coincide and amplify the destructiveness.
- The maximum possible populations (tourist/workforce) may be present in the most affected areas.
- Access to and from the damaged areas is likely to be restricted and coastal areas may remain partly inundated for several days.

Authority

Federal

The National Weather Service of the National Oceanic and Atmospheric Administration (NOAA) is specified within **The Tsunami Warning and Education Act** (22 U.S.C. § § 3201 *et seq.)* as the lead agency responsible for operating the **US Tsunami Warning System** and for providing technical assistance and training to the **Global Tsunami Warning System**. NOAA is responsible for maintaining national tsunami warning centers and for managing the **National Tsunami Hazard Mitigation Program (NTHMP)**.

Territorial

This Annex is applicable to all Territory departments and divisions. The USVI and VITEMA recognize the **Tsunami Hazard** to the Territory and directed the development of the **USVI VITEMA Tsunami Incident Annex**.

Relationship to Other Plans

The Territorial Tsunami Incident Annex is not meant to stand alone, but is intended to be used in support of, and in conjunction with, the **Territorial Emergency Operations Plan** (TEOP). The TEOP outlines broad emergency response concepts with appendices detailing emergency response for each hazard faced by VITEMA. This document is to be used solely as an Annex to the TEOP.

The following plans, policies and procedures to be used in support of, and in conjunction with this Annex:

- **VITEMA Territorial Emergency Operations Plan**
- **VITEMA Emergency Response Plan**
- **VITEMA Territorial Communications Plan**
- **VITEMA Territorial Hazard Mitigation Plan**

Section 2: Operations

Operational Priorities

- Protecting life, property, livelihoods, and the environment;
- Ensuring that the immediate needs of the population are met;
- Restoration of critical infrastructure, government services, and key life sustaining resources;
- Successful mitigation of hazards that develop as a result of the emergency events.

Concept of Operations

The United States Virgin Islands Territorial Emergency Management Agency (VITEMA) utilizes the *Incident Command System* and utilization of a *multi-disciplinary approach* to prepare for, plan for respond to, and recover from a tsunami event.

In the event of a **Tsunami Warning**, the population identified in the risk or vulnerable areas will be warned and advised to move to pre-identified evacuation points if time permits. After the general warning to the public, the emphasize will be on alerting and evacuating the populations at the schools, convalescent homes, day care facilities, and tourist facilities in the vulnerable areas.

Sequence of Operational Activities

1. Alert and Warning Phase
   - Activation Triggers
   - Notifications

2. Response and Recovery Phase
   - Activation
   - Resource Allocation
   - Evacuation and Traffic Control Points
   - Evacuation Order
   - Evacuation Routes
   - Area Security
   - Re-entry
   - Damage Assessment
   - Emergency Public Information

Activation Triggers

The **VITEMA Tsunami Incident Annex** is a part of the **Territorial Emergency Operations Plan**. The Tsunami Incident Annex can be implemented as required in response to a Tsunami Incident requiring any form of emergency response. There are four (4) levels of Tsunami Alerts for the USVI. They are issued by the West Coast/Alaska Tsunami Warning Center (WC/ATWC) and the Puerto Rico Seismic Network (PSRN).

1. ***Tsunami Warning***

A Tsunami Warning is issued when a potential tsunami with significant widespread inundation is imminent or expected. Warnings alert the public that widespread, dangerous coastal flooding accompanied by powerful currents is possible and may continue for several hours after arrival of the initial wave. Warnings also alert emergency management officials to take action for the entire *tsunami hazard zone*. Appropriate actions to be taken by local officials may include the evacuation of low-lying coastal areas, and the repositioning of ships to deep waters when there is time to safely do so. Warnings may be updated, adjusted geographically, downgraded, or canceled. To provide the earliest possible alert, initial warnings are normally based only on seismic information.

Actions to be taken by public: move to high ground as soon as possible and follow emergency instructions.

2. ***Tsunami Advisory***

A Tsunami Advisory is issued due to the threat of a potential tsunami which may produce strong currents or waves dangerous to those in or near the water. Coastal regions historically prone to damage due to strong currents induced by tsunamis are at the greatest risk. The threat may continue for several hours after the arrival of the initial wave, but significant widespread inundation is not expected for areas under an advisory. Appropriate actions to be taken by local officials may include closing beaches, evacuating harbors and marinas, and the repositioning of ships to deep waters when there is time to safely do so. Advisories are normally updated to continue the Advisory, expand/contract affected areas, upgrade to a Warning, or cancel the Advisory.

Actions to be taken by public: be aware of possible strong and dangerous currents. Stay tuned for local emergency guidance.

3. *Tsunami Watch*

A Tsunami Watch is issued to alert emergency management officials and the public of an event which may later impact the Watch area. The Watch area may be upgraded to a Warning or Advisory, or canceled, based on updated information and analysis. Therefore, emergency management officials and the public should prepare to take action. Watches are normally issued based on seismic information without confirmation that a destructive tsunami is underway.

Actions to be taken by public: be aware of potential danger and stay tuned for more information.

4. *Tsunami Information Statement*

A Tsunami Information Statement is issued to inform emergency management officials and the public that an earthquake has occurred, or that a Tsunami Warning, Watch or Advisory has been issued for another section of the ocean. In most cases, information statements are issued to indicate there is no threat of a destructive tsunami and to prevent unnecessary evacuations as the earthquake may have been felt in coastal areas. An Information Statement may, in appropriate situations, caution about the possibility of destructive local tsunamis. Information statements may be re-issued with additional information, though normally these messages are not updated. However, a Watch, Advisory or Warning may be issued for the area, if necessary, after analysis and/or updated information becomes available.

Actions to be taken by public: be aware there is no danger at the moment; however, a distant ocean basin may be in danger of a tsunami.

Notification

Tsunami Watches and Warnings are disseminated by the WC/ATWC and the PRSN based upon data received from buoy networks, coastal sea level data, and seismic data. Both the WC/ATWC and the PRSN will notify the 9-1-1 Centers on both St. Thomas and St. Croix. These centers have the availability to activate the sirens with both siren and voice messaging. The 9-1-1 centers will also notify VITEMA officials. The San Juan Forecast Office of the NWS; upon receiving a Warning, Advisory, or a Watch; will also issue an EAS message to Puerto Rico and USVI primary stations as well as activate the NOAA Weather Radio.

The primary alert pathway of notification the USVI government has is the **VI Alert Warning System**. The *VI Alert System* has been programmed to monitor the products issued by the WC/ATWC and has pre-scripted Warning and Watch messages. Based upon the product received from the WC/ATWC, the *VI Alert* then sends the message to the following:

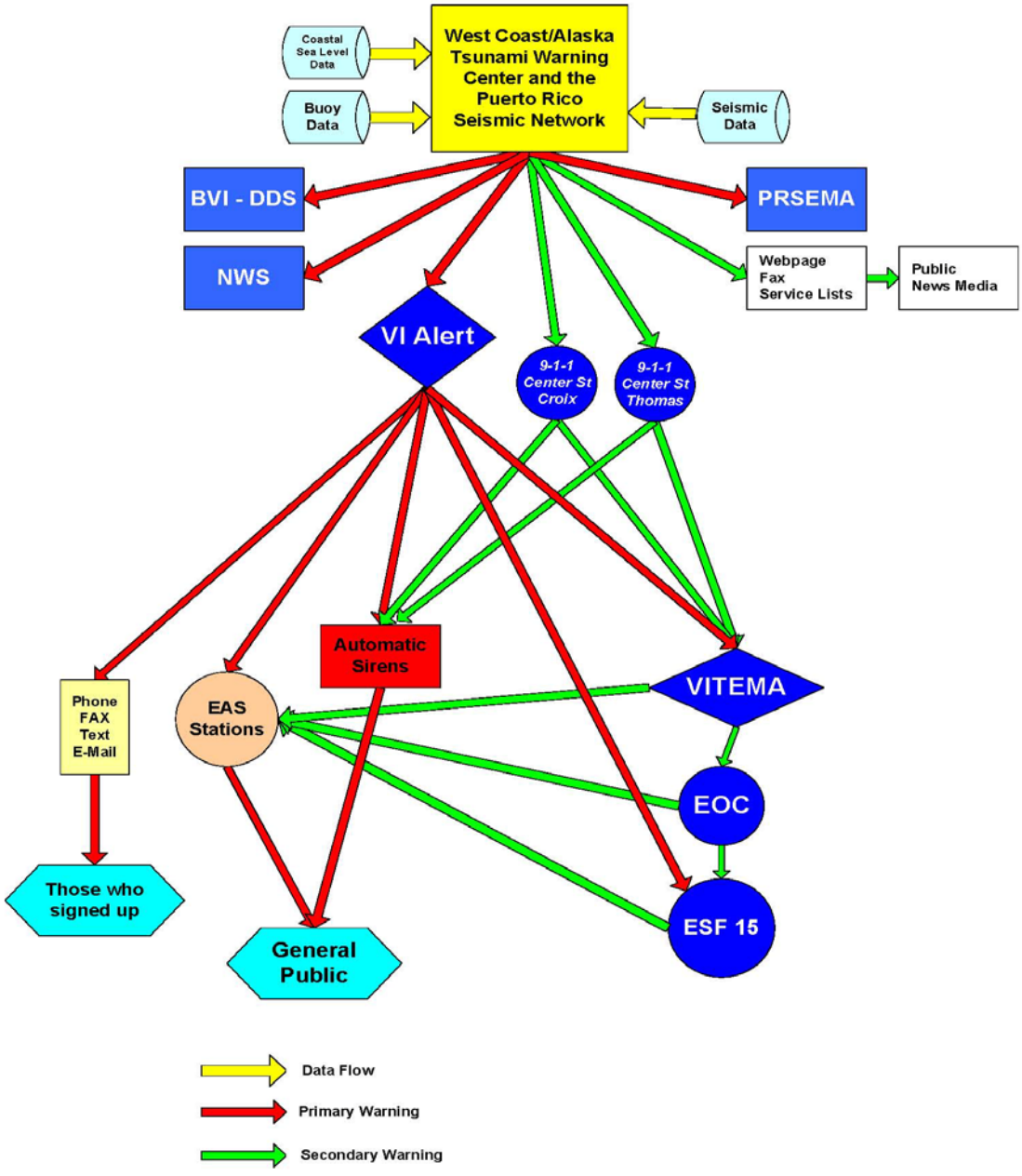
1. To all persons, organizations, and agencies that have signed up for the service
2. To Emergency Alert System (EAS) radio stations for broadcast to the general public
3. To the Automatic Siren System (to be developed) that will activate siren and voice messages
4. To the Emergency Support Function (ESF) 15 – External Affairs – contacts
5. To VITEMA officials

As a backup, the TWC also notifies the 9-1-1 Centers on both St. Thomas and St. Croix. These centers have the ability to activate the sirens with siren and voice messages. Local radio and cable TV stations may also relay EAS messages and provide additional information on the status of Tsunami Alerts in the region.

Once VITEMA is notified, it will activate the EOC as appropriate and the ESF 15 – External Affairs function in the EOC. VITEMA, the EOC, and ESF 15 can all notify the EAS system to notify the public.

Government officials and/or departments, private institutions, and the general population can also sign up to receive tsunami email notification from the WC/ATWC at: http://wcatwc.arh.noaa.gov/watcher/tsunamiwatcher.php and at the PRSN website: http://prsn.uprm.edu/english/forms/servicelist.php in addition to technology-based Warning notifications. The public of the USVI should also be prepared to treat prolonged ground tremors as a warning of an impending tsunami. Because the arrival of a tsunami can occur within minutes of a major earthquake, very strong or prolonged ground shaking should be interpreted as a notification of a potential tsunami threat for the region. Citizens need to be educated to respond to these and other natural signs, such as very loud sounds from the sea or sudden change in sea level, and not wait to receive notification through official channels.

Notification Diagram



Response and Recovery Phase

A tsunami may be generated from a location that is close to the USVI and allows for no official warning through the Warning System. People may only be aware that a tsunami may be coming from feeling a substantial earthquake or seeing the ocean dramatically recede or rise. If this is the case, people should begin walking quickly to high ground. If walking to higher elevations is not possible, then climbing to at least the 4th floor of the nearest multi-storied building should be considered. In some locations, climbing a tree might be the only option and should be utilized as a last resort. People should not attempt to drive their cars as there is no road capacity for all of the vehicles. Where ever possible, people should assist those who need help in moving to higher ground.

If there is time when a Tsunami Warning is issued, evaluation will occur to determine the probability of a tsunami reaching the vulnerable areas and determination of appropriate actions. Those actions may include a *phased evacuation* or a *total evacuation* depending on the situation. Consideration must be given to how long it will take to evacuate the area, any special needs of evacuees, identification of densely populated areas, and how to appropriately handle the tsunami impact and potential earthquake damage.

Emergency Management	Action
Threat Notification	▪ Determine credibility of threat ▪ The Governor declares an emergency and considers an evacuation order ▪ Activation of the Emergency Operations Center ▪ Identification of areas to be evacuated ▪ Assessment of consequences ▪ Implement Evacuation Plan ▪ Deploying first responders to evacuation points
Partial or Full Activation of the EOC	▪ Establish Incident Command and consider implementing Incident Command at evacuation point
Alerting of First Responders	▪ Stage Emergency Responders and equipment outside the vulnerable area ▪ Continue to monitor threat
Issue Public Information	▪ Issue Public Information Messages

Resource Allocation

Resource allocation and coordination for a Tsunami Incident will take into consideration of the following special areas of concern:

- Evacuation of education and childcare facilities and nursing homes located within the Tsunami Evacuation Zone
- Evacuation of access and functional needs populations (special needs or disabled) within the Tsunami Evacuation Zone
- Evacuation of prisons located within the Tsunami Evacuation Zone
- Establishment of a Family Assistance Center to assist with reunification of evacuated persons

Evacuation and Traffic Control

One of the most critical challenges for a Tsunami Event is evacuation of the vulnerable area or areas. Emergency Support Function (ESF) 1 – Transportation, in coordination with VITEMA and private sector partners, will work together to develop and implement, as needed, Evacuation and Traffic Control Plans that are in compliance with the laws and regulations of the USVI regarding controlling movement of people and property.

Declaration of Emergency

In the case of a Tsunami Event, the Governor will declare a State of Emergency enabling the Governor to grant emergency powers and to issue the Order of Evacuation to the vulnerable area. If the tsunami occurs with no warning, the Declaration of Emergency will be issued as soon as possible to grant the needed emergency powers for response.

Evacuation Order

Upon confirmation of a Tsunami Warning, the Governor is responsible for issuing an Evacuation Order for the threatened area and for requesting the activation of VITEMA and for representatives from the essential agencies to report to the Emergency Operations Center (EOC). See Attachment D for Sample Evacuation Order.

Evacuation Routes

When a Tsunami Watch, Warning, or Advisory is issued, VITEMA will identify the most appropriate evacuation routes. The primary objective for people is to move up and inland away from the coast. Tsunami Inundation Maps will assist in the identification of evacuation routes and evacuation points in the event that a Tsunami Warning is issued.

- Develop notification and evacuation procedures. Actions include evacuation of low-laying coastal areas and the movement of boats and cruise ships out of harbors to deeper waters. VITEMA recommends that coastal areas are to be cleared at a minimum of 60 feet above sea level.
- Vertical evacuations (shelter-in-place) should only be made if the safety of the persons can be assured as a viable evacuation point.
- If located outside a Tsunami Evacuation Zone, stay outside of the Evacuation Zones. Curtail all non-emergency travel.
- Disseminate maps and evacuation procedures to the public and post in public places, tourist attractions, and even telephone books.
- Consideration needs to be given to the evacuation of individuals or families with special needs (access and functional needs populations). Access and functional needs individuals include, but are not limited to: injured, fragile, blind, mobility impaired, deaf, young children, and handicapped.
- Identify evacuation points and shelter locations with the capacity to sustain the evacuated population. Care, shelter, communication, and security will be set up at the shelter site.
- Develop simple maps showing the evacuation routes and evacuation points.

Area Security

After an area has been evacuated, ESF 13 –Public Safety and Security will set up traffic control points including: roadblocks, barricades, and a system of patrols for evacuated areas.

Re-Entry

Evacuated areas should remain closed to the public until after the threat of the tsunami no longer exists and VITEMA issues the *all clear* message.

Damage Assessments

All affected agencies shall coordinate damage assessment with VITEMA. VITEMA will review the preliminary damage assessments (PDAs). They will determine the need to establish and deploy Damage Assessment Teams in coordination with ESF 14 – Long Term Community Recovery. Determination will be based on the severity of damages initially reported or expected and the population of the affected areas. If not already done for a Warning or Evacuation, a declaration of

an emergency or disaster may be considered based upon the initial damage assessment. Officials will consider a health inspection of damaged areas to ensure the areas are safe for residents to return.

Emergency Public Information

VITEMA is responsible for media coordination and establishment of a Public Information Officer (PIO) whose responsibilities include:

- Preparing the daily press briefings in coordination with the EOC
- Assisting in coordination of press releases for the elected officials
- Responding to inquiries from the media in conjunction with the subject matter experts (SMEs)

See Attachment C for Media Messaging Guide.

Section 3: Organization – Roles and Responsibilities

Roles and Responsibilities

A Territorial agency designated as an ESF primary agency serves as the executive agent under the Territorial Coordinating Officer (or Territorial Resource Coordinator for non-Stafford Act incidents) to accomplish the ESF mission. Support agencies are those entities that support a primary agency in executing the mission of the ESF.

Tsunami Response Organizations

Primary Agencies (General Responsibilities)

Primary Agencies support VITEMA and coordinate with the other primary and support agencies. These agencies will provide staff for operational functions at fixed and field facilities as well as provide post-tsunami situational assessments. Primary Agencies will work with private-sector organizations to maximize use of all available resources depending on the needs of the incident.

It is the responsibility of the Primary Agencies to keep other ESFs and organizational elements informed of priorities and activities related to the incident. They will conduct situational and periodic tsunami readiness assessments, and execute contracts and procure goods and services as needed. Throughout this process, the Primary Agencies will also ensure financial and property accountability for ESF activities.

Before an incident occurs, it is the responsibility of Primary Agencies to participate in planning for short- and long-term tsunami incident management and recovery operations, as well as maintaining trained personnel to support interagency tsunami response and support teams.

Supporting Agencies (General Responsibilities)

Supporting Agencies are responsible for conducting tsunami response operations when requested by VITEMA, or the designated ESF primary agency, consistent with their own authority and resources.

In preparation for an incident, Supporting Agencies will participate in planning for short- and long-term tsunami incident management and recovery operations. In addition, they will develop supporting tsunami operational plans, standard operating procedures (SOPs), checklists, or other job aids, in concert with existing first-responder standards.

Supporting Agencies will also be responsible for providing input for periodic tsunami readiness assessments. It is the responsibility of these agencies to maintain trained personnel to support interagency tsunami response and support teams during an incident and to identify new equipment or capabilities required to prevent or respond to tsunami hazards at the time of the incident.

During an incident, the Supporting Agencies will furnish available personnel, equipment, or other resource support as requested by VITEMA or the respective ESF primary agency. At the conclusion of the incident, the Supporting Agencies will provide post-tsunami situational assessments.

Operations Section – General Responsibilities

The Operations Section will manage and direct emergency operations, mutual aid, and resource requests during a Tsunami Incident. This section will coordinate with Territorial communities, special districts, and outside agencies before, during, and after the incident.

After the incident, the Operations Section will direct and coordinate the post-tsunami situational assessments as well as coordinate evacuation transportation and shelter needs. The Operations Section will also be responsible for coordinating with private sector entities for assistance and damage assessment. Coordination with Animal Control on care issues and public health concerns will also fall under the responsibility of the Operations Section.

Planning and Intelligence Section – General Responsibilities

During a Tsunami Incident, the Planning and Intelligence Section will manage the Situation, Documentation, Demobilization, and Resources Units. In addition, they will address emergency management and consequence management concerns and provide mapping and geographic information systems (GIS) products.

Logistics Section – General Responsibilities

It is the responsibility of the Logistics Section to identify support requirements such as supplies, services, equipment, facilities, etc. during a Tsunami Incident. This section will also identify and develop databases that will be useful to support response and recovery as well as critical systems and facilities. During an incident, the Logistics Section will provide other sections with instructions to access and track resources.

Finance, Administration and Recovery (FAR) Section – General Responsibilities

During a Tsunami Incident, the Finance, Administration and Recovery (FAR) Section will ensure plans are in place for continuity of operations of payroll processing as well as work to ensure lists are developed of available staff. The FAR Section will provide other sections with instructions on policies and procedures for cost tracking and prepare and execute emergency contracts as requested.

Coastal Communities and Special Districts

During a Tsunami Incident, it is the responsibility of the coast communities and special districts to develop community and special district Tsunami Warning and Evacuation Policy, Plans and Procedures. They will then coordinate with VITEMA in planning, training and exercises; and ensure appropriate local officials have signed up for *VI Alert*. It is also the responsibility of the Coast Communities and Special Districts to identify liaisons to respond to the VITEMA EOC as appropriate.

Management

Governors' Office

During an incident, the Governor's Office also has the ability to declare emergencies, order evacuations, authorize financial resources, and exercise other emergency powers as granted by law. The Governor's Office will act as the Primary Agency for ESF 15 – External Affairs, in response to Tsunami Incidents. In addition, the Office will act as a Supporting Agency for ESF 14 – Long Term Community Recovery, in response to Tsunami Incidents.

VITEMA

During a Tsunami Incident, VITEMA will act as the Primary agency for ESF 2 – Communications, ESF 5 – Emergency Management/Planning, and ESF 14 – Long Term Community Recovery. In addition, VITEMA will act as a Supporting agency for ESF 1 – Transportation, ESF 3 – Engineering, ESF 4 – Fire-fighting, ESF 6 – Mass Care, Emergency Assistance, Housing and Human Services, ESF 7 – Logistics Management and Resource Support, ESF 8 – Public Health and Medical Services, ESF 9 – Urban Search and Rescue, ESF 10 – Oil and Hazardous Materials, ESF 11 – Agriculture and Natural Resources, ESF 12 – Energy, ESF 13 – Public Safety and Security and ESF 15 – External Affairs.

It is also the responsibility of VITEMA to act as the Territorial Coordinating Agency for all natural and human caused disasters and emergencies, as well as serve as a liaison between the Governor's office, DHS, and other organizations both inside and outside of the Territory. VITEMA will produce and maintain incident reports and other appropriate documentation in relation to all Tsunami

Incidents, as well as issuing all clear messages. VITEMA is also responsible for media coordination and establishment of a Public Information Officer (PIO).

The Virgin Islands National Guard

During a Tsunami Incident, the Virgin Island National Guard will act as directed by the Governor and provide support and resources to all responding agencies. The Virgin Islands National Guard will also command and support the Civil Support Team (CST).

US Coast Guard

With enough notice, the United States Coast Guard (USCG) will evacuate USCG personnel to higher ground and notify the local ports and vessel operators of the imminent danger and close the ports.

After a Tsunami Event, USCG Facility and Vessel inspectors will conduct assessments of the ports and help Sector San Juan (SSJ) identify problems and when the ports can be opened to commercial traffic. The USCG will also assist with search and rescue of persons in the water.

The Officer in Charge (OIC) in St. Thomas and OIC in St. Croix will work directly with their VITEMA counterparts.

Police Department

The USVI Police Department will act as the lead for ESF 13 – Public Safety and Security, during a Tsunami Incident.

Before the incident, the Police Department is responsible for assisting with the alert and notification of communities and citizens.

During an incident, the Police Department is responsible for managing intelligence concerns and facility and personnel protection as well as setting up traffic control points including: roadblocks, barricades, and a system of patrols for evacuated areas.

Following the incident, the Police Department will assist with damage assessment and casualty management as well as coordinate law enforcement mutual aid resources.

Fire Services

USVI Fire Services will act as the lead for ESF 4 – Firefighting, ESF 9 – Search and Rescue, and ESF 10 – Oil and Hazardous Materials. Fire Services will coordinate rescue mutual aid resources in response to a tsunami and provide input to Logistics on fire and rescue, HazMat, and medical logistical support. In addition, Fire Services will coordinate with Emergency Medical Services, public works, utilities and hospitals.

Department of Planning and Natural Resources

The Department of Planning and Natural Resources will assist ESF 10 – Oil and Hazardous Materials, with technical assistance and environmental information for the assessment of the health/medical aspects of situations involving hazardous materials (HazMat).

Department of Public Works

The Department of Public Works will act as the lead for ESF 3 – Public Works and Engineering, and coordinate with affected communities on the closing or clearing of impacted roadways. The Department of Public Works will be responsible to lead the determination and planning of alternate evacuation routes.

After the incident, the Department of Public Works will lead post-tsunami damage assessment and coordinate Public Works mutual aid. The Department of Public Works will also provide for the transportation of fuel and provide for the preparation of gravesites. In addition, the Department will lead planning and implementation of temporary repairs to public infrastructure.

Department of Health and EMS

The Department of Health will act as the lead for ESF 8 – Public Health and Medical Services, during a Tsunami Incident. In addition, the Department of Health will support EMS in response to mass casualty incidents and concerns, and serve as lead to enact preventive health services such as control of communicable diseases.

It is the responsibility of the Department of Health to coordinate the evacuation of patients when deemed appropriate by Territory authorities and provide support to ESF 6 – Mass Care, Emergency Assistance, Housing and Human Services; agencies with laundry services, food preparation and stockpiling commodities.

The Department of Health will coordinate inspection of health hazards in damaged buildings, inspect food supplies, water supplies, drugs and other consumables, and manage post-event mosquito and other vector control.

Other responsibilities include managing logistical support requirements and contacts with private sector vendors, providing policy and guidance on decontamination procedures, and coordinating mental health needs with communities and the Department of Human Services. The Department of Health will also detect and identify possible sources of contamination that threaten the community following a Tsunami Incident.

Department of Human Services

As the lead for ESF 6 – Mass Care, Emergency Assistance, Housing and Human Services, the Department of Health and Human Services will provide for the emergency care and shelter needs of disaster victims. The Department of Human Services will also be responsible for providing public information, mental health services and support, and stress management programs for responders.

Department of Justice

During a Tsunami Incident, the Department of Justice is responsible for the management of mass casualty incidents. Within the Department of Justice, the Medical Examiner provides determination of cause of death and identification of victims. The Department of Justice will also secure temporary and/or permanent cold storage facilities for storing decedents.

Department of Property and Procurement

During a Tsunami Incident, the Department of Property and Procurement will act as lead agency for ESF 1 – Transportation, and ESF 7 – Resource Support. In addition, the Department of Property and Procurement will assist ESF 1 in identifying and arranging for utilization of all types of transportation and assist in the distribution of supplemental commodities.

The Department of Property and Procurement will provide repair services and fuel for emergency vehicles and emergency power, as well as provide facilities, equipment, supplies, private sector ground and air transportation resources and logistical support to Territorial health and medical response operations.

Office of Veterans Affairs

The Office of Veterans Affairs will provide medical and mental health support to ESF 8 – Public Health and Medical Services, operations including triage, medical treatment, and the utilization of surviving VA medical clinics within the disaster area. In addition, the Office of Veterans Affairs will provide available medical supplies for distribution to mass care and medical care locations.

Territorial Coordination Officer

The Territorial Coordination Officer will coordinate requests for assistance from the United States Public Health Service (USPHS), National Disaster Management System (NDMS), National Urban Search and Rescue (US&R) Response System and other relevant federal agencies. The Territorial Coordination Officer will also provide and facilitate interagency coordination.

Department of Education

The Department of Education will provide school nurses to assist in management of health care needs at shelters.

Water and Power Authority

During a Tsunami Incident, the Water and Power Authority will act as lead for ESF 12 – Energy, and provide for power restoration potable water after the incident.

Department of Licensing & Consumer Affairs

The Department of Licensing & Consumer Affairs will assist with the inspection for contamination of foods, water and water products.

American Red Cross

The American Red Cross (ARC) will provide emergency first aid, supportive counseling, health care for minor illnesses and injuries to disaster victims in mass care shelters, recovery centers, distribution centers and other sites deemed necessary by ESF 8 – Public Health and Medical Services. The ARC will provide counseling for the family members of the injured or dead and acquaint families with and make referrals to available health resources and services. At the request of ESF 8, the ARC will provide blood and blood products through the Regional Blood Center in Puerto Rico.

The ARC will provide coordination for the uploading of appropriate casualty/patient information from ESF 8 – Public Health and Medical Services, into the disaster information system within ESF 6 – Mass Care, Emergency Assistance, Housing and Human Services.

St. Croix Rescue, St. Thomas Rescue, and St. John Rescue - Private Non-Profit Organizations

St. Croix Rescue, St. Thomas Rescue, and St. John Rescue organizations will provide extrication, high angle rescue, and marine rescue services and medical backup during a Tsunami Incident.

Department of Agriculture

The Department of Agriculture will act as the lead for ESF 11 – Agriculture and Natural Resources, and support ESF 8 – Public Health and Medical Services, operations with personnel, equipment, food, and supplies. The Department of Agriculture will also provide removal of dead livestock, pets and other carcasses.

Department of Tourism

The Department of Tourism will support VITEMA External Affairs operations, as well as support ESF 6 – Mass Care, Emergency Assistance, Housing and Human Services, and ESF 14 – Long Term Community Authority.

West Indian Company – Dock Master

During a Tsunami Incident, the West Indian Company is responsible for notifying 9-1-1 and keeping them informed of situations and actions, as well as providing periodic updates. The West Indian Company also has the responsibility to inform the USCG National Response Center and the Regional USCG Command of situations and actions. The West Indian Company will send an executive level liaison to respond to the VITEMA EOC, and prepare WICO facilities for recovery operations.

Section 4: Plan Maintenance and Testing, Training and Exercise

Maintenance

The VITEMA Planning Chief is responsible for ensuring that the VITEMA Tsunami Incident Annex remains updated. All changes to the Tsunami Incident Annex must be submitted to the VITEMA Director and the Virgin Islands Emergency Management and Homeland Security Council (EMHS Council) for final approval prior to adoption.

The VITEMA Planning Chief will, on a *yearly basis*, solicit and incorporate suggestions and changes from the EMHS Council, as needed.

Testing, Training, and Exercise

The VITEMA Exercise Coordinator, in cooperation with the VITEMA Planning Chief and the VITEMA Director, will regularly conduct training and exercises to ensure that VITEMA staff and key stakeholders and partners are familiar with the Tsunami Incident Annex. Exercise records will be kept by VITEMA.

Improvement Plan(s) and After Action Report(s) will be developed and kept on file following each exercise. These documents will be utilized for future improvements and updates to the Tsunami Incident Annex.

Section 5: Authorities and References

Authorities

Federal

The National Oceanic and Atmospheric Administration's (NOAA) is specified within The Tsunami Warning and Education Act (22 U.S.C. § § 3201 et seq.) as the lead agency responsible for operating the US Tsunami Warning System and for providing technical assistance and training to the Global Tsunami Warning System. NOAA is responsible for maintaining National Tsunami Warning Centers and for managing the National Tsunami Hazard Mitigation Program (NTHMP).

This Annex has been established utilizing standards set forth in the *National Fire Protection Association 1600: Standard on Disaster/Emergency Management and Business Continuity Programs*, as well as the *Developing and Maintaining Emergency Operation Plans, Comprehensive Preparedness Guide 101 (CPG-101), version 2.0* provided by the Federal Emergency Management Agency.

Territorial

This Annex is applicable to all Territory departments and divisions. The USVI and VITEMA recognize the Tsunami Hazard to the Territory and directed the development of the USVI VITEMA Tsunami Incident Annex.

VITEMA

The principal mission of VITEMA is to protect lives and property by preparing Territorial organizations to respond to, recover from and mitigate against all hazards, through planning, coordinating, and training and exercise activities. VITEMA is the sole USVI government agency designated to supervise, administer and coordinate all-hazards response and recovery operations. Authority is derived from V. I. Code, Title 23, the VITEMA Act (5233) of 1986 and the Emergency Management Act of 2009.

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Polloni, Christopher, USGS, and J. Cook, Woods Hole Oceanographic Institution Graphic Services http://www.whoi.edu/page.do?pid=12460&tid=441&cid=6748&ct=61&article=2430

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West Coast/Alaska Tsunami Warning Center, Operations Manual (NOAA/NWS/WCATWC). 910 South Felton Street, Palmer, Alaska 99645. http://wcatwc.arh.noaa.gov/Products/msgdefs.htm

Woods Hole Oceanographic Institution. Co-op Building, MS #16, Woods Hole, MA 02543. http://www.whoi.edu/page.do?pid=7016


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United States Virgin Islands Emergency Management Agency (VITEMA)

APPENDIX A: ACRONYMS and TERMS

Last Revised: August 22, 2011

Appendix A: Acronyms and Terms

Acronyms	
AAR	After Action Report
AEMEAD	State Agency for Emergency Management and Disaster Administration (in San Juan)
ARC	American Red Cross
CST	Civil Support Team
CTWP	Caribbean Tsunami Warning Program formed with NOAA's NWS
DHS	United States Department of Homeland Security
DPM	Department of Disaster Management (in the British Virgin Islands)
EAS	Emergency Alert System
EMHS Council	Emergency Management Homeland Security Council
EMWIN	Emergency Managers Weather Information Network
EO	Executive Order
EOC	Emergency Operations Center
EOP	Emergency Operations Plan or Procedures
ESF	Emergency Support Function
ETA	Estimated Time of Arrival
FAR	Finance, Administration and Recovery
FEMA	Federal Emergency Management Agency
GIS	Geographic Information Systems
HazMat	Hazardous Materials
IAP	Incident Action Plan
IC	Incident Command
ICS	Incident Command System
NGO	Non-Governmental Organization
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NRF	National Response Framework
NTHMP	National Tsunami Hazard Mitigation Program
NWS	National Weather Service
PDA	Preliminary Damage Assessment
PIO	Public Information Officer
PRSN	Puerto Rican Seismic Network
PTWC	Pacific Tsunami Warning Center
SME	Subject Matter Expert
SOP(s)	Standard Operating Procedure(s)
STJ	Saint John
STT	Saint Thomas
STX	Saint Croix

Acronyms	
TA	Technical Assistance
TCL	Target Capabilities List
TEOP	Territorial Emergency Operations Plan
US	United States
USCG	United States Coast Guard
USGS	United States Geological Survey
USVI	United States Virgin Islands
UTC	Universal Coordinated Time
VI	Virgin Islands
VI Alert	Virgin Island Alert
VITEMA	Virgin Islands Emergency Management Agency
WAPA	Water and Power Authority, USVI
WC/ATWC	West Coast/Alaska Tsunami Warning Center
WCM	Warning Coordination Meteorologist
WICO	West Indian Company
WMO	World Meteorological Organization

Terms	
Amplitude	The rise above or drop below the ambient water level as read on a tide gauge.
Arrival Time	Time of arrival, usually of the first wave of the tsunami, at a particular location.
Bathymetry	The measurements of the depths of the large bodies of water (i.e. oceans, seas).
Crest	The high point, peak or top of a wave.
Earthquake	Sudden slip on a fault, and the resulting ground shaking and radiated seismic energy caused by the slip, or by volcanic or magmatic activity, or other sudden stress changes in the earth.
Estimated Time of Arrival	Computed arrival time of the first tsunami wave at coastal communities after a specific earthquake has occurred.
First Motion	Initial motion of the first wave, a rise in the water level is denoted by R, a fall by F.
Horizontal Inundation Distance	The distance that a tsunami wave penetrates onto the shore, measured horizontally from the mean sea level position of the water's edge. Usually measured as the maximum distance for a particular segment of the coast.
Inundation	The depth, relative to a stated reference level, to which a particular location is covered by water.
Inundation Area	An area that is flooded with water.
Inundation Line (limit)	The inland limit of wetting measured horizontally from the edge of the coast defined by mean sea level.
Local/Regional Tsunami	Source of the tsunami within 1000 km of the area of interest. Local or near-field tsunami has a very short travel time (30 minutes or less), mid-field or regional tsunami waves have travel times on the order of 30 minutes to 2 hours. Note: "Local" tsunami is sometimes used to refer to a tsunami of landslide origin.
National Oceanic and Atmospheric Administration	The federal agency responsible for tsunami warnings and monitoring. Part of the Department of Commerce.
National Weather Service(NWS)	Branch of NOAA which operates the Tsunami Warning Centers and disseminates warnings.
Normal Earthquake	An earthquake caused by slip along a sloping fault where the rock above the fault moves downwards relative to the rock below.
Pacific Tsunami Warning Center (PTWC)	Responsible for issuing warnings to Hawaii, to US interests in the Pacific other than the west coast and Alaska, to countries located throughout the Pacific, and to all Caribbean communities except Puerto Rico and the USVI.

Terms	
Period	The length of time between two successive peaks or troughs. May vary due to complex interference of waves. Tsunami periods generally range from 5 to 60 minutes.
Puerto Rican Seismic Network (PRSN)	The mission of the PRSN is to inform in a reliable and timely manner the generation and effects of earthquakes and tsunamis for Puerto Rico and Virgin Islands.
Run-up	Maximum height of the water onshore observed above a reference sea level. Usually measured at the horizontal inundation limit.
Teletsunami	Source of the tsunami more than 1000 km away from area of interest. Also called a *distant-source* or *far-field* tsunami.
Tidal Wave	Common term for tsunami used in older literature, historical descriptions and popular accounts. Fast-moving tidal bores do occur in some unique coastal areas, but tides, caused by the gravitational attractions of the sun and moon, may increase or decrease the impact of a tsunami, but have nothing to do with their generation or propagation. However, most tsunamis (initially) give the appearance of a fast-rising tide or fast-ebbing as they approach shore and only rarely as a near-vertical wall of water.
Travel Time	Time (usually measured in hours and tenths of hours) that it took the tsunami to travel from the source to a particular location.
Trough	The low point, or bottom of a wave. The depression between wave crests.
Tsunami	A Japanese term derived from the characters "tsu" meaning harbor and "nami" meaning wave. Now generally accepted by the international scientific community to describe a series of travelling waves in water produced by the displacement of the sea floor associated with submarine earthquakes, volcanic eruptions, or landslides.
Tsunami Earthquake	A tsunamigenic earthquake which produces a much larger tsunami than expected for its magnitude.
Tsunamigenic Earthquake	Any earthquake which produces a measurable tsunami.
Tsunami Magnitude	A number which characterizes the strength of a tsunami based on the tsunami wave amplitudes. Several different tsunami magnitude determination methods have been proposed.
United States National Seismic Network	Operated by the USGS. Monitors, in real-time, magnitude (M)>5 earthquake activity worldwide and M>3 in conterminous US.
Universal Coordinated Time	International common time system (formerly GMT, Greenwich Mean Time).

Terms	
USVI	The United States Virgin Islands, including St. Croix, St. John, St. Thomas and Water Island.
Warning Coordination Meteorologist	Regional weather service person responsible for providing information on the Tsunami Warning System to local agencies.
West Coast/ Alaska Tsunami Warning Center (WA/ATWC)	Established in 1967 originally to issue warnings to Alaska of local tsunami events. WC/ATWC is now responsible for issuing warnings for any event likely to impact either Alaska, the west coast of the US, or the Pacific coast of Canada.
Vertical Evacuation	Evacuation from one floor(s) to the floor(s) below or above. In the case of a tsunami threat, this shelter-in-place option would involve evacuating persons to the upper floors of a substantial structure.

Sources for Terms listed in this table:

http://nthmp-history.pmel.noaa.gov/terms.html

http://earthquake.usgs.gov/learn/glossary/?term=earthquake

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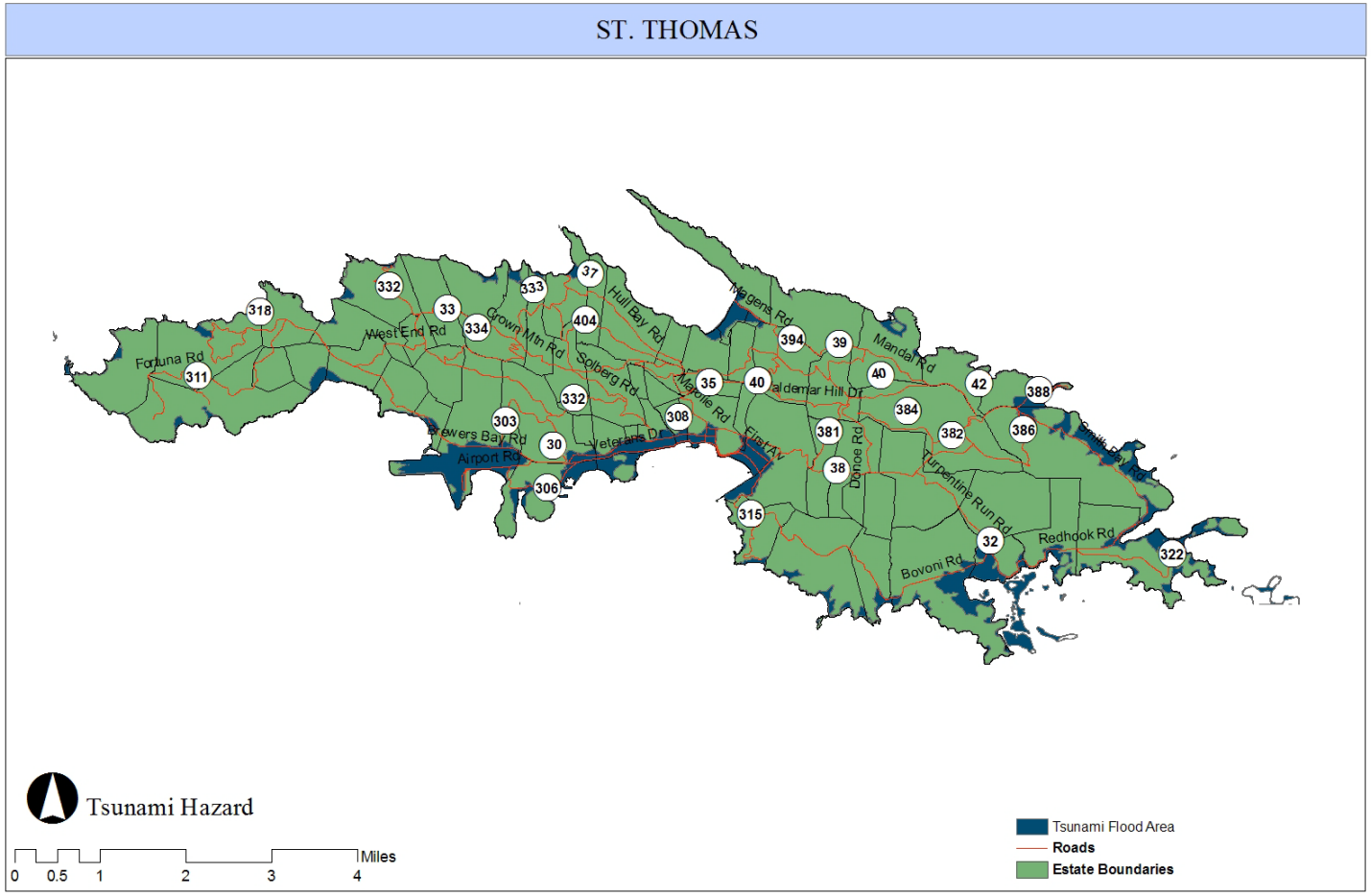
APPENDIX B: INUNDATION MAPS

Last Revised: August 22, 2011

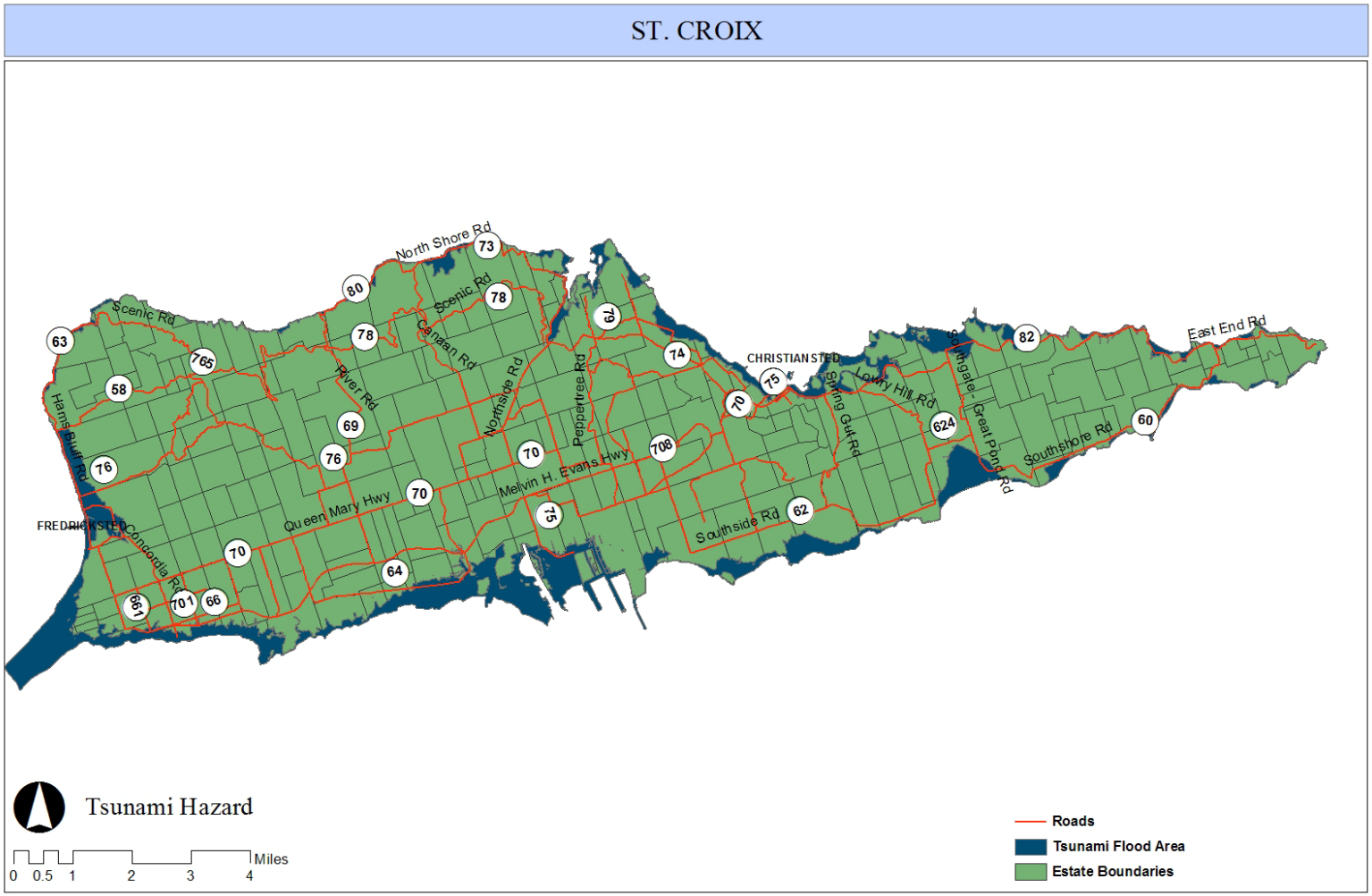
Appendix B: Tsunami Inundation Maps

The following maps, along with more detailed information on tsunami risk can found in Section 4 of the **United States Virgin Islands Territorial Hazard Mitigation Plan**.

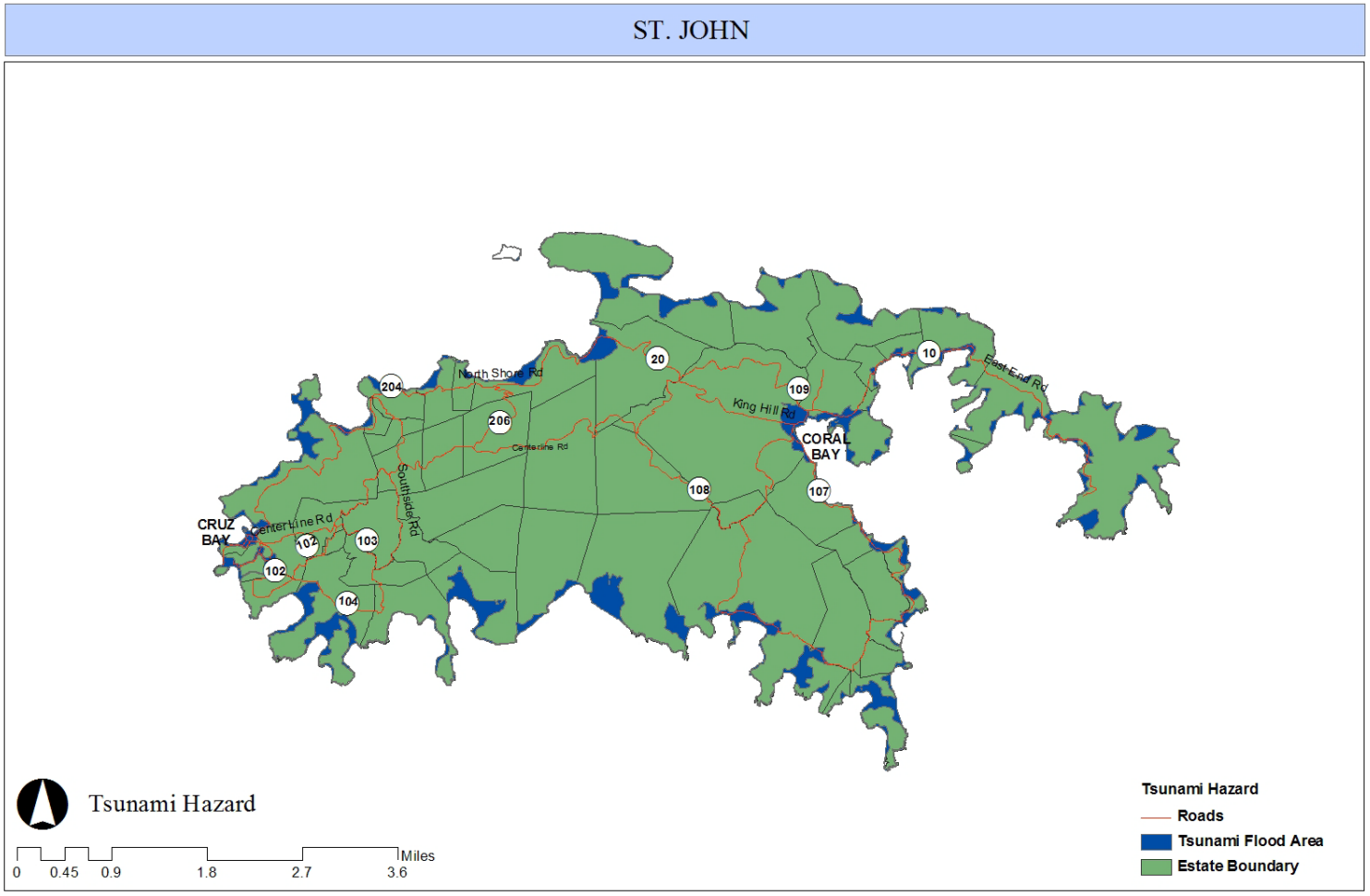
Tsunami Hazard Map, St. Thomas



Tsunami Hazard Map, St. Croix



Tsunami Hazard Map, St. John



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APPENDIX C: MEDIA MESSAGING GUIDE

Last Revised: August 22, 2011

Appendix C: Media Messaging Guide

Introduction

The purpose of this Appendix is to provide a guide for USVI media on the methods of dissemination of emergency messaging from USVI officials in the event of a Tsunami Incident. The information that follows was reported in a document entitled, *Tsunami: Guide for the Media of Puerto Rico*, produced by The Puerto Rico Seismic Network (PRSN). The Media Guide was produced in accordance with the National Tsunami Hazard Mitigation Program, established by the National Oceanic and Atmospheric Administration (NOAA), to provide clear and accurate information in regards to the means of communications utilized by the government during a Tsunami Incident. It is the goal of the Media Guide to aid local media in their efforts to help the USVI communicate messaging during a Tsunami Incident in a clear and timely fashion.

Origin of Information Distribution

For Puerto Rico and the USVI there are two agencies which issue tsunami information – the West Coast and Alaska Tsunami Warning Center (WC/ATWC) and the PRSN. Tsunami information is sent from both agencies to four (4) focal points for distribution. Those four points are the National Weather Service, the State Agency for Emergency Management and Disaster Administration (AEMEAD) in San Juan, the Department of Disaster Management in the British Virgin Islands (DDM), and the Virgin Island Emergency Management Agency (VITEMA) through the 9-1-1 Centers in Saint Thomas and Saint Croix. It is the responsibility of VITEMA to disseminate the information to the general public.

Alert Messaging

In the event of a Tsunami Incident, alert messages will be issued to Puerto Rico and the USVI. The NWS will activate the Emergency Alert System (EAS) which will broadcast a recorded message by NOAA. These messages will use several different codes when broadcasting an EAS. The code indicates the level of Tsunami Alert, the location of the incident, the time of arrival of the tsunami, and the action to be taken. The codes are as follows:

Code	Meaning
TSW	Tsunami Warning
TSA	Tsunami Watch
SPS	Special Weather Statement
CEM	Civil Emergency Message

Emergency Managers Weather Information Network

The Emergency Managers Weather Information Network (EMWIN) is a system developed by the NWS to convey essential and timely information to emergency responders. The system uses different methods of primary communication – radio, internet, and satellite. These methods are intended to provide data to users who currently do not have any or can afford very little. Other methods are available at higher costs to the end-user including various commercial weather distribution systems. EMWIN is a supplement to other NWS dissemination services which include:

- NOAA Weather Radio (NWR)
- NOAA Weather Wire System (NWWS)
- Family of Services (FOS)
- NOAAPORT, and
- NEXRAD Information Dissemination Service (NIDS)

EAS Alert Levels

EAS messages are provided in a bulletin format. The bulletins are distributed to the areas in the proximity of or that may be affected by the Tsunami Incident by the PRSN and the WC/ATWC. The type of alert message that is included in the bulletin depends on the analysis of seismic data and the level of the sea. The bulletin will state the codes previously described above to classify the emergency notification, then a dialog box will follow that explains briefly the significance of each message's warning and the actions suggested to the general public. Each type of EAS message has a different meaning and suggested action.

Message	Meaning	Suggested Action
Warning	Inundating wave possible	Full evacuation suggested
Watch	Danger level not yet known	Stay alert for more information
Advisory	Strong	Stay away from the shore
Information Statement: No tsunami	Minor waves at most	No action suggested

In addition, the Tsunami Warning Bulletins produced by the WC/ATWC are identified by codes that they are assigned for the pertinent authorities: the World Meteorological Organization (WMO) and the National Weather Service (NWS).

The identifiers of the WMO are:

- WEXX20
- WEXX22
- SEXX60
- WEXX30 and
- WEXX32

The identifiers of the NWS are:

- TSUAT1
- TIBAT1
- EQIAT1
- TSUATE
- TIBATE

The chart produced below illustrates the connections between the identifiers and the alert messages they convey.

WMO Header	NWS AWIPS ID	Explanation
WEXX20 PAAQ	TSUAT1	Tsunami Warning/Watch/Advisory
WEXX22 PAAQ	TIBAT1	Tsunami Information Statement
WEXX30 PAAQ	TSUATE	Public Tsunami Warning/Watch/Advisory
WEXX32 PAAQ	TIBATE	Public Tsunami Information Statement
SEXX60 PAAQ	EQIAT1	Tsunami Information Statement

Provided at the end of this document is a sample message with each section previously discussed in this Appendix identified. It is strongly suggested that this document, as well as the full report provided by the PRSN, be used by USVI to create a *Media Guide* to inform local media within the USVI of messaging procedures and to promote understanding of messaging terminology.

Sample Message

WCATWC Message #7

```
WEXX20 PAAQ 231601
```

WMO Header

```
TSUAT1
```

NWS AWIPS ID

```
BULLETIN
TSUNAMI MESSAGE NUMBER 7
NWS WEST COAST/ALASKA TSUNAMI WARNING CENTER PALMER AK
1201 PM AST WED MAR 23 2011
```

Date and hour of the message.

Updating the level of warning

```
THIS MESSAGE DOWNGRADES THE WARNING TO AN ADVISORY FOR
PUERTO RICO AND THE VIRGIN ISLANDS.
```

Area for which the warning is in effect.

Identifies the level of warning in effect

```
... A TSUNAMI ADVISORY IS NOW IN EFFECT FOR PUERTO RICO AND
THE VIRGIN ISLANDS...
```

Identifies the areas that are not under the Warning, Advisory, and/or Watch of tsunami.

```
...THIS MESSAGE IS INFORMATION ONLY FOR COASTAL AREAS OF
TEXAS - LOUISIANA - MISSISSIPPI - ALABAMA - FLORIDA -
GEORGIA - SOUTH CAROLINA - NORTH CAROLINA - VIRGINIA -
MARYLAND - DELAWARE - NEW JERSEY - NEW YORK - CONNECTICUT -
RHODE ISLAND - MASSACHUSETTS - NEW HAMPSHIRE - MAINE - NEW
BRUNSWICK - NOVA SCOTIA - NEWFOUNDLAND AND LABRADOR FROM
BROWNSVILLE TEXAS TO CAPE CHIDLEY LABRADOR...
```

Action recommended for the areas affected.

RECOMMENDED ACTIONS
PERSONS IN LOW-LYING COASTAL AREAS SHOULD BE ALERT TO INSTRUCTIONS FROM THEIR LOCAL EMERGENCY OFFICIALS. EVACUATIONS ARE ONLY ORDERED BY EMERGENCY RESPONSE AGENCIES.
- PERSONS IN TSUNAMI ADVISORY AREAS SHOULD MOVE OUT OF THE WATER... OFF THE BEACH AND OUT OF HARBORS AND MARINAS.

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United States Virgin Islands Emergency Management Agency (VITEMA)

APPENDIX D: SAMPLE EVACUATION ORDER

Last Revised: August 22, 2011

Appendix D: Sample Evacuation Order

EXECUTIVE ORDER NO. (####)

WHEREAS, the United States Virgin Islands has been placed under a Tsunami Warning by the National Oceanic and Atmospheric Administration (NOAA) West Coast/Alaska Tsunami Warning Center (WC/ATWC) Puerto Rico Seismic Network (PRSN) and the National Weather Service (NWS). It was estimated that the wave will arrive here at approximately *(date/time);* and

WHEREAS, tsunamis—like hurricanes—are potentially dangerous even though they may not strike each coastline or do damage when they strike, the effects of this event have the potential to generate great damage to our Territory;

WHEREAS, effective at *(date/time)* today, I have declared that a State of Emergency exists within the Territory; and

WHEREAS, I hereby declare that all state and local government agencies perform all emergency functions as assigned in the Emergency Operations Plan or as directed by the Director, Virgin Islands Territory Emergency Management Agency (VITEMA) during this State of Emergency.

NOW THEREFORE, by the virtue of the power and authority vested in me as Governor pursuant to the Constitution and the laws of the Territory, I hereby order a mandatory evacuation of the following areas:

1. _____
2. _____
3. _____
4. _____
5. _____

This mandatory evacuation order is effective at *(date/time)* . The scope of this Order may be expanded to include such areas as are identified on a county-by-county basis by local emergency management officials for people who are deemed to be in immediate danger.

GIVEN UNDER MY HAND AND THE
GREAT SEAL OF THE TERRITORY,

Date

Governor

ATTEST

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ASSOCIATES

Tsunami Incident Annex 2011

United States Virgin Islands Emergency Management Agency (VITEMA)

APPENDIX E: POTENTIAL ASSEMBLY AREAS

Last Revised: August 22, 2011

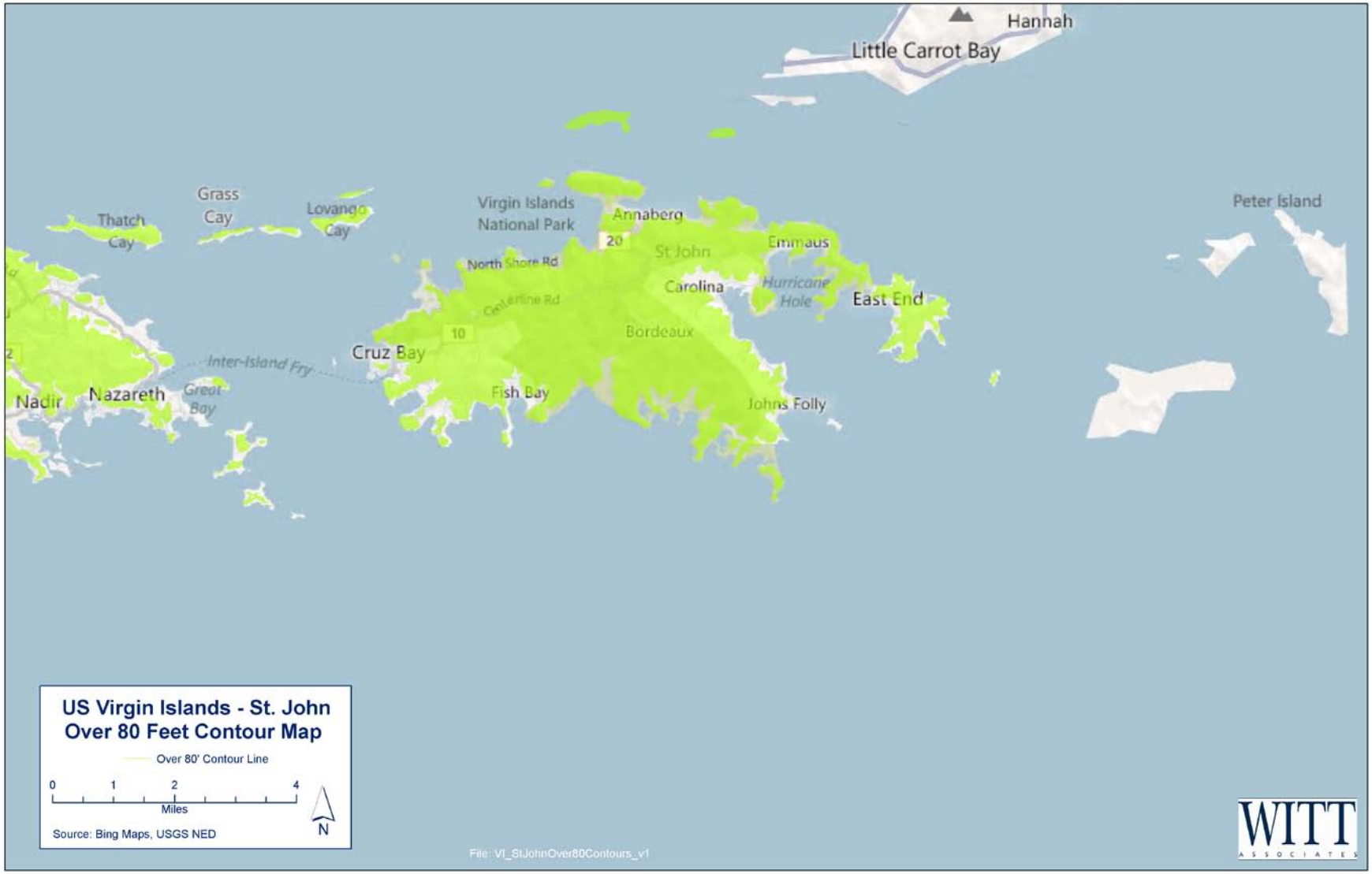
Appendix E: Potential Assembly Areas

An assembly area is a designated outside location which is on higher ground or inland from coastal waters. Identified assembly areas defined assembly points after evacuation.

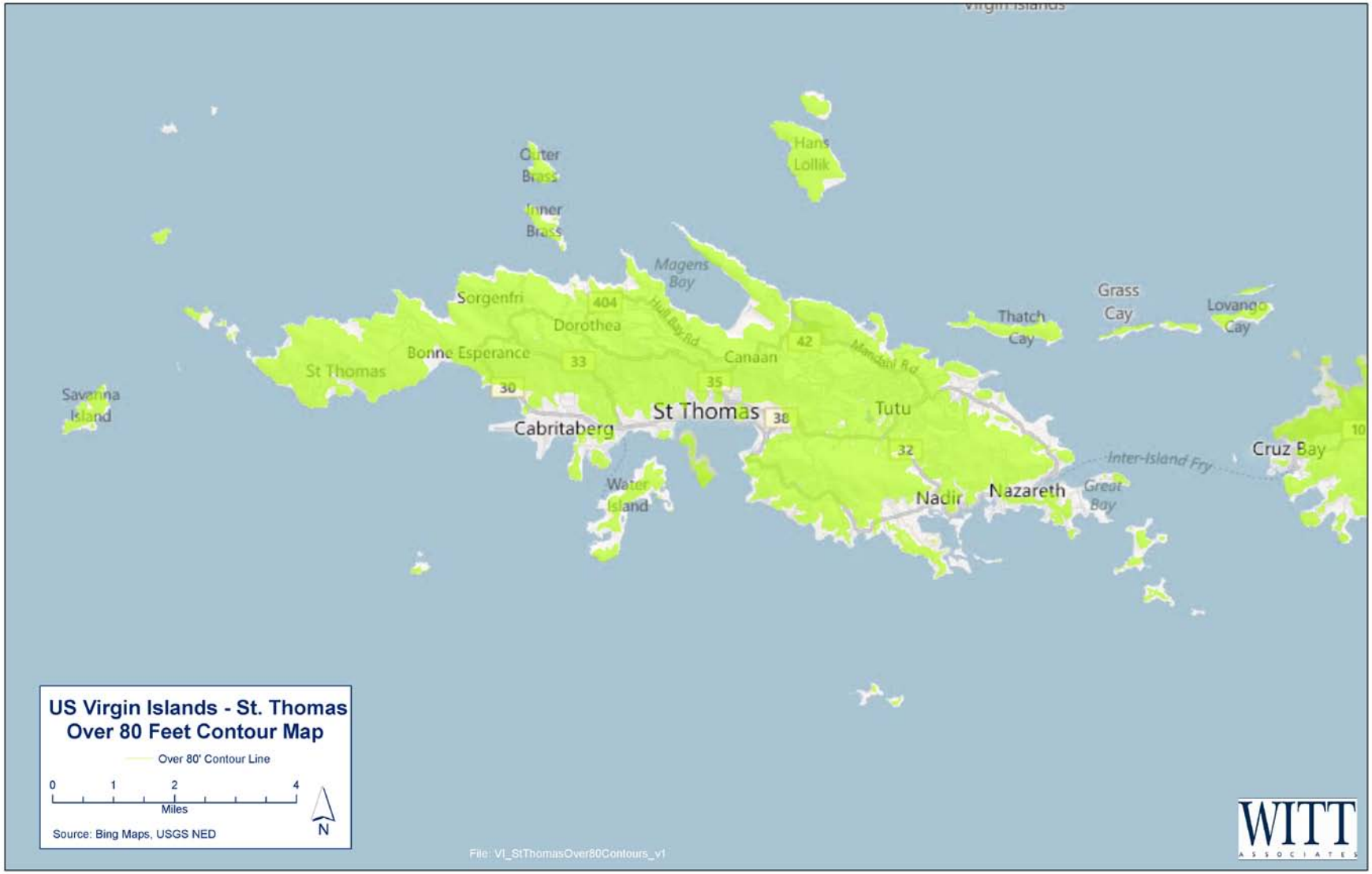
The maps that follow are intended to be planning tools that may aid VITEMA in choosing assembly areas based on the estimated elevation throughout the island. The following maps indentify areas between 60 – 80 feet in elevation and areas above 80 feet in elevation.

Saint Croix – Potential Assembly Areas Above 80 feet in Elevation

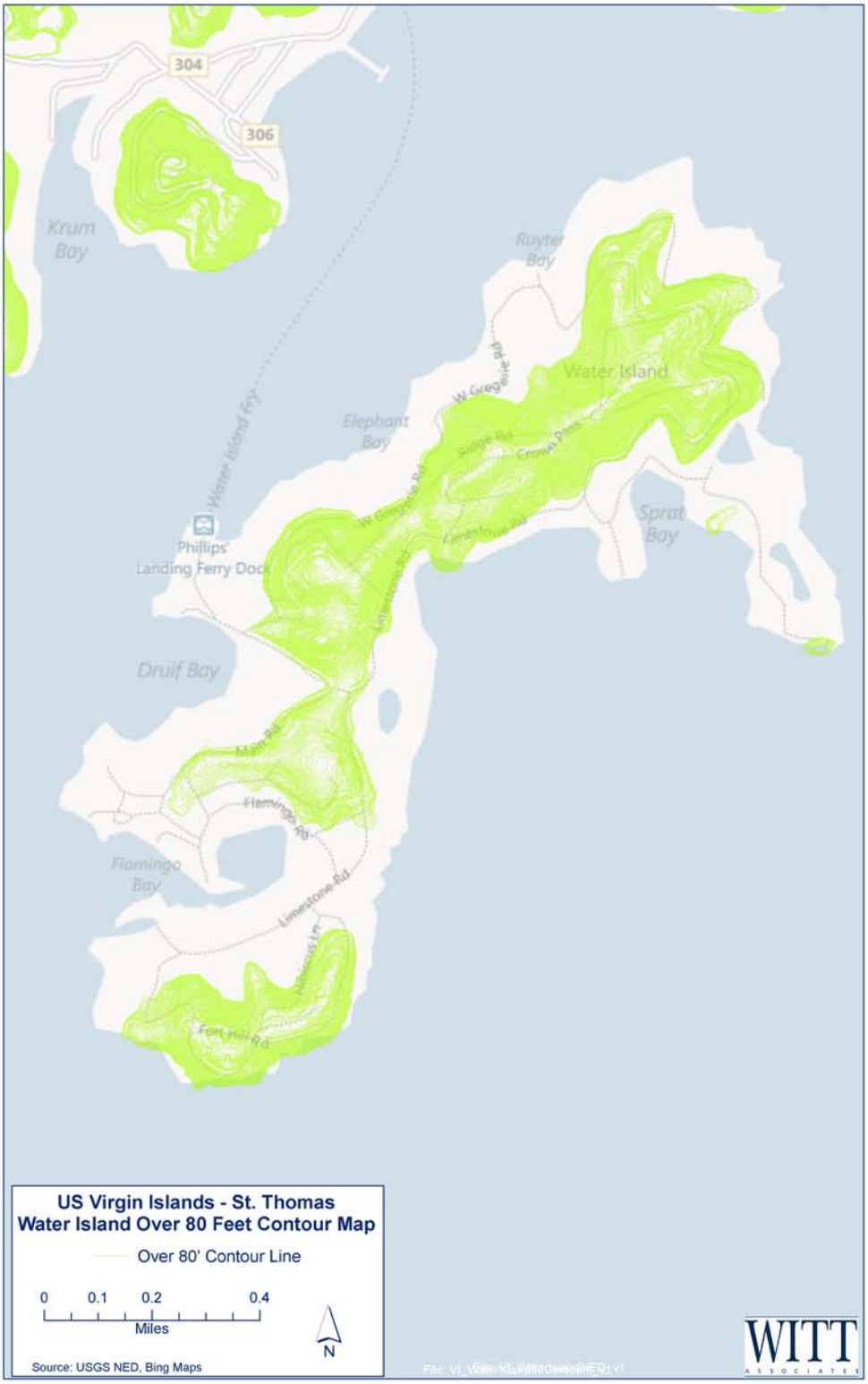
Saint John – Potential Assembly Areas Above 80 feet in Elevation



Saint Thomas – Potential Assembly Areas Above 80 feet in Elevation

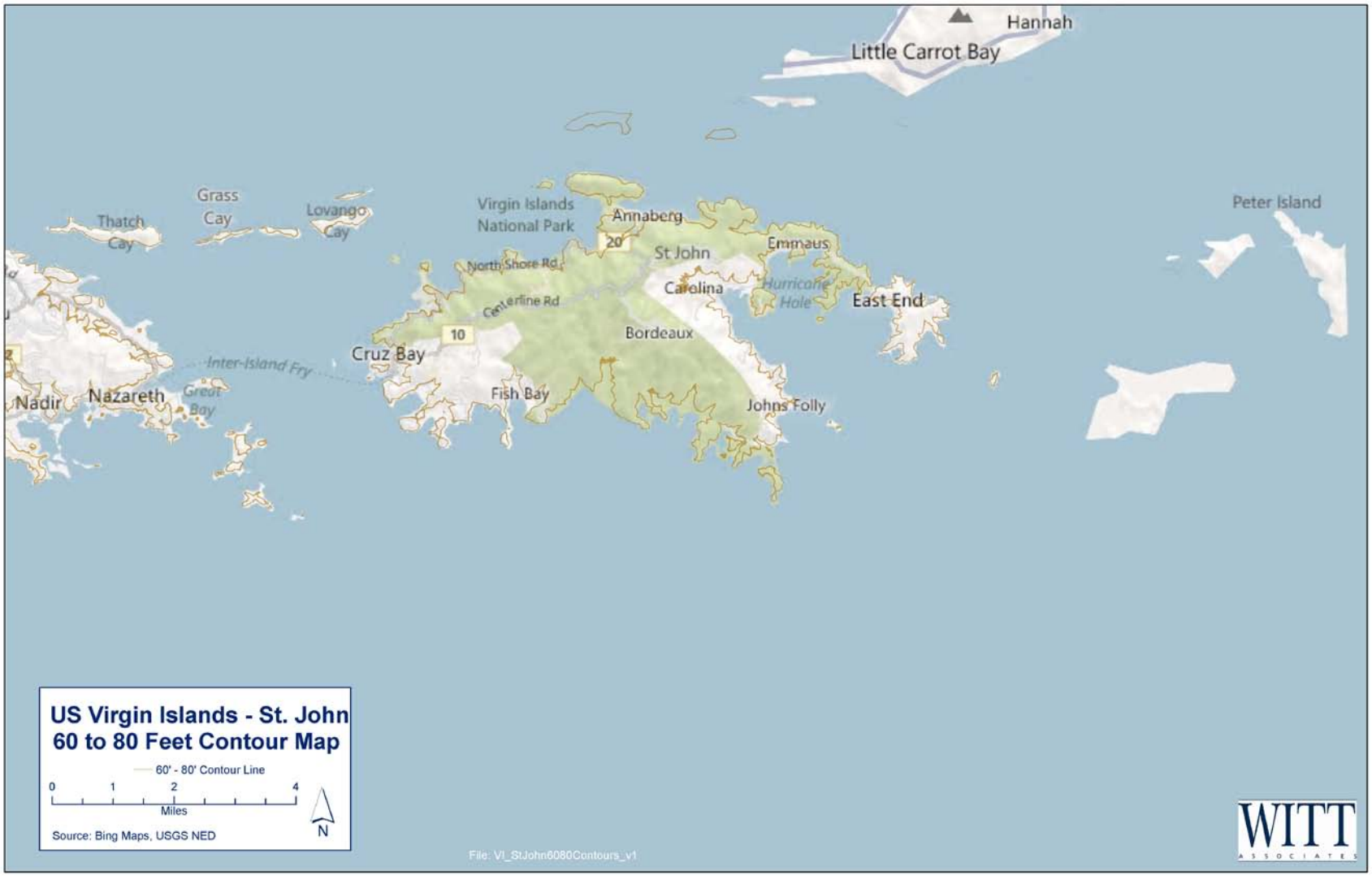


Water Island – Potential Assembly Areas Above 80 feet in Elevation

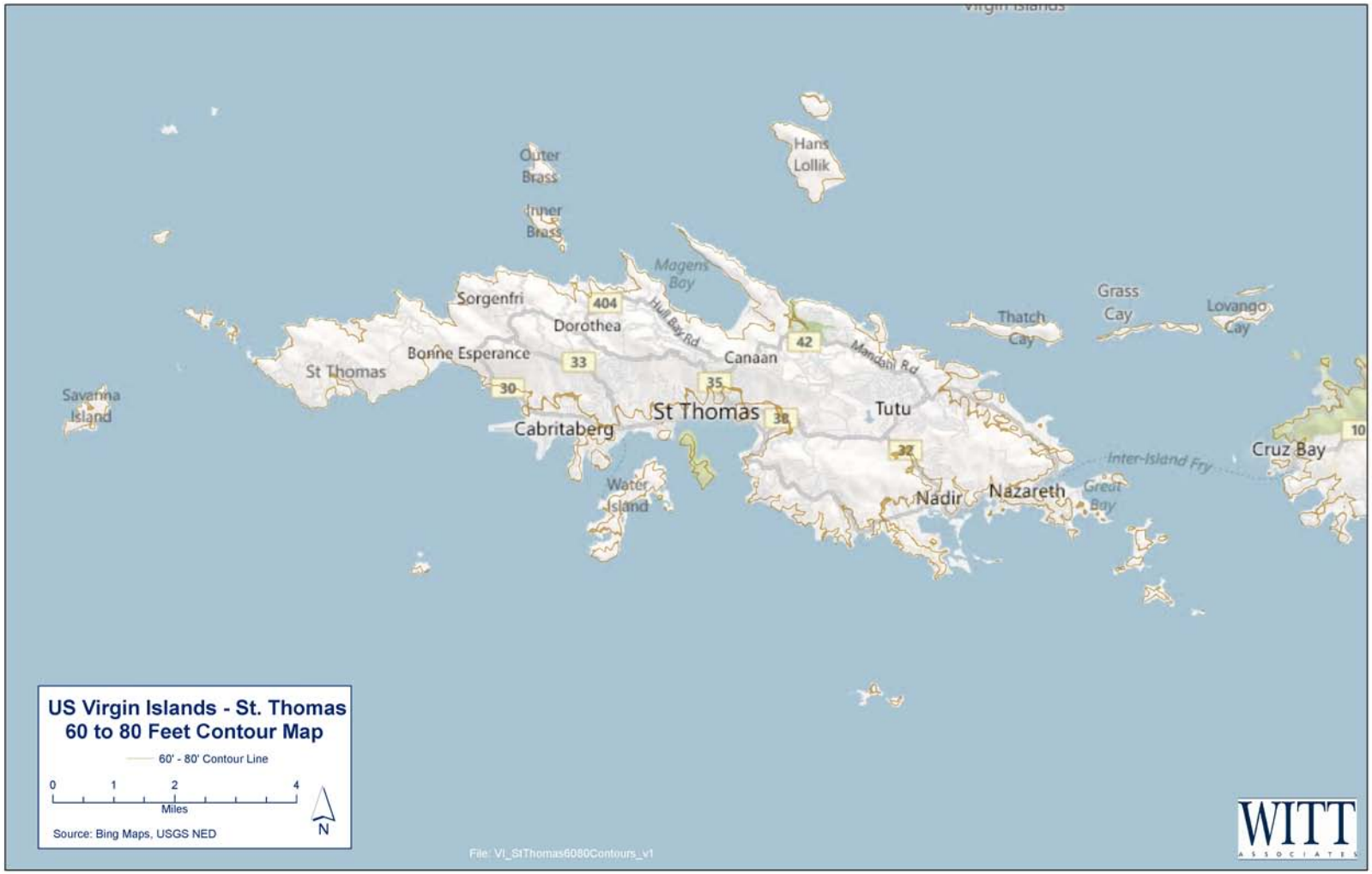


Saint Croix – Potential Assembly Areas – 60 to 80 feet in Elevation

Saint John – Potential Assembly Areas – 60 to 80 feet in Elevation



Saint Thomas – Potential Assembly Areas – 60 to 80 feet in Elevation



Water Island – Potential Assembly Areas – 60 to 80 feet in Elevation

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APPENDIX F: POPULATED PLACES ABOVE 80 FEET ELEVATION

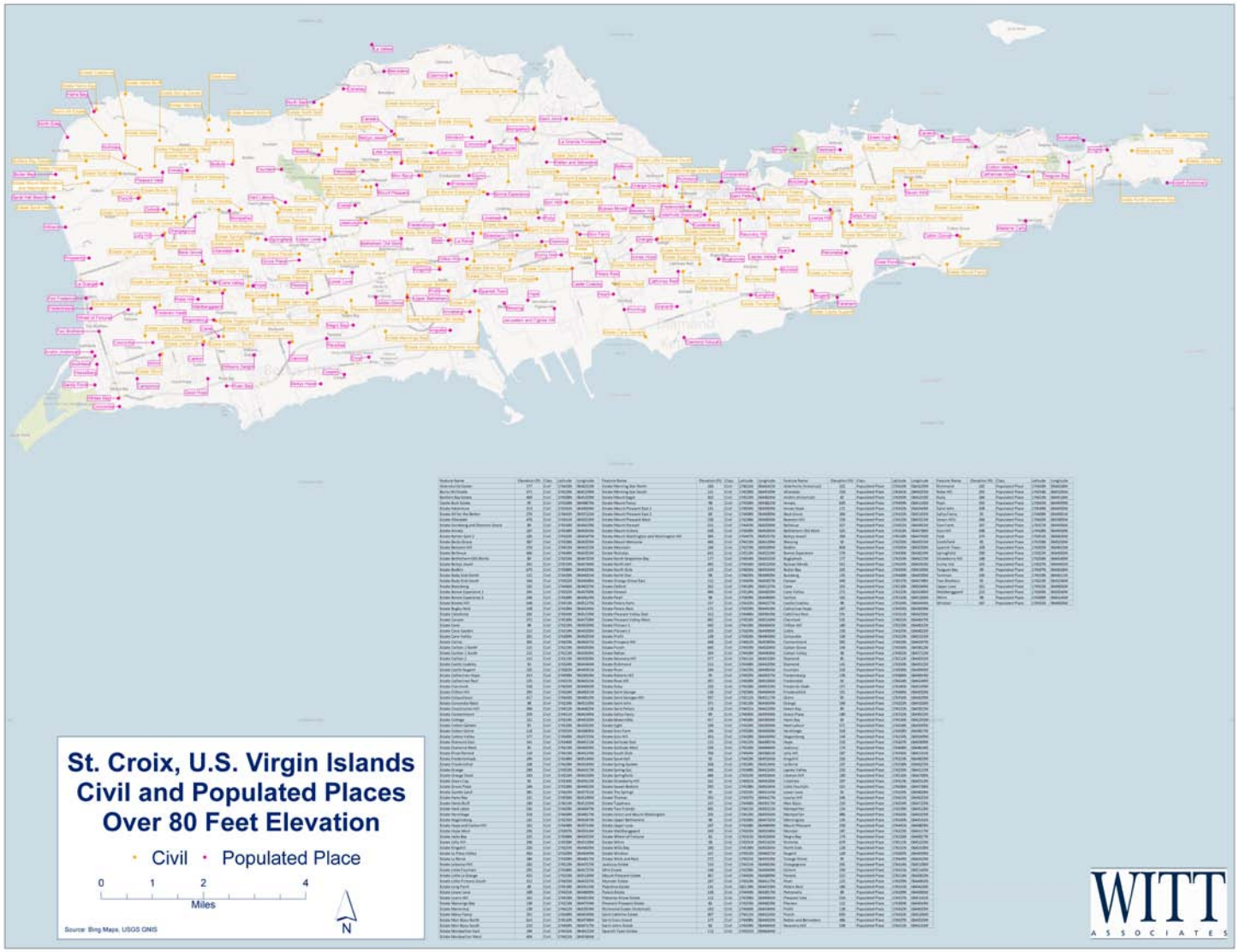
Last Revised: August 22, 2011

Appendix F: Populated Places Above 80 Feet Elevation

The maps that follow are intended to be planning tools that may aid VITEMA in choosing assembly areas based on the estimated elevation throughout the island. The following maps indentify populated places above 80 feet in elevation.

The following maps are presented in small format for information purposes only. Large Format (ANSI E 32" x 44") digital files are available at VITEMA for copy reproduction and ease of reading the information contained therein.

Saint Croix – Populated Places Above 80 Feet in Elevation Map



Saint Croix – Populated Places Above 80 Feet in Elevation Table

Feature Name	Elevation (ft)	Class	Latitude	Longitude
Alderhvile (historical)	325	Populated Place	174416N	0644229W
Aldershville Estate	177	Civil	174433N	0644252W
Allandale	318	Populated Place	174341N	0645025W
Andrin (historical)	82	Populated Place	174203N	0645253W
Annaly	659	Populated Place	174459N	0645116W
Annas Hope	171	Populated Place	174342N	0644344W
Beck Grove	384	Populated Place	174331N	0645101W
Beeston Hill	259	Populated Place	174412N	0644321W
Bellevue	427	Populated Place	174452N	0644401W
Bethlehem Old Work	105	Populated Place	174353N	0644738W
Betzys Jewell	358	Populated Place	174534N	0644745W
Blessing	92	Populated Place	174250N	0644553W
Bodkin	804	Populated Place	174505N	0645030W
Bonne Esperance	279	Populated Place	174436N	0644610W
Bugbyhole	177	Populated Place	174333N	0644215W
Bulows Minde	551	Populated Place	174425N	0644342W
Burns Hill Estate	571	Civil	174533N	0645239W
Butler Bay	102	Populated Place	174455N	0645330W
Buttlers Bay Estate	469	Civil	174508N	0645259W
Butzberg	135	Populated Place	174448N	0644039W
Canaan	440	Populated Place	174537N	0644748W
Cane	102	Populated Place	174218N	0645044W
Cane Valley	272	Populated Place	174310N	0645048W
Carlton	102	Populated Place	174210N	0645100W
Castle Burk Estate	95	Civil	174328N	0644807W
Castle Coakley	98	Populated Place	174324N	0644444W
Catharinas Hope	187	Populated Place	174453N	0643659W
Cathrines Rest	151	Populated Place	174321N	0644256W
Clairmont	535	Populated Place	174631N	0644647W
Clifton Hill	180	Populated Place	174333N	0644631W
Coble	230	Populated Place	174425N	0644825W
Concordia	128	Populated Place	174212N	0645151W
Contentment	282	Populated Place	174410N	0644247W
Cotton Grove	144	Populated Place	174356N	0643812W
Cotton Valley	98	Populated Place	174502N	0643712W
Diamond	85	Populated Place	174212N	0644932W
Diamond	141	Populated Place	174350N	0644515W
Estate Adventure	213	Civil	174241N	0644834W

Feature Name	Elevation (ft)	Class	Latitude	Longitude
Estate All for the Better	276	Civil	174441N	0643722W
Estate Allandale	476	Civil	174341N	0645019W
Estate Annaberg and Shannon Grove	89	Civil	174243N	0644619W
Estate Annaly	167	Civil	174548N	0645054W
Estate Barren Spot 2	105	Civil	174332N	0644547W
Estate Becks Grove	387	Civil	174328N	0645059W
Estate Beeston Hill	259	Civil	174413N	0644322W
Estate Bellevue	466	Civil	174444N	0644355W
Estate Bethlehem Old Works	89	Civil	174253N	0644732W
Estate Betsys Jewel	341	Civil	174533N	0644744W
Estate Bodkin	673	Civil	174508N	0645029W
Estate Body Slob North	121	Civil	174429N	0644631W
Estate Body Slob South	164	Civil	174352N	0644648W
Estate Boetzberg	102	Civil	174446N	0644037W
Estate Bonne Esperance 1	344	Civil	174555N	0644700W
Estate Bonne Esperance 2	246	Civil	174438N	0644614W
Estate Brooks Hill	548	Civil	174413N	0645127W
Estate Bugby Hole	138	Civil	174328N	0644234W
Estate Caledonia	292	Civil	174543N	0645219W
Estate Canaan	371	Civil	174538N	0644758W
Estate Cane	98	Civil	174218N	0645039W
Estate Cane Garden	112	Civil	174218N	0644329W
Estate Cane Valley	331	Civil	174309N	0645055W
Estate Carina	302	Civil	174423N	0644037W
Estate Carlton 1 North	115	Civil	174213N	0645059W
Estate Carlton 1 South	115	Civil	174213N	0645059W
Estate Carlton 2	115	Civil	174213N	0645059W
Estate Castle Coakley	92	Civil	174324N	0644444W
Estate Castle Nugent	102	Civil	174302N	0644041W
Estate Catherines Hope	213	Civil	174458N	0643654W
Estate Catherines Rest	125	Civil	174321N	0644251W
Estate Clairmont	528	Civil	174633N	0644642W
Estate Clifton Hill	203	Civil	174324N	0644631W
Estate Colquohoun	417	Civil	174443N	0644814W
Estate Concordia West	98	Civil	174219N	0645159W
Estate Constitution Hill	394	Civil	174411N	0644402W
Estate Contentment	259	Civil	174411N	0644249W
Estate Cottage	121	Civil	174314N	0644520W
Estate Cotton Garden	85	Civil	174533N	0643453W

Feature Name	Elevation (ft)	Class	Latitude	Longitude
Estate Cotton Grove	118	Civil	174355N	0643809W
Estate Cotton Valley	177	Civil	174509N	0643725W
Estate Diamond East	141	Civil	174346N	0644511W
Estate Diamond West	82	Civil	174213N	0644929W
Estate Elizas Retreat	118	Civil	174413N	0644124W
Estate Frederikshaab	194	Civil	174248N	0645144W
Estate Friedensthal	108	Civil	174428N	0644244W
Estate Grange	200	Civil	174353N	0644317W
Estate Grange Stock	243	Civil	174318N	0644156W
Estate Green Cay	92	Civil	174530N	0643912W
Estate Grove Place	184	Civil	174338N	0644922W
Estate Gumbs Land	381	Civil	174423N	0643751W
Estate Hams Bay	131	Civil	174558N	0645249W
Estate Hams Bluff	190	Civil	174613N	0645219W
Estate Hard Labor	545	Civil	174428N	0644947W
Estate Hermitage	318	Civil	174458N	0644817W
Estate Hogensborg	131	Civil	174233N	0645047W
Estate Hope and Carton Hill	161	Civil	174448N	0643714W
Estate Hope West	236	Civil	174307N	0645014W
Estate Jacks Bay	223	Civil	174508N	0643423W
Estate Jolly Hill	246	Civil	174358N	0645139W
Estate Kingshill	226	Civil	174325N	0644659W
Estate La Press Valley	463	Civil	174328N	0644044W
Estate La Reine	184	Civil	174358N	0644617W
Estate Lebanon Hill	282	Civil	174523N	0644707W
Estate Little Fountain	292	Civil	174508N	0644737W
Estate Little La Grange	423	Civil	174333N	0645149W
Estate Little Princess South	312	Civil	174453N	0644337W
Estate Long Point	89	Civil	174518N	0643513W
Estate Lower Love	108	Civil	174321N	0644839W
Estate Lowry Hill	161	Civil	174418N	0644019W
Estate Mannings Bay	138	Civil	174223N	0644754W
Estate Marienhoj	138	Civil	174421N	0643959W
Estate Marys Fancy	351	Civil	174448N	0644549W
Estate Mon Bijou North	614	Civil	174510N	0644748W
Estate Mon Bijou South	210	Civil	174454N	0644717W
Estate Montpellier East	194	Civil	174541N	0644522W
Estate Montpellier West	404	Civil	174421N	0645044W
Estate Morning Star North	184	Civil	174615N	0644541W

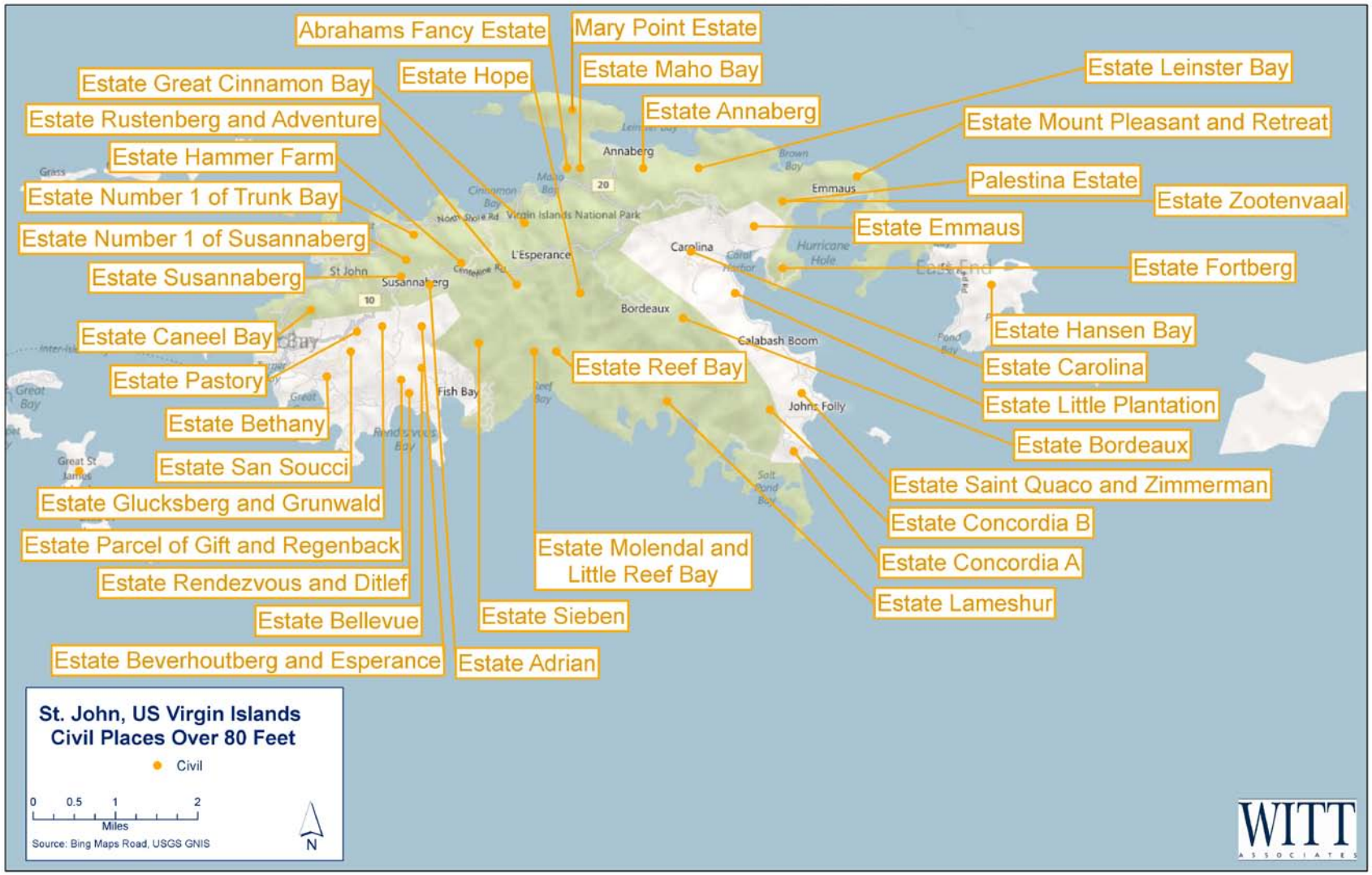
Feature Name	Elevation (ft)	Class	Latitude	Longitude
Estate Morning Star South	121	Civil	174528N	0644539W
Estate Mount Eagle	502	Civil	174523N	0644824W
Estate Mount Fancy	98	Civil	174328N	0643822W
Estate Mount Pleasant East 1	131	Civil	174503N	0643959W
Estate Mount Pleasant East 2	89	Civil	174408N	0644009W
Estate Mount Pleasant West	236	Civil	174238N	0644903W
Estate Mount Stewart	515	Civil	174443N	0645039W
Estate Mount Victory	538	Civil	174500N	0645204W
Estate Mount Washington and Washington Hill	384	Civil	174447N	0645257W
Estate Mount Welcome	446	Civil	174413N	0644139W
Estate Mountain	184	Civil	174253N	0645009W
Estate Nicholas	643	Civil	174513N	0645219W
Estate North Grapetree Bay	177	Civil	174454N	0643525W
Estate North Hall	495	Civil	174456N	0645224W
Estate North Slob	125	Civil	174503N	0643554W
Estate North Star	98	Civil	174603N	0644859W
Estate Orange Grove East	112	Civil	174443N	0644307W
Estate Oxford	262	Civil	174418N	0645137W
Estate Parasol	486	Civil	174518N	0644859W
Estate Pearl	98	Civil	174309N	0644400W
Estate Peters Farm	157	Civil	174422N	0644227W
Estate Peters Rest	171	Civil	174333N	0644419W
Estate Pleasant Valley East	312	Civil	174448N	0643819W
Estate Pleasant Valley West	682	Civil	174503N	0645149W
Estate Plessen 1	430	Civil	174418N	0644944W
Estate Plessen 2	105	Civil	174303N	0644909W
Estate Profit	138	Civil	174303N	0644649W
Estate Prospect Hill	348	Civil	174452N	0645309W
Estate Punch	640	Civil	174433N	0645204W
Estate Rattan	394	Civil	174458N	0644458W
Estate Recovery Hill	577	Civil	174411N	0644159W
Estate Richmond	213	Civil	174348N	0644239W
Estate River	184	Civil	174423N	0644854W
Estate Roberts Hill	95	Civil	174503N	0644037W
Estate Rose Hill	597	Civil	174508N	0645106W
Estate Ruby	220	Civil	174418N	0644519W
Estate Saint George	138	Civil	174258N	0644944W
Estate Saint Georges Hill	597	Civil	174311N	0645117W
Estate Saint John	371	Civil	174513N	0644424W

Feature Name	Elevation (ft)	Class	Latitude	Longitude
Estate Saint Peters	118	Civil	174431N	0644129W
Estate Sallys Fancy	89	Civil	174406N	0643959W
Estate Seven Hills	417	Civil	174450N	0643859W
Estate Sight	180	Civil	174426N	0643939W
Estate Sion Farm	184	Civil	174359N	0644439W
Estate Sion Hill	354	Civil	174428N	0644449W
Estate Solitude East	115	Civil	174512N	0643801W
Estate Solitude West	528	Civil	174520N	0644844W
Estate South Slob	256	Civil	174454N	0643601W
Estate Sprat Hall	92	Civil	174423N	0645324W
Estate Spring Garden	568	Civil	174528N	0645144W
Estate Spring Gut	446	Civil	174348N	0644154W
Estate Springfield	486	Civil	174353N	0645004W
Estate Strawberry Hill	161	Civil	174401N	0644530W
Estate Sweet Bottom	295	Civil	174538N	0645034W
Estate The Springs	95	Civil	174255N	0644114W
Estate Thomas	335	Civil	174437N	0644417W
Estate Tipperary	167	Civil	174448N	0643917W
Estate Two Friends	495	Civil	174421N	0645021W
Estate Union and Mount Washington	105	Civil	174413N	0643924W
Estate Upper Bethlehem	98	Civil	174258N	0644732W
Estate Upper Love	187	Civil	174358N	0644849W
Estate Waldberggaard	249	Civil	174303N	0645038W
Estate Wheel of Fortune	82	Civil	174241N	0645204W
Estate Whim	98	Civil	174201N	0645142W
Estate Wills Bay	180	Civil	174538N	0645054W
Estate Windsor	157	Civil	174542N	0644627W
Estate Work and Rest	272	Civil	174321N	0644319W
Fountain	318	Populated Place	174500N	0644940W
Fredensborg	138	Populated Place	174406N	0644654W
Fredensdal	92	Populated Place	174424N	0644244W
Frederiks Haab	157	Populated Place	174246N	0645149W
Friedensfeld	151	Populated Place	174446N	0644650W
Glynn	85	Populated Place	174454N	0644629W
Grange	194	Populated Place	174352N	0644318W
Green Kay	89	Populated Place	174531N	0643915W
Grove Place	180	Populated Place	174332N	0644922W
Hams Bay	85	Populated Place	174556N	0645251W
Hard Labour	571	Populated Place	174428N	0644936W

Feature Name	Elevation (ft)	Class	Latitude	Longitude
Hermitage	318	Populated Place	174458N	0644817W
Hogensborg	144	Populated Place	174234N	0645049W
Hope	210	Populated Place	174307N	0645009W
Jealousy	174	Populated Place	174408N	0644814W
Jealousy Estate	154	Civil	174411N	0644819W
Jolly Hill	187	Populated Place	174356N	0645141W
Kingshill	226	Populated Place	174323N	0644659W
La Reine	197	Populated Place	174358N	0644625W
Laprey Valley	233	Populated Place	174335N	0644111W
Libanon Hill	180	Populated Place	174516N	0644708W
Limetree	197	Populated Place	174413N	0644552W
Little Fountain	315	Populated Place	174506N	0644738W
Lower Love	92	Populated Place	174320N	0644828W
Lowrys Hill	246	Populated Place	174421N	0644021W
Mint Estate	148	Civil	174258N	0644949W
Mon Bijou	210	Populated Place	174454N	0644720W
Montpellier	154	Populated Place	174539N	0644523W
Montpellier	486	Populated Place	174420N	0645033W
Morningstar	135	Populated Place	174530N	0644541W
Mount Pleasant	230	Populated Place	174445N	0644803W
Mount Pleasant Estate	367	Civil	174443N	0644809W
Munster	187	Populated Place	174323N	0644117W
Munster Estate	187	Civil	174323N	0644117W
Negro Bay	174	Populated Place	174229N	0644827W
Nicholas	679	Populated Place	174511N	0645220W
North Side	128	Populated Place	174531N	0645318W
Nugent	128	Populated Place	174302N	0644039W
Orange Grove	95	Populated Place	174444N	0644310W
Orangegrove	295	Populated Place	174414N	0645108W
Oxford	299	Populated Place	174421N	0645140W
Palestina Estate	131	Civil	182118N	0644220W
Parara Estate	128	Civil	174443N	0643917W
Parasol	522	Populated Place	174514N	0644902W
Patience Grove Estate	112	Civil	174338N	0644844W
Pearl	125	Populated Place	174259N	0644402W
Peters Rest	184	Populated Place	174331N	0644420W
Petronella	89	Populated Place	174339N	0644005W
Pleasant Prospect Estate	82	Civil	174253N	0644829W
Pleasant Vale	554	Populated Place	174457N	0645141W

Feature Name	Elevation (ft)	Class	Latitude	Longitude
Plessen	112	Populated Place	174300N	0644914W
Profit	138	Populated Place	174302N	0644650W
Punch	650	Populated Place	174432N	0645206W
Rattan and Belvedere	486	Populated Place	174507N	0644510W
Recovery Hill	538	Populated Place	174411N	0644153W
Richmond	102	Populated Place	174443N	0644258W
Richmond Estate (historical)	243	Civil	174446N	0644349W
Robe Hill	292	Populated Place	174254N	0645105W
Ruby	184	Populated Place	174413N	0644518W
Ryan	292	Populated Place	174341N	0644059W
Saint Cathrine Estate	407	Civil	174411N	0644224W
Saint Croix Island	177	Civil	174408N	0644453W
Saint John	108	Populated Place	174549N	0644450W
Saint Johns Estate	82	Civil	174549N	0644444W
Sallys Fancy	95	Populated Place	174409N	0644001W
Seven Hills	266	Populated Place	174445N	0643905W
Sion Farm	187	Populated Place	174357N	0644436W
Sion Hill	348	Populated Place	174428N	0644450W
Slob	174	Populated Place	174351N	0644650W
Smithfield	85	Populated Place	174159N	0645250W
Spanish Town	108	Populated Place	174302N	0644623W
Spanish Town Estate	112	Civil	174331N	0644624W
Springfield	289	Populated Place	174352N	0644956W
Strawberry Hill	148	Populated Place	174356N	0644540W
Sunny Isle	105	Populated Place	174337N	0644455W
Teagues Bay	98	Populated Place	174507N	0643618W
Testman	144	Populated Place	174519N	0644011W
Two Brothers	95	Populated Place	174223N	0645246W
Upper Love	161	Populated Place	174352N	0644856W
Waldberggaard	223	Populated Place	174300N	0645040W
Whim	98	Populated Place	174200N	0645144W
Windsor	167	Populated Place	174531N	0644626W

Saint John – Populated Places Above 80 Feet in Elevation Map

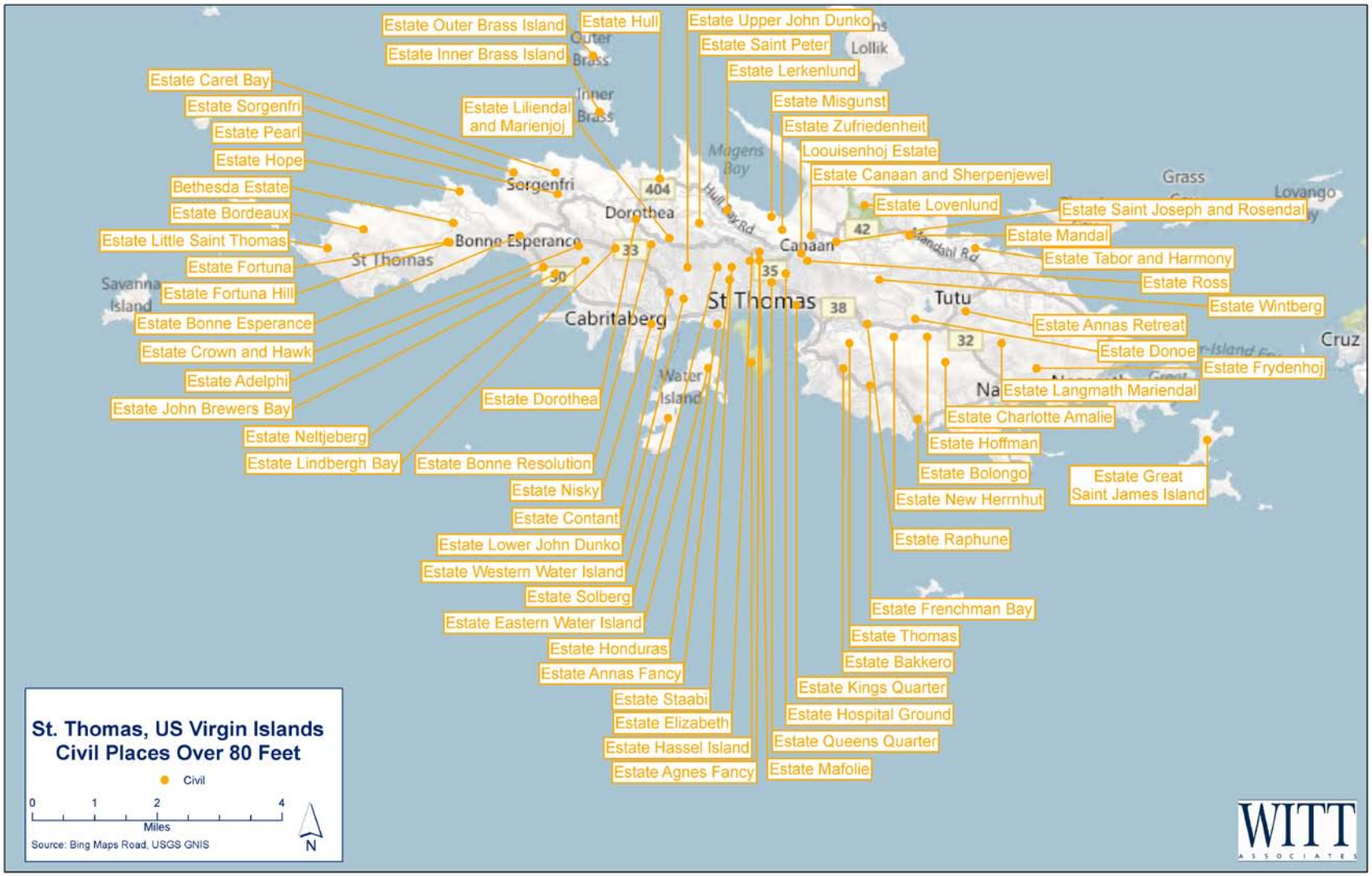


Saint John – Populated Places Above 80 Feet in Elevation Table

Feature Name	Elevation (ft)	Class	Latitude	Longitude
Abrahams Fancy Estate	112	Civil	182138N	0644436W
Adrian	591	Populated Place	182029N	0644606W
Annaberg	82	Populated Place	182147N	0644348W
Bethany	390	Populated Place	181952N	0644658W
Bordeaux	1168	Populated Place	182007N	0644315W
Estate Adrian	623	Civil	182028N	0644603W
Estate Annaberg	397	Civil	182138N	0644348W
Estate Bellevue	479	Civil	181938N	0644608W
Estate Bethany	108	Civil	181933N	0644708W
Estate Beverhoutberg and Esperance	587	Civil	182003N	0644608W
Estate Bordeaux	971	Civil	182008N	0644323W
Estate Caneel Bay	522	Civil	182013N	0644718W
Estate Carolina	108	Civil	182048N	0644318W
Estate Concordia A	295	Civil	181848N	0644213W
Estate Concordia B	394	Civil	181913N	0644228W
Estate Emmaus	374	Civil	182103N	0644238W
Estate Fortberg	312	Civil	182038N	0644220W
Estate Glucksberg and Grunwald	390	Civil	182003N	0644633W
Estate Great Cinnamon Bay	322	Civil	182105N	0644503W
Estate Hammer Farm	722	Civil	182041N	0644543W
Estate Hansen Bay	420	Civil	182028N	0644008W
Estate Hope	299	Civil	182023N	0644428W
Estate Lameshur	154	Civil	181918N	0644333W
Estate Leinster Bay	236	Civil	182138N	0644313W
Estate Little Plantation	200	Civil	182023N	0644250W
Estate Maho Bay	249	Civil	182138N	0644428W
Estate Molendal and Little Reef Bay	551	Civil	181948N	0644457W
Estate Mount Pleasant and Retreat	315	Civil	182133N	0644133W
Estate Number 1 of Susannaberg	686	Civil	182043N	0644618W
Estate Number 1 of Trunk Bay	397	Civil	182058N	0644613W
Estate Orange Grove West	436	Civil	174414N	0645119W
Estate Parcel of Gift and Regenback	791	Civil	181931N	0644621W
Estate Pastory	361	Civil	182000N	0644649W
Estate Reef Bay	328	Civil	181948N	0644443W
Estate Rendezvous and Ditlef	492	Civil	181923N	0644616W
Estate Rustenberg and Adventure	794	Civil	182028N	0644508W
Estate Saint Quaco and Zimmerman	262	Civil	181923N	0644208W

Feature Name	Elevation (ft)	Class	Latitude	Longitude
Estate San Soucci	315	Civil	181948N	0644653W
Estate Sieben	640	Civil	181953N	0644532W
Estate Susannaberg	640	Civil	182033N	0644621W
Estate Zootenvaal	131	Civil	182118N	0644220W
Johns Folly	98	Populated Place	181910N	0644212W
L'Esperance	564	Populated Place	182025N	0644533W
Mary Point Estate	492	Civil	182213N	0644433W
Mollendal	459	Populated Place	181945N	0644505W
Monte	197	Populated Place	181915N	0644634W
Mount Pleasant	420	Populated Place	182121N	0644411W
Reef Bay	308	Populated Place	181946N	0644416W
Saint John Island	397	Civil	181939N	0644416W
Sieben	571	Populated Place	181951N	0644537W
Susannaberg	627	Populated Place	182029N	0644622W

Saint Thomas – Populated Places Above 80 Feet in Elevation Map



Saint Thomas – Populated Places Above 80 Feet in Elevation Table

Feature Name	Elevation (ft)	Class	Latitude	Longitude
Adelphi	269	Populated Place	18.348289	-64.983481
Adrian	591	Populated Place	18.341343	-64.768471
Annaberg	82	Populated Place	18.363009	-64.730137
Barrett	472	Populated Place	18.365234	-64.945979
Benner	95	Populated Place	18.322177	-64.861808
Bethany	390	Populated Place	18.331065	-64.782916
Bonne Esperance	676	Populated Place	18.354400	-64.987092
Bordeaux	1168	Populated Place	18.335232	-64.720970
Bordeaux (historical)	135	Populated Place	18.361344	-65.013760
Bovoni	141	Populated Place	18.314677	-64.892087
Canaan	427	Populated Place	18.357177	-64.920700
Caret Bay Estate	794	Populated Place	18.363845	-64.975980
Contant	341	Populated Place	18.341901	-64.955980
Cowell Battery	249	Populated Place	18.325789	-64.932645
Donoe	253	Populated Place	18.336621	-64.897643
Dorothea	784	Populated Place	18.358567	-64.961813
Ensomned	121	Populated Place	18.368012	-64.952368
Estate Thomas	269	Populated Place	18.339677	-64.910977
Fortuna (historical)	879	Populated Place	18.353011	-65.005426
Hoffman	174	Populated Place	18.333565	-64.894865
John Oley	325	Populated Place	18.359678	-64.997092
Johns Folly	98	Populated Place	18.319399	-64.703469
Lerkenlund	558	Populated Place	18.360234	-64.940146
L'Esperance	564	Populated Place	18.340232	-64.759304
Lilliendahl	1056	Populated Place	18.354401	-64.952091
Louisenhoj	794	Populated Place	18.351067	-64.924867
Lovenlund	167	Populated Place	18.359121	-64.910977
Mafolie	801	Populated Place	18.352456	-64.931534
Mandal	217	Populated Place	18.355510	-64.898476
Misgen	715	Populated Place	18.354400	-64.931812
Mollendal	459	Populated Place	18.329121	-64.751526
Monte	197	Populated Place	18.320788	-64.776249
Mount Pleasant	420	Populated Place	18.355787	-64.736526
Nazareth	125	Populated Place	18.320788	-64.854863
Neltjeberg	705	Populated Place	18.366067	-64.972924
Peterborg	272	Populated Place	18.371622	-64.925422
Raphune	394	Populated Place	18.334399	-64.909032
Reef Bay	308	Populated Place	18.329399	-64.737915

Feature Name	Elevation (ft)	Class	Latitude	Longitude
Resolution	994	Populated Place	18.354401	-64.956536
Rosendal	433	Populated Place	18.352177	-64.912088
Santa Maria Estate	971	Populated Place	18.358567	-64.978202
Sieben	571	Populated Place	18.330788	-64.760415
Solberg	610	Populated Place	18.347457	-64.941813
Sorgenfri	614	Populated Place	18.365511	-64.982925
Susannaberg	627	Populated Place	18.341343	-64.772916
Tutu	197	Populated Place	18.338843	-64.886531
Zambee	1109	Populated Place	18.356067	-64.976536

Water Island – Populated Places Above 80 feet in Elevation

Populated Places Geographic Information System (GIS) data for Water Island was not available at the time of this printing.

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WITT ASSOCIATES

Tsunami Incident Annex 2011

United States Virgin Islands Emergency Management Agency (VITEMA)

APPENDIX G: PUBLIC EDUCATION CAMPAIGN

Last Revised: August 22, 2011

Appendix F: Public Education Campaign

Introduction

Public education is vital in preparing citizens to respond properly to tsunami threats. An educated public is more likely to take steps to receive tsunami warnings, recognize potentially threatening tsunami events, and respond appropriately to those events.

As the population make up of the Virgin Islands will change with the influx of tourists during tourist season, it is necessary then to adjust any education campaign to account for these populations separately. Through the guidelines set forth in this outreach strategy, VITEMA will develop a public outreach plan that will help develop consistent messages, identify communication and outreach approaches and tactics, coordinate efforts, and guide future public outreach and communications initiatives to the Virgin Island's general public. After this, a second set of guidelines is provided to target information to tourists who will be on the islands for only a brief duration.

General Public Outreach Strategy

A report produced by the California Emergency Management Agency, titled *The State of Public Readiness in California and How to Increase It: Final Report*, provides evidence that there are two factors which are central to motivating the public to prepare for disasters such as tsunamis. Those two factors are:

Consistent Messaging

The public needs to receive **consistent** messaging from various sources that provide preparedness information regarding what actions to take, how to reduce losses, and where to find more information. This information needs to be presented in as many ways as possible through multiple mediums in an ongoing, continuous manner.

Physical Cues

Members of the public are more likely to take action if they see physical/visual cues from others, such as friends establishing evacuation routes to utilize while under threat of a tsunami, government offices creating evacuation plans and establishing meeting locations at points of elevation 60 feet above sea level or higher, or family and friends subscribing to VITEMA's *VI Alert* notification system.

Vision

The vision for this strategy, or the ultimate outcome it seeks to achieve, includes the following:

Before a Tsunami
▪ US Virgin Islanders take active steps to ready themselves, their families, their businesses, and their communities for earthquakes.
▪ US Virgin Islanders perpetuate a self-sustaining culture of preparedness by sharing their preparedness activities with one another.
During a Tsunami
▪ US Virgin Islanders take appropriate action to minimize disaster-associated injuries, loss of life, and property damage.
After a Tsunami
• US Virgin Islanders survive, recover and thrive.

Mission

The mission of this strategy is to foster a culture of tsunami preparedness in the USVI.

Goals

The goals of this strategy are to:

- Further develop the awareness of, engagement in, and support for the plan and a stakeholder coalition among internal audiences.
- Cultivate collaboration among stakeholder coalition members.
- Build and maintain a community of tsunami-ready USVI Citizens who, by demonstrating their preparedness activities within their social circles, can help foster tsunami preparedness as a social movement as well as all-hazard preparedness.
- Expand the community of those prepared for a tsunami by reaching out to those who are not yet engaged in tsunami preparedness activities.

Outreach Strategy

While implementing a plan based on consistent messaging and physical cues, it will be important for VITEMA to first facilitate collaboration among stakeholders from around the USVI community. Forming a coalition of community stakeholders interested and engaged in tsunami preparedness will allow VITEMA to successfully reach a broader audience through its coalition members than VITEMA would on its own.

This plan will unfold in three (3) phases, and they are as follows:

Phase I

The first phase concentrates efforts on reaching out to other government agencies that are already preparing for a Tsunami Event as a means of recruiting them to join the coalition. This provides a platform for coordinating efforts and sharing capabilities.

Phase II

The second phase takes an innovative approach to tsunami preparedness education. These efforts target individuals who have already demonstrated an interest in tsunami preparedness. This phase fosters a community of individuals with an interest in preparedness. The coalition supports these individuals/groups during their efforts to "virally" expand the coalition as they talk to their peers, share messages/information, and provide visual cues to others.

This approach is designed to be effective at an online as well as at grassroots, local and Territory-wide levels, and is scalable to meet any effort. Coalition members also coordinate delivery of consistent messages to audiences and media. A *rapid-response team* is created to opportunistically reach out to the media when events, such as earthquakes, occur that will bring tsunami preparedness to the forefront of the public's consciousness.

Phase III

The third phase takes a step back to analyze how the community coalition has grown and to identify whether any groups have been left out of this movement. The coalition targets those groups directly rather than going through the targeted groups identified in Phase II to help make them part of the larger community.

This strategy is designed to provide a *basic structure for collaboration*, not to impose an operational or work plan on members of the coalition group. It is not intended to set up a reporting structure to hold participating agencies accountable. This plan is meant to set the direction of the group and to establish larger overarching goals. It is the basis for future collaboration in both operational and work planning efforts and begins the process of knitting existing programs together to achieve greater efficiencies and effectiveness.

The purpose of this strategy is to ensure that a wide variety of coalition members are involved in the development of the coalition's operational plan to maximize the buy-in and ownership of the specific objectives.

Recommendations

While forming the final public outreach plan from the strategy outlined above, utilize the following recommendations:

- Build and maintain a coalition of tsunami preparedness advocates, agencies and organizations in USVI to foster coordination and collaboration of communications efforts, including pooling resources and using consistent messaging among coalition member agencies and grassroots organizations at the Territory and local levels.

- Determine and promote consistent conceptual messaging that will foster a culture of preparedness and self-reliance among US Virgin Islanders.

- Develop coalition strategies that are informed by current social science research in tsunami preparedness and on innovative communications techniques and best practices.

- Build and maintain a community of individuals and groups that have previously engaged in tsunami preparedness activities and empower those "community members" to reach out to others.

- Identify and reach out to those who are not engaged in activities, but are receptive to tsunami preparedness messaging with the goal of engaging them in the community by taking part in tsunami preparedness activities.

- Promote use of this strategy as a guide for agencies and organizations across the USVI as a means of implementing the above recommendations to improve the efficacy of tsunami preparedness outreach in the USVI.

- The USVI should participate in the National Weather Service program "**Tsunami Ready**". The Tusnami Ready program is designed to help cities, towns, counties, universities and other large sites in coastal areas reduce the potential for disastrous tsunami-related consequences. Further information can be found here: http://www.tsunamiready.noaa.gov/

Tourism Specific Outreach

Crisis management strategies are needed to help retain the confidence of tourists and the travel industry, and to minimize the impact of a crisis on the tourist destination. The best way to help minimize the impact of a tsunami event is to be well prepared. Whether the US Virgin Islands is preparing its own residents or visitors, the techniques for preparing effectively can be very similar. Good communications based on the principles of honesty and transparency is the key to successful crisis management, but other tourism specialties also need to be involved.

To assist with this tourism outreach, the following guidelines suggest specific actions to take before a crisis:

A) Communications

- *Preparation of a Tsunami Plan*
  Reach out and involve public services and private tourism companies in the planning process for a Tsunami Incident and update the plan annually. This will also aid in establishing ongoing dialogue and relationships within the tourist industry.

- *Designate Spokespersons*
  Tourism organizations should designate spokespersons for their organization. Information provided to the media during a crisis must be authoritative and coordinated. The designated spokesperson should be a high ranking official, but not necessarily the top person in the organization. Organizations should also have additional spokespersons for redundancy or to rotate periodically during the event. Practice and train spokespersons using mock news conferences and exercises.

- *Communicate Regularly with Media*
  Encourage tourism organizations to establish communications with local media. Relationships can take years to develop, therefore it is important to communicate frequently in good times as well as bad. An established quality relationship with local media will aid efforts during a Tsunami Event when information needs to be disseminated quickly.

B) Promotion and Planning

- *Develop a Database of Tourism Entities in the Territory*
  Database should include all tourism organizations within the Territory as well as major travel agencies and transport companies.

- *Encourage Tourist Organizations to Improve Communication of Safety Issues with Tourists*
  Tourism entities should make tourist safety and emergency information available on their websites and at their facilities.

  Information provided should include, but is not limited to:

  - Emergency telephone numbers;
  - Tsunami Warning Signs/Alerts and Explanations;
  - Evacuation maps with designated routes;
  - Minimum safe elevation during a Tsunami Incident; and the
  - Importance of keeping photocopies of travel documents.

Encourage tourism organizations to establish a consistent effort to promote this information to their guests.

C) Tourist Industry Involvement

- *Establish a Working Relationship between Government Departments Responsible for Safety and Security and the Tourism Industry*
  Decisions made by police agencies and emergency services have a great influence on how a crisis involving tourists is managed. Suggest starting a Safety and Security working group to bring these partners together on a regular basis to discuss tourism not only in regards to a tsunami incident but overall tourism safety issues as well.

- *Encourage Tourism Industry to get Involved in Defining Evacuation Procedures*
  Tourism authorities need to make sure they are aware of all evacuation measures planned during a tsunami event. Review the entire tourism chain—airport arrivals, ground transport, hotels, restaurants, shopping zones and all tourist sites with members of the tourism industry. This will allow the tourism industry to understand actions that will need to be taken at each of these locations during a tsunami incident.

- *Encourage tourism organizations to train local personnel for tsunami events*
  Staff should be well trained and exercised in the Territories plans and procedures for a tsunami event.

D) Monitor to be Prepared

- *Establish Strong Contacts for Information Exchange*
  Set up reciprocal agreements with major hotels, airlines, and tour operators to exchange up-to-the-minute data on occupancy levels. Build a system capable of exchanging your data with these key partners.

- *Monitor Hospital Admissions Involving Tourists*
  Information on *non-crisis* situation hospital admissions of tourists can be used as a point of comparison to put any possible problems in the future in a proper perspective. This information will also be needed after a Tsunami Event during the recovery phase.

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